Prevalence and socioeconomic inequality in screen time, phone, and tablet use in children in Iran

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Abstract

Background:

Nowadays, children spend a lot of time during the day in front of the television(TV) and using their phones. We aimed to evaluate screen time and phone use in Iranian children and their relation to the socioeconomic status of children's families.

Methods:

This descriptive analytical study was done on 10-12-year-old children from Kurdistan, Fars, and Markazi provinces. Cluster sampling was used for sampling. Date collection included completing demographic questionnaires, calculating BMI of children and phone & tablet use, screen time, and socioeconomic status. We used linear and logistics regression to estimate the final model and decomposition method of the Oaxaca. The concentration index and the concentration curve were used to measure and illustrate socioeconomic inequalities. All analysis was conducted with the Stata / SE 14.0 software.

Results:

1590 children (52.58% boys) were enrolled in our study, 594 (74%) of boys and 420 (56%) of girls had daily Screen Time activities for more than two hours, and 388 (48.20%) of boys and 211 (28.20%) of girls use mobile phones and tablets for more than two hours a day. Screen Time activities were significantly higher in boys, older children, higher BMIs, more educated mothers, and 35≤year-old fathers (P_VALUE <0.05). The use of mobile phones and tablets by boys, ten-year-olds, families of four or less, older BMIs, children with higher levels of parental education, and more educated mothers is significantly higher (P_VALUE <0.05). In addition, the Concentration Index for Screen Time activities (C = 0.083) and phone or tablet use (C = 0.536), shows that the Screen Time, phone or tablet use activities are higher in children with high socioeconomic status.

Conclusion:

The screen time activities and phone & tablet use are higher in children with high socioeconomic status. Also, many other factors like gender, age, BMI, parent's education, and age can affect screen time activities and phone & tablet use in children. It is recommended to measure the effectiveness of the changeable factors by modifying and controlling these factors in future studies.

Background:

Children spend 50–80% of their day hours on inactivity behaviors, but compared to other behaviors, one type of these behaviors is Screen Time (1, 2).

Since 2011, the usage of smartphones has increased in children aged 11 (3), based on the World Health Organization (WHO) recommendations, screen time activities such as watching TV, and electronic games, should not be more than 2 hours per day (4), however, nowadays, 2–5 years-old kids spend 32 hours per week, and 6–11 years old children spend about 28 hours a week watching TV (5); also, the average use of phones in teens is seven hours and 22 minutes per day (6).

Individual variables such as family history of obesity, general obesity, family socioeconomic status, and age can increase screen time activities in children; also, boys use phones much more than girls (7, 8).

There is no clear association between phone use and screen time with socioeconomic status. Recent studies show that screen time activities, owning mobile phone, and phone use is much more in children with lower socioeconomic status than high (SES) (8, 9), but another study showed an utterly different result that owning a phone and phone use is higher in teenage children with higher socioeconomic status families (10).

Phone use can have many complications in children. Recent studies showed that health status got worse in children who used mobile phones regularly and behavioral problems, headaches and migraine, skin itches, depression, and anxiety significantly increased by using the mobile phone in children; also, it was associated with higher stress and poor sleep quality in children and young people (11–13).

Based on the side effects of screen time, activity and phone use on children's mental and physical health, identifying the factors that increase screen time, activity and phone use is essential to prevent harm to children by modifying these factors. Therefore this study was aimed to evaluation of screen time and phone use in Iranian children and their relation with the socioeconomic status and socioeconomic inequality of children's families.

Method:

Study design and period:

This cross-sectional study was performed in 2015 in Iran

Study sample:

The cluster sampling method was used for sampling. The country's provinces were divided into three provincial clusters of 9, 9, and 13 as follows, and one province was selected from each cluster. Since the sampling was performed with a combination of systematic classification, cluster, and random methods, to reduce the error, the sample size selected from each cluster was proportional to the volume of that cluster.

Multi-stage sampling was performed as follows:

Step 1: the provinces of the country divided into three clusters.

Step 2: from cluster number 1, Kurdistan province; From cluster No. 2, Central; And randomly selected from cluster number three of Fars province.

Step 3: Marivan city from Kurdistan province, Saveh city from Markazi province, and Gerash city from Fars province were randomly selected.

Step 4: to conduct the study and cooperation with the questioners, the Vice Chancellor for Research and Technology of Kurdistan University of Medical Sciences corresponded with the education of all the provinces of Kurdistan, Markazi, and Fars.

