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Exploring the Relationship between Maternal Parenting Stress and Children's Internet Addiction in South Korea

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Abstract: *The study aims to investigate the association between maternal parenting stress and children's internet addiction, with achievement pressure perceived by children as a mediator, and explore the moderating role of maternal social support employing Abidin's Parenting Stress Model. Data from the thirteenth Panel Study on Korean Children were utilized, focusing on the responses of 12-year-old children (N=1,118) for secondary analysis. Using SPSS 26.0 and Process macro 4.2, the indirect path (Model 4) and the moderated mediation hypothesis (Model 7) were tested within a cross-sectional design. We found that maternal parenting stress and achievement pressure perceived by children had a significant positive direct effect on children's internet addiction. Also, achievement pressure perceived by children partially mediated the relationship between maternal parenting stress and children's internet addiction. The moderated mediation effect of maternal informational support was significant in the relationship between maternal parenting stress, achievement pressure perceived by children, and children's internet addiction. When the level of maternal informational support was high, the direct and indirect effect of maternal parenting stress on children's internet addiction was lowered. To prevent children's internet addiction, it is crucial to understand maternal parenting stress, achievement pressure perceived by children, and the level of maternal social support. The adverse effect of maternal parenting stress and achievement pressure perceived by children on children's internet addiction can be mitigated through the provision of maternal social support. In particular, providing informational support for mothers, such as university admission trends and effective parenting styles is crucial for reducing maternal parenting stress.*

Keywords: Child; Internet Addiction Disorder; Parenting; Stress; Social Support

1. Introduction

Internet Addiction Disorder, a term first coined by Goldberg [1], refers to the pathological, and obsessive use of the internet. Assessment of this disorder typically involves evaluating multiple dimensions of internet use, including disruption of adaptive capabilities, social withdrawal, and tolerance [2]. While the prevalence of internet addiction among the general population in South Korea has been steadily increasing since 2016, it experienced its first decline in the past five years, dropping from 24.2% in 2021 to 23.6% in 2022 [3]. Despite the overall decline, internet addiction prevalence increased among adolescents aged 10-19, rising from 37.0% in 2021 to 40.1% in 2022. In particular, the number of elementary school students at risk for internet addiction has increased more significantly compared to middle and high school students over the past three years, indicating a concerning trend of internet addiction prevalence among young adolescents aged 10-12 [3]. Internet addiction that begins in elementary school often persists into adolescence [4] and can negatively impact on psychological development, leading to depression, anxiety, and aggression [4, 5]

Previous studies have consistently reported that parenting stress, negative parental behaviors such as yelling and punishing, and parent-child relationship are key factors affecting children's internet [4], [6-8]. Among various factors influencing children's internet addiction, elevated parenting stress is a well-known risk factor [7-9].

Mothers traditionally assume the role of primary caregiver, dedicating the most time to child-rearing in the South Korean culture [5], [10]. These mothers often view their children's academic performance as a reflection of their success or failure, placing significant pressure on their children to excel [11]. Given the essential role mothers play in their children's development, it is crucial to investigate the relationship between maternal parenting stress and children's behavioral issues, particularly internet addiction. In South Korea, academic achievement pressure has long been the most significant source of stress for students. The pressure of highly competitive university entrance exams drives both parents and children to begin exam preparation as early as elementary school [12, 13]. Parents make more excessive economic and psychological investments in their children's education, fostering achievement-oriented expectations and emphasizing competitive success through comparisons with others. When children fail to meet their parents' high academic expectations, it often leads to significant parental stress and pressure. When children perceive parental achievement pressure as positive and nurturing, it positively influences their academic achievement and mental health [5], [13]. However, if the pressure is perceived as negative and excessive, it may lead to frustration and feelings of inferiority, compromising the child's psychological well-being [11] and increasing vulnerability to digital game addiction [14].

