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# Lower-Income Predicts Increased Smartphone Use and Problematic Behaviors Among Schoolchildren During COVID-19 Related School Modification: A Longitudinal Study

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## ABSTRACT

**Background:** As the coronavirus disease 2019 (COVID-19) has continued for a couple of years, the long-term effects of the pandemic and the subsequent school curriculum modification on the mental health of children and parents need to be investigated. To clarify the changes that can occur during one school year and to predict the risk factors for vulnerable groups, this study identified parameters relative to children's screen time, their problematic behavior, and parental depression.

**Methods:** A total of 186 participants were analyzed who were parents of elementary schoolchildren in South Korea. These parents were required to complete a web-based questionnaire twice. The questionnaires were conducted in June 2020 and September 2021. Participants' general demographics including family income, children's screen time, sleep patterns, problematic behavior, and parental depression were assessed via the parental questionnaire that included various measurement tools.

**Results:** Children's body mass index (BMI) increased significantly in 2021 ( $18.94 \pm 3.75$  vs.  $18.14 \pm 3.30$ ,  $P < 0.001$ ). Smartphone frequency of use per week ( $5.35$  vs.  $4.54$ ,  $P < 0.001$ ) and screen time per day ( $3.52$  vs.  $3.16$ ,  $P < 0.001$ ) significantly increased during the period of the COVID-19 pandemic. The television screen time ( $2.88$  vs.  $3.26$ ,  $P < 0.001$ ), frequency of viewing ( $3.77$  vs.  $4.77$ ,  $P < 0.001$ ), and children's problematic behaviors significantly decreased ( $9.15$  vs.  $11.85$ ,  $P < 0.001$ ). A lower income household was a key predictor of increased smartphone frequency ( $B = 1.840$ , 95% confidence interval [CI],  $0.923$ – $2.757$ ,  $P < 0.001$ ) and smartphone screen time ( $B = 1.992$ , 95% CI,  $1.458$ – $2.525$ ,  $P < 0.001$ ). The results showed that the lower income household ( $B = 5.624$ , 95% CI,  $2.927$ – $8.320$ ,  $P < 0.001$ ) and a child's psychiatric treatment history ( $B = 7.579$ , 95% CI,  $5.666$ – $9.492$ ,  $P < 0.001$ ) was the most significant predictor of problematic behaviors of children and parental depression ( $B = 3.476$ , 95% CI,  $1.628$ – $5.325$ ,  $P < 0.001$ ;  $B = 3.138$ , 95% CI,  $1.827$ – $4.450$ ,  $P < 0.001$ ).

**Conclusion:** This study suggested that children's smartphone screen time and BMI increased during COVID-19 because of the school curriculum modification following school closures in South Korea. The increased children's problematic behaviors and parental depression were predicted by lower-income households and the previous psychiatric history of children.