Step 5: The list of primary schools in the cities of Marivan, Saveh, and Gerash obtained from the same city's training. Then, six primary schools (three girls 'primary schools and three boys' primary schools) were randomly selected from primary schools in each city.

Step 6: From the selected schools of each city, there were 526 samples (263 girls students and 263 boys students) selected from 10 to 12-year-old children (grades 5 and 6).

The study sample included 1590 boys and girl children with the age of 10-12 years old.

Data collection:

Based on the list received from schools, the volume of the allocated sample selected as a multi-stage study of 10 to 12-year-old children (fifth and sixth grades) in each province.

To collect the required data. The children answered one part of the questionnaire, and then they took home the questionnaire, and their parents answered the other part of it at home, and the next day, they brought back the questionnaire. The Demographic variables, including height, weight, and calculating a person's body mass index or BMI for children, were measured by trained public health professionals.

To determine the socio-economic situation in this study, we used a questionnaire that has been presented by O'Donnell et al.

These questionnaires evaluated various variables such as education, the job of the head of the household, different house stuff, etc. Based on the Principal Component Analysis (PCA) method, the variables that had the most significant impact on the variance of all variables were identified at first. Then a new variable (SES) was created based on these variables. According to this index, the population was divided into five quintiles of very poor, poor, moderate, rich, and very rich (14-18).

The individual body mass index (BMI) (weight in kilograms divided by height in meters) was calculated. According to the WHO, a set of sexual BMIs was used to define obesity and overweight, which is a standard for various studies of obesity in children and adolescents aged 2-29 years worldwide. Accordingly, overweight is defined as between 85% and 95%, obesity is above 95%, and slimming is below 5% (19).

In addition, screen time and phone or tablet use were evaluated by asking them how much time they spent each day watching TV or playing with the computer, using smartphones or tablets (for playing the game, talking, texting, or some other use). Spending more than two hours per day was considered high screen time, phone, and tablet use (20).

In this study, a total of 1590 questionnaires were completed, and each questionnaire given a numeric code between 1 and 1590. The data were entered into SPSS software version 20 by two trained experts.

In this study, curve concentration method, Index, Concentration index, and Odds Ratio were used to measure inequality.

After the inequalities were measured, the next step was to decompose them. In the Oaxaca Decomposition Oaxaca method, the difference between the mean of a result in two different groups is explained by the determinants of socioeconomic inequality (determinants) and the magnitude of their effect on inequality. Descriptive analysis of data was evaluated using mean, relative, and mean descriptive indicators. Each of the indicators of Screen Time, activity and phone & tablet use levels was considered as the response variable. To analyze the level of physical activity, Screen Time, and using phone & tablet, the Chi-Square test was used to estimate the prevalence of variable response in each level of demographic variables and then multivariate logistic regression was used to estimate the final model based on variables with $p < 0.1$ in Chi-Square test and single variable OR and AOR calculation. All analyzes were performed with Stata / SE 14.0 software.

Results:

Out of a total of 1590 participants in the study (52.58%), 836 were boys, and (47.42 %)were 754 girls. In addition, (14.10) 224 of them were fourth-grade students, (48.33) 768 were fifth- grade, and (37.57) 597 was in sixth grade.

Screen Time activities and using phone & tablet were divided into two groups based on the time spent less than two hours or more and equal to two hours. 594 (74%) of boys and 420 (56%) of girls had daily Screen Time activities for more than two hours. 388 (48.20%) of boys and 211 (28.20%) of girls use mobile phones and tablets for more than two hours a day. Screen Time activities are significantly higher in boys, older children, higher BMIs, more educated mothers, and 35≤year-old fathers (P_VALUE <0.05). The use of mobile phones and tablets by boys, ten-year-olds, families of four or less, older BMIs, children with higher levels of parental education, and more educated mothers were significantly higher (P_VALUE <0.05) (tables 1&2).

The Concentration Index for Screen Time activities (C = 0.083) shows that the Screen Time activities are higher in children with high socioeconomic status (Table 3). The Screen Time activity concentration curve is below the equation line, which indicates that the Screen Time activities are more in the rich group of society (Figure 1)

The Concentration Index is for the use of positive phones or tablet (C = 0.536), which indicates the higher use of phones or tablet in children with high socioeconomic status (Table 3). The concentration curve for phone or tablet use is below the equality line, which indicates further use of the phone or tablet is more in the rich group of society (Figure 2)

Girl children reported significantly more screen time activities. Moreover, more screen time activities were reported in the Low-income group, which was not statistically significant. Gender plays the most critical role in creating inequalities in Screen Time activities, accounting for 74.16% of the total Concentration index (Table 4).