Social support plays a crucial role in shaping the quality of parenting practices [15] and significantly influences maternal roles and behaviors [16]. It has the potential to mitigate negative parenting behaviors and children's behavioral problems such as internet addiction. In a previous study, the moderating effect of the social service variables was tested on the relationship between parenting stress and maltreatment [17]. Another study claimed that the effect of maternal parenting stress on the strengths of attachment to their infants was moderated by social support [18]. As supported by previous research, social support moderates the relationship between stress and parenting behavior. Social support, however, is a complex construct characterized by various sources and actions [19]. Verifying the buffering effect of social support across multiple dimensions may offer the ultimate approach to alleviate parents' parenting stress and resolve the emotional problems that parenting has on children. Abidin [20] proposed that parenting stress arises from the discrepancy between the roles parents perceive in their relationship with their children and the actual resources available to fulfill these roles. According to Abidin's model [20] parents tend to utilize various coping resources including emotional or informational social support, collaboration with a spouse or a partner, and drawing upon their parental self-efficacy when they experience stress during the parenting process. Parenting stress and the availability of coping resources significantly interact with parental caregiving behaviors. For example, elevated levels of parenting stress can deplete coping resources, leading to the emergence of negative parenting behaviors such as verbal aggression, insulting, threatening, and punitive measures [6]. When parental stress increases, this can increase the achievement pressure, potentially contributing to adverse behavioral outcomes in children, such as poor social, emotional, and academic outcomes [7].

Abidin's Parenting Stress Model [20] explains that parenting stress arises from the discrepancy between parents' perceived role expectations and their available resources. This stress directly influences parenting behaviors and can contribute to negative developmental outcomes in children. This model is appropriate for the present study because it goes beyond simple correlations. It encompasses mediating factors, such as achievement pressure, and moderating factors, such as social support. This comprehensive approach allows for specific elucidation of the pathways through which parental stress leads to child behavioral problems, facilitating a more nuanced understanding of these relationships in empirical analysis.

Using Abidin's Parenting Stress Model as the theoretical framework, this study aims to investigate the relationships among maternal parenting stress, achievement pressure perceived by children, and children's internet addiction. Specifically, it aims to examine the mediating role of achievement pressure perceived by children and the moderating role of maternal social support in these relationships. This study utilizes data from a large, nationally representative sample of elementary school children to clarify how these variables interact and contribute to children's internet addiction.

Based on the theoretical framework of Abidin's model and previous literature, the following hypotheses are proposed (Figure 1). First, higher levels of maternal parenting stress are expected to be associated with greater levels of children's internet addiction. Second, maternal parenting stress is anticipated to be positively associated with achievement pressure perceived by children. Third, higher levels of achievement pressure perceived by children are expected to be linked with higher levels of children's internet addiction. Lastly, maternal social support is proposed to moderate the association between maternal parenting stress and achievement pressure perceived by children, with greater social support linked to a weaker association.

In contrast to prior studies that have primarily examined parenting style or general stress, the present study is expected to highlight informational support as a key moderating factor, thereby offering a specific and actionable target for intervention.