The use of a phone or tablet had a significant and direct relationship with gender, father's age, and mother's low education. Girls used phones more than boys. The low economic situation was inversely related to the chances of using a phone or tablet. A low economic situation (137.08%) played the most critical role in creating inequalities in the use of phones and tablets (Table 4).

Table 1: The relationship of demographic variables with Screen Time & Using Cell phone / tablet

Variable	Total population	Number (%)	Screen Time <2h/day Number (%)	Screen Time >2h/day Number (%)	P_value	Using Cell phone & tablet <2h/day Number (%)	Using Cell phone & tablet >2h/day Number (%)	P_value
Sex	Male	836 (52.58)	209 (27.00)	594 (74.0)	0.000	417 (51.8)	388 (48.2)	0.000
	Female	754 (47.42)	330 (44.00)	420 (56.00)		538 (71.8)	211 (28.2)	
Age groups	10	224 (14.10)	85 (38.8)	134 (61.2)	0.002	98 (45.20)	119 (54.8)	0.000
	11	768(48.33)	282 (37.8)	464 (62.2)		491 (65.7)	256 (34.3)	
	12	597 (37.57)	171 (29.1)	416 (70.9)		365 (62.00)	224 (38.0)	
Household size	≤4	927(60.99)	326 (36.00)	580 (64.0)	0.055	529 (58.40)	377 (41.60)	0.001
	> 4	593(39.01)	182 (31.20)	402 (68.80)		391 (66.80)	194 (33.2)	
BMI	Under 5 percentiles	102 (6.47)	44 (43.60)	57 (56.40)		72 (71.3)	29 (28.7)	
	5-50 percentiles	484 (30.71)	190 (39.75)	288 (60.25)	0.002	347 (72.60)	131 (27.40)	0.000
	50-85 percentiles	561 (35.60)	177 (32.40)	370 (67.6)		304 (55.60)	243 (44.4)	
	Overweight & Obese	429 (27.22)	124 (29.90)	291 (70.10)		222 (53.5)	193 (46.5)	
Parents' level of education*	Non-academic	1241(79.50)	427 (34.90)	795 (65.1)	0.696	808 (66.10)	415 (33.9)	0.000
	Academic	320 (20.50)	105 (33.8)	206 (66.2)		134 (43.2)	176 (56.8)	
Mother education	Illiterate and primary	591(38.06)	234 (40.10)	349 (59.9)	0.002	435 (74.5)	149 (25.5)	0.000
	Mid school and high school	397(25.56)	126 (32.20)	265 (67.8)		257 (65.6)	135 (34.4)	
	Diploma and academic	565(36.38)	168 (30.50)	383 (69.50)		244 (44.4)	305 (55.6)	
Mother age	<35	507 (35.41)	179 (35.8)	321 (64.2)	0.603	312 (62.4)	188 (37.6)	0.005
	35-44	759 (53.00)	246 (33.2)	494 (66.8)		456 (61.6)	284 (38.4)	
	>45	166 (11.59)	58 (35.8)	104 (64.2)		79 (48.8)	83 (51.2)	
Father age	<35	111 (7.67)	50 (45.45)	60 (54.55)	0.011	73 (66.4)	37 (33.6)	0.052

	35-44	916 (63.26)	286 (31.8)	614 (68.2)	560 (62.2)	340 (37.8)
	>45	421 (29.07)	146 (35.8)	262 (64.2)	229 (56.10)	179 (43.9)