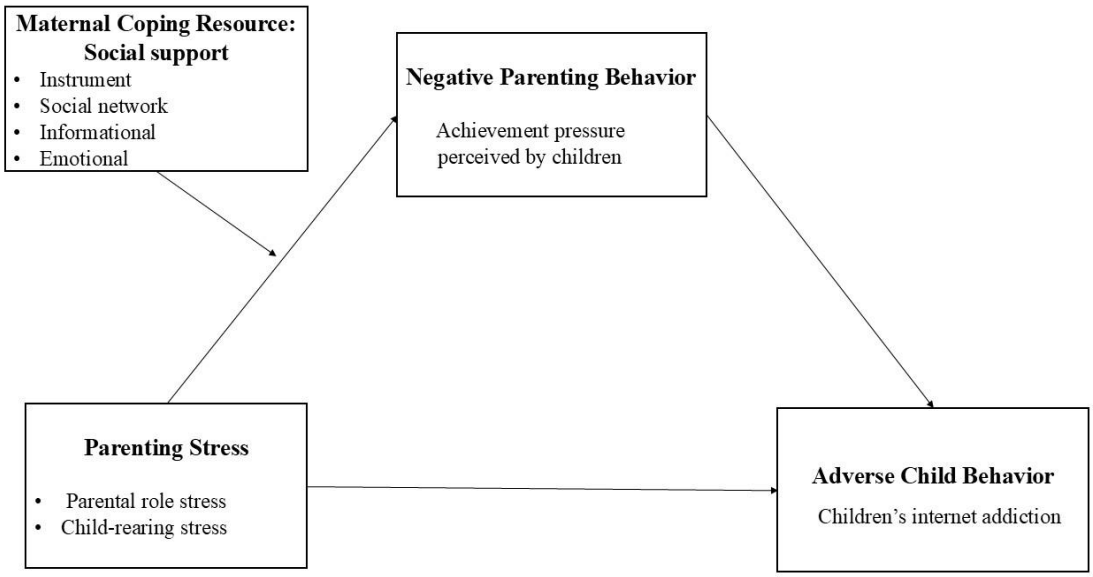

Figure 1. Conceptual Framework of the Study Based on Abidin's Parenting Stress Model

2. Materials and Methods

2.1 Study design and data source

The Panel Study on Korean Children (PSKC), initiated in 2008, is a longitudinal survey designed to track the growth and development of Korean children from birth over an extended period [21]. Its primary objective is to collect nationwide data on children's physical, cognitive, and psychological development, as well as information about their environments at various stages. This panel study also aims to examine how the influence of regional communities and childcare policies correlate with these factors and moderate these dynamics. The sampling process employed a stratified multistage sampling method, commencing with the original sample of 2,078 newborns in the first wave of 2008. Subsequently, the 13th survey in 2020 included 1,397 participants who had reached the age of twelve. The retention rate was 67.2% compared to the initial cohort in 2008.

The present study used data from the 13th wave of the PSKC, collected in 2020. Due to missing values in one or more variables of interest, 279 cases were excluded from the final dataset. Consequently, a secondary analysis was conducted on the final sample of 1,118 participants.

2.2 Measures

2.2.1 Maternal parenting stress

Maternal parenting stress was measured using the parenting stress scale for parents of school-aged children developed by H. K. Kang [22]. The scale consists of two domains: parental role stress, and child-rearing stress. Examples of items reflecting parental role stress include statements such as "I feel stressed about my child's academic performance" and "I feel frustrated because there is no specific information about private education." An example item representing child-rearing stress is "I am unable to allocate time for myself because I have to take care of my child." The scale consists of 24 items, and each item was rated on a five-point Likert scale (1= Strongly disagree to 5= Strongly agree). A higher score indicates a higher level of maternal parenting stress. The internal consistency was adequate in the current sample as Cronbach's alpha was .93.

2.2.2 Achievement pressure perceived by children

Achievement pressure perceived by children was defined as an outcome of negative parenting behavior in this study [23]. This scale was measured using the instrument developed by Y. Kang [24]. Sample items include, "My parents say that studying is the most important thing to me," and "What my parents are most interested in regarding me are my school grades." The scale comprises a total of 15 items, and each item is rated on a five-point Likert scale (1= Strongly disagree to 5= Strongly agree). Higher scores indicate a greater level of achievement pressure perceived by a child and the internal consistency was adequate in the current sample as Cronbach's alpha was .93.

2.2.3 Children's internet addiction

In this study, Children's internet addiction was assessed using the K-Scale [2], developed by the National Information Society Agency's Internet Addiction Prevention Center [2]. The PSKC made slight modifications to the scale, replacing 'internet' with 'personal computer' and 'smartphone'. K-Scale is composed of four key components: (1) disruption of adaptive capabilities, (2) social withdrawal, (3) development of tolerance, and (4) orientation towards virtual life.

The respondents were mothers, and the scale consists of 15 items such as "My child's school grades have dropped due to excessive use of the computer or smartphone," and "When my child is not using the computer or smartphone, he/she seems unable to focus on anything else and appear anxious." On a four-point Likert scale (1= Strongly disagree to 4= Strongly agree). Children scoring 28 or above on the total score are classified as being in a risk group. The internal consistency was adequate in the current sample as Cronbach's alpha was .87.

2.2.4 Maternal social support

Maternal social support was measured using a modified 12-item social support scale [25, 26]. It consists of four sub-domains, measuring the maternal social support received from individuals outside the household.

The four sub-domains included 3 items of instrumental support (financial assistance, material assistance, practical assistance), 4 items of social network support (social visits, mutual visits during a family crisis, sharing of dining activities, sharing of vacation), 3 items of informational support (decision-making on important issues, providing information on child education, leisure activities, and household management) and 2 items of emotional support (comfort and trust). Sample questions include, "There is someone who can provide financial assistance in an emergency (instrumental support)," "I have someone to go on vacation with (social network support)," "There is someone who provides information on childcare and education (informational support)," and "There is someone special I can confide in when I feel lonely (emotional support)."

The responses were measured on a five-point Likert scale (1= Strongly disagree to 5= Strongly agree). Higher summed scores for each domain indicated a higher level of social support in that domain. In this study, Cronbach's α was .93, and by sub-domain, instrumental support was .81, social network support was .82, informational support was .86, and emotional support was .69.

2.3. Covariates

Children's gender, mother's age, household income, maternal education level, maternal subjective health status, parental cohabitation, dual-income status, children's time spent without adults or only with siblings per day, and parental supervision perceived by children were included as covariates.

Maternal subjective health status was assessed with one question: "How do you rate your physical health?" A five-point Likert scale was used for the response (1= Poor to 5= Excellent). A score of 1-2 indicates unhealthy status, 3 suggests relatively healthy status, and 4-5 indicates healthy status. Children's time spent without adults or only with siblings per day was assessed with one question: "How many hours does your child stay alone at home without adults or only with siblings during a day?" Parental supervision perceived by children was assessed using 4 items, including "My parents know how I usually spend my time after school," and "My parents know when I will come home if I go outside or when I will return home if I go out." A four-point Likert scale was used (1= Strongly disagree to 4= Strongly agree), and higher scores indicated a higher level of parental supervision perceived by children. A score of 1 was coded as low, 2-3 were coded as average, and 4 were considered high for the analysis.

2.4 Data analysis

For data analysis, IBM SPSS 26.0 and PROCESS Macro 4.2 [27] programs were used, and all statistical tests were conducted with a significance level of .05. Descriptive statistics were used to summarize sample characteristics. To examine significant differences in children's internet addiction based on general characteristics, an independent t-test and one-way analysis of variance (ANOVA) were performed. Upon detecting significant differences, Scheffé post-hoc tests were conducted. Pearson correlation analysis was used to examine the correlations among maternal parenting stress, achievement pressure perceived by children, children's internet addiction, and maternal social support.

To explore the mediating effect of achievement pressure perceived by children in the relationship between maternal parenting stress and children's internet addiction, a hierarchical regression analysis was conducted. The statistical significance of the indirect effect was determined using Hayes' proposed bootstrapping validation through PROCESS Macro Model 4. To examine the moderating effect of maternal social support on the relationship between maternal parenting stress and achievement pressure perceived by children, and to validate the moderated mediation effect, bootstrap validation was conducted using the moderated mediation model, from PROCESS Macro Model 7. Bootstrap resampling was performed 5,000 times, and if the 95% confidence interval (CI) did not include zero between the lower and upper values, it was considered statistically significant.

3. Results

3.1 Characteristics of the study participants according to children's internet addiction scores

Table 1 summarizes the key characteristics of the participants. Among the 1,118 children studied, 565 (50.5%) were male. Mothers' average age was 43.1 years. The average monthly household income was 5.8 million Korean won, and 39.1% of families fell within the 4.5 to 6 million Korean won income range. Dual-income families comprised 58.3% of the sample. In terms of maternal education, 44.5% of mothers had completed university or higher education. Most mothers (87.2%) reported being in "relatively healthy" or "healthy" condition. A majority of children (94.7%) lived with both parents. Notably, 59.7% of children spent more than an hour daily unsupervised. About 38.5% of children perceived high levels of parental supervision. A total of 53.9% of the children were identified as being at risk of internet addiction.

According to Scheffé's post-hoc analysis, children more likely to exhibit higher internet addiction were male, had mothers with a high school education or lower, had mothers reporting poor health, came from dual-income families, spent more unsupervised time, and perceived lower parental supervision.