*: The highest level of parenting education

Table 2: Single-variable and multivariate logistic regression

		Screen Time				Using Cell phone & tablet			
Variable	**Total population**	**OR**	**P_value**	**OR (adjusted)**	**P_value**	**OR**	**P_value**	**OR (adjusted)**	**P_value**
Sex	Female	1	-	1	0.000	1	-	1	0.000
	Male	2.23 (1.8– 2.8)	0.000	2.31 (1.81 – 2.94)	-	2.37 (1.92 – 2.93)	0.000	2.58 (2.02 – 3.31)	
Age groups	10	1	-	1	-	1	-	1	
	11	1.04 (0.76 – 1.42)	0.768	1.07 (0.76 – 1.51)	0.686	0.43 (0.32 – 0.58)	0.000	0.42 (0.30 – 0.60)	0.000
	12	1.54 (1.1 – 2.13)	0.009	1.39 (0.98 – 1.98)	0.068	0.51 (0.37 – 0.69)	0.000	0.38 (0.27 – 0.55)	0.000
Household size	4≤	1	-	1	-	1	-	1	0.364
	> 4	1.24 (0.99 – 1.55)	0.056	1.58 (1.22 – 2.05)	0.001	0.7 (0.56 – 0.86)	0.001	0.88 (0.68 – 1.15)	
BMI	Under 5 percentiles	0.62 (0.40_ 0.95)	0.030	0.71 (0.44 – 1.12)	0.142	0.50 (0.32 – 0.80)	0.004	0.50 (0.30_0.85)	0.011
	5-50 percentiles	0.73 (0.56 _0.94)	0.014	0.78 (0.58_1.04)	0.088	0.47 (0.36_0.61)	0.000	0.53 (0.39_0.72)	0.000
	50-85 percentiles	1	-	1	-	1	-	1	-
	Overweight & Obese	1.12 (0.85_1.48)	0.412	1.14 (0.83 – 1.55)	0.418	1.09 (0.84_1.41)	0.521	0.99 (0.73_1.34)	0.958
Mother education	Diploma and academic	1	-	1		1	-	1	-
	Illiterate and primary	0.65 (0.5 – 0.8)	0.001	0.68 (0.51 – 0.90)	0.007	0.27 (0.21 – 0.35)	0.000	0.23 (0.17 – 0.30)	0.000
	Mid school and high school	0.92 (0.7 – 1.22)	0.571	0.96 (0.70 – 1.31)	0.795	0.42 (0.32 – 0.55)	0.000	0.36 (0.26 – 0.49)	0.000
Mother age	<35	1	-	-	-	1	-	-	
	35-44	1.1 (0.9 – 1.4)	0.352	-	-	1.03 (0.82 – 1.31)	0.782	-	-
	>45	1 (0.7 – 1.4)	1.00	-	-	1.74	0.002	-	

						(1.22 – 2.49)			
Father age	<35	1	-	1	-	1	-	1	-
	35-44	1.8 (1.2 – 2.7)	0.004	1.74 (1.13 – 2.67)	0.012	1.2 (0.79 – 1.82)	0.397	1.14 (0.71 – 1.83)	0.594
	>45	1.5 (1 – 2.3)	0.064	1.35 (0.85 – 2.15)	0.204	1.54 (0.99 – 2.40)	0.054	2.07 (1.24 – 3.45)	0.005

Table 3: concentration index for screen time and phone use

	CI Coefficient (95%Conf.Interval)	P
Screen Time	0.083 (0.018,0.147)	0.011
Phone use	0.536 (0.480,0.591)	<0.001

Table 4: Decomposition of Concentration Index for phone use and Screen Time Activities

Screen Time activities					Phone use					
C%	Cont to C	CI	Elast	Coef	**C%**	**Cont to C**	**CI**	**Elast**	**Coef**	
										Sex
										Male
74.16	0.041	0.049	0.831	0.361***	14.04	0.031	0.049	0.625	0.251***	Female
										Age
										10
0.13	0.000	-0.004	-0.016	-0.011	0.01	0.000	-0.004	-0.008	0.005	11
-0.15	-0.000	-0.076	0.001	0.000	-0.84	-0.001	-0.076	0.024	0.016	12
										Economic statue
-10.45	-0.005	-0.741	0.007	0.009	137.08	0.304	-0.741	-0.410	-0.487***	Poorest SES
13.92	0.007	-0.362	-0.021	-0.024	37.77	0.083	-0.362	-0.231	-0.263***	2th SES
0.31	0.000	0.015	0.011	0.013	-1.24	-0.002	0.015	-0.183	-0.212**	Middle SES
4.46	0.002	0.380	0.006	0.007	-22.08	-0.049	0.380	-0.128	-0.152*	4th SES
										5th SES
										Size of family
										4≤
-18.13	-0.010	-0.126	0.079	0.058	4.15	0.009	-0.126	-0.072	-0.050	> 4
										Mother Education
17.39	0.009	0.123	0.078	0.037	18.79	0.041	0.123	0.336	0.145*	Uneducated & Elementary
-0.88	-0.000	0.047	-0.010	-0.009	-1.28	-0.002	0.047	-0.059	-0.050	Middle & High school
										Diploma and academic
										Father Education
-17.20	-0.009	0.118	-0.081	-0.032	-6.97	-0.015	0.118	-0.130	-0.046	Uneducated & Elementary
-2.60	-0.001	-0.037	0.038	0.038	1.43	0.003	-0.037	-0.084	-0.081	Middle & High school
										Diploma and academic
										Mother age
										<35
-3.83	-0.002	-0.046	0.045	0.021	1.03	0.002	-0.046	-0.049	-0.020	35-44
-0.22	-0.000	-0.010	0.012	0.013	0.10	0.000	-0.010	-0.023	-0.031	>45
										Father age
										<35
21.93	0.012	0.030	0.409	0.168*	4.77	0.010	0.030	0.353	0.132	35-44
16.08	-0.008	-0.052	0.172	0.112	-8.66	-0.019	-0.052	0.369	0.205**	>45

Coeff Marginal effects, Elast elasticity, CI Concentration index of the social determinants, Cont to C Contribution to the overall concentration index, C% unadjusted percentage calculated on the overall explained portion of the C

* 0.01≤p<0.05; ** 0.001≤p<0.01; *** p<0.001

Discussion:

More than 74% of boys and 56% of girls had an average of more than 2 hours of Screen Time per day. In a similar study conducted in 2015 by Moradi et al. In Sanandaj, 50% of boys and 45% of girls had an average of more than 2 hours of Screen Time activity per day (21). In other similar studies, the reported values are lower than the present study (22–24), this can be due to the effects of time and the tendency of adolescents to use televisions, computers, and various methods of using them. In most studies comparing Screen Time activity between girls and boys, same as the results of our study, a higher proportion of this activity was reported in boys (24, 25); in some of them, the differences were statistically significant (21, 22, 26).

Factors like being a boy, being more than four members of the family, educated mother, and being a middle-aged father were all influencing the increase in screen time. However, body mass index and mother's age did not show a significant relationship. In a study conducted by Moradi et al. In Sanandaj in 2015 (21) and a study conducted by LeBlanc et al. In Canada in 2015 (25), Screen Time activity significantly associated with body mass index. Moreover, LeBlanc et al. Reported a significant relationship between father literacy and Screen Time activity. In contrast, in the study of Moradi et al., there was no significant relationship between parent's age and parental literacy with Screen Time activity (21, 25).

In this study, more than 48% of boys and 28% of girls used mobile phones and tablets for more than two hours a day. In the study of Moradi et al., Which conducted in 2015, this ratio was less reported (23% in boys and 17% in girls) (21). Of course, the fact that we are in a period of transition, and the use of new technologies is increasing day by day can be a justification for this difference created in the last few years. In the present study, children's use of mobile phones and tablets had a significant relationship with age, gender, family dimension, literacy, and maternal age. In contrast, in a similar study, it had a significant relationship only with gender and mother's age (21).

The index and concentration curve in the present study show a high ratio of obesity, screen time, and tablets and mobile phones in high socioeconomic levels. Improving the ability of households to access new technologies, reducing working time for working parents can be one of the reasons for the increase in Screen Time indicators and the use of tablets and mobile phones and obesity in families with better socioeconomic status.

The gender variable was the most critical factor that explained the difference between Screen Time activity so that this activity was much higher in girls. Perhaps because of the Iranian culture, more family control on girls, and a lack of female access to physical activity are among the controversial justifications for girls' more use of screen time. Gender, socioeconomic, and father s age variables were among the variables affecting inequality in tablet and phone use in the present study, which naturally increased with socioeconomic status as well as increasing father s age. On the other hand, perhaps in wealthy families, less time is given to children due to both parents' employment and more conflict.

In our study, being a girl, older age, and better socioeconomic status of households were the most important variables affecting the inequality observed among children in terms of overweight and obesity. In similar studies that looked at the factors influencing inequality in overweight and obesity in children, some in the decomposition model said that age and gender were the essential components of the observed differences (27), while others family lived with location and mother literacy level has introduced as a more important factor (28).

Conclusion:

A significant percentage of children spend more than two hours on screen time, phone, and tablet use. The screen time activities, and phone & tablet use are higher in children with high socioeconomic status. Moreover, many other factors like gender, age, BMI, parent's education, and age can affect screen time, activities and phone & tablet use in children. It is recommended that further studies be performed on other factors that may affect screen time and phone & tablet use in children, and it is also recommended to measure the effectiveness of the changeable factors by modifying and controlling each of these factors in future studies.

Abbreviations:

TV
Television
WHO
World Health Organization
SES
Socioeconomic status than high
No
Number
BMI
Body mass index

Declarations:

• Ethics approval and consent to participate

Written consent was obtained from a parent or guardian for participants under 16 years old. This manuscript has been ethical approval by the ethics committee of Kurdistan University of Medical Sciences, Sanandaj, Iran.

• Consent for publication

Not applicable

• Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

• Competing interests

The authors declare that they have no competing interests.

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• Authors' contributions

GM and BP were the major contributors in writing the manuscript, EG analyzed and interpreted the data; also FZ was a contributor in writing the manuscript, JM, ZA, BZ and FM collected the data. All authors read and approved the final manuscript.

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Figures

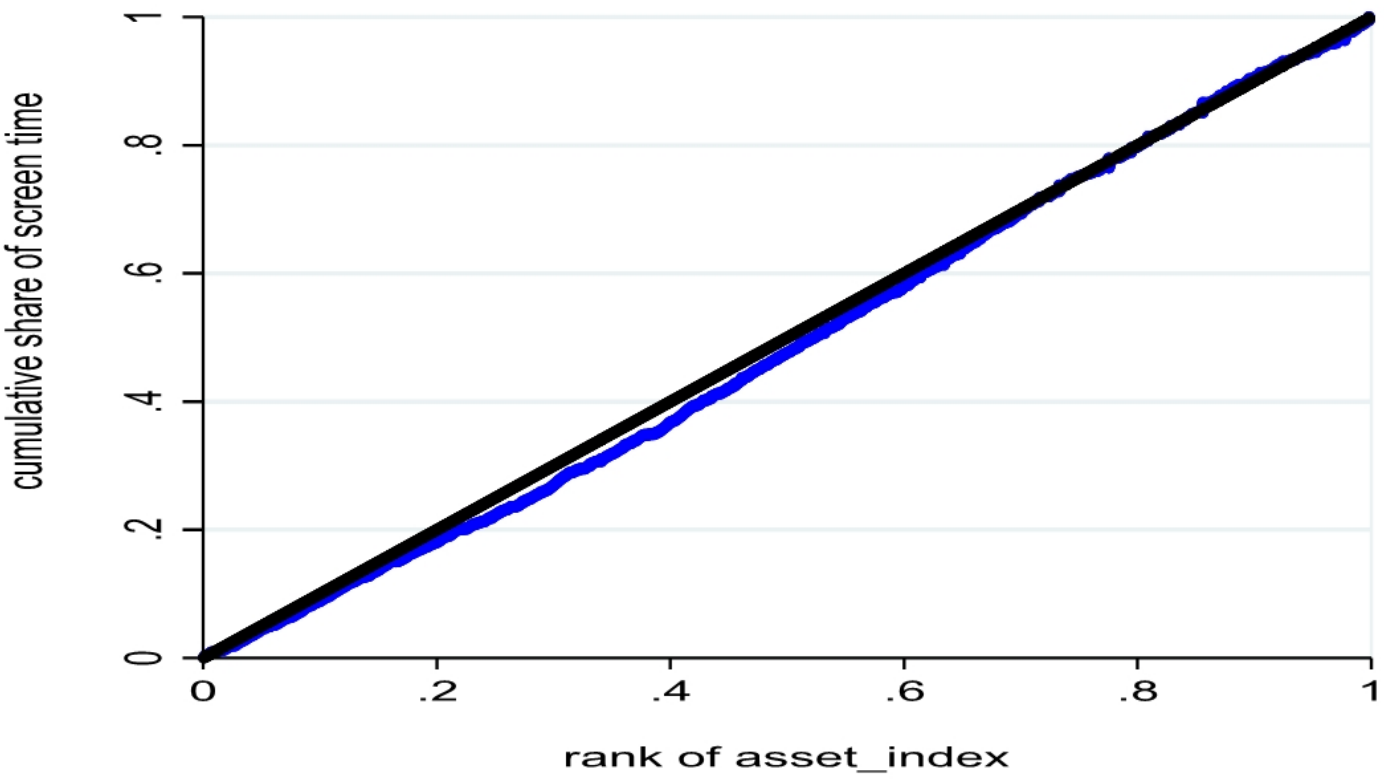

Figure 1

concentration curve chart for Screen Time variables

Figure 2

concentration curve for phone use