3.2 Corrrelations of key variables

Table 2 shows bivariate correlations of key variables. Maternal parenting stress showed a significant positive correlation with achievement pressure perceived by children ($r=.16$, $p<.001$) and children's internet addiction ($r=.32$, $p<.001$). Achievement pressure perceived by children and children's internet addiction also exhibited significant positive correlations ($r=.17$, $p<.001$). Maternal parenting stress and maternal social support ($r=-.20$, $p<.001$) revealed a significant negative correlation, and all subdomains of maternal social support showed significant negative correlations with maternal parenting stress. Achievement pressure perceived by children did not show a significant correlation with maternal social support. However, children's internet addiction and maternal social support ($r=-.16$, $p<.001$) exhibited a significant negative correlation. All sub-domains of maternal social support also showed significant correlations with children's internet addiction.

3.3 Mediating Effect of Achievement Pressure Perceived by Children

To examine the mediating effect of achievement pressure perceived by children in the relationship between maternal parenting stress and children's internet addiction, a hierarchical regression analysis was conducted as presented in Table 3. Hierarchical regression confirmed that achievement pressure perceived by children partially mediates the relationship between maternal parenting stress and children's internet addiction. Maternal parenting stress significantly predicted children's internet addiction ($\beta = .28$), and also positively predicted achievement pressure ($\beta = .14$), which in turn was associated with internet addiction ($\beta = .12$). The effect of parenting stress on internet addiction dropped slightly ($\beta = .26$) when achievement pressure was added, indicating a partial mediation. The final model explained 22.0% of the variance in internet addiction. Control variables also had significant effects: longer unsupervised time (1–2 hours: $\beta = .10$; ≥3 hours: $\beta = .19$) increased

internet addiction, while higher perceived parental supervision (medium: β = –.16; high: β = –.23) reduced it. Bootstrapping analysis confirmed the significance of the mediating effect, with an indirect effect size of .013 (95% CI [.006, .022]), supporting the mediating role of achievement pressure between parenting stress and internet addiction.

3.4 Moderating effect and moderated mediation of maternal social support

To examine the moderating effect of maternal social support in the relationship between maternal parenting stress and achievement pressure perceived by children, and to verify the moderated mediation effect, we conducted bootstrap validation using Model 7 of the PROCESS Macro [27] as presented in Table 4. Moderated mediation analysis using PROCESS Macro Model 7 tested whether maternal social support influenced the relationship between parenting stress and achievement pressure. Among the sub-domains of support, only informational support had a significant moderating effect (β = –.25, p = .002), weakening the influence of parenting stress on achievement pressure.

Table 4 shows that the relationship between maternal parenting stress and children's perceived achievement pressure significantly varied depending on the level of maternal information support. In particular, the interaction term between parenting stress and information support showed a significant negative effect (B = –0.25, SE = 0.08, β = –.15, t = –3.10, p = .002), indicating that higher levels of information support weakened the impact of parenting stress on children's perceived achievement pressure. Conditional indirect effect analysis further demonstrated that when informational support was 1 SD below the mean, the indirect effect was .02 (95% CI=.01-.03); whereas at the mean level it was .01 (95% CI= .01-.02), and at 1 SD above the mean it remained .01 (95% CI= .00-.02). These results suggest that under conditions of low information support, parenting stress exerts a stronger indirect effect on children's internet addiction through achievement pressure, while higher levels of informational support mitigate this mediated pathway.

Johnson-Neyman analysis indicated that the indirect effect remained significant when the mean score of maternal informational support (measured on a 5-point Likert scale) ranged from 1.00 to 4.57. Beyond 4.57, the effect was no longer significant, suggesting that higher levels of informational support can effectively buffer the impact of maternal stress on children's perceived achievement pressure and, ultimately, their risk of internet addiction.

Table 1. Children's Internet Addiction According to General Characteristics (N=1,118)

Variables	Average±SD	N (%)	Internet addiction Mean±SD	t/F(*p*) Scheffé
Gender				
Male		565(50.5)	29.2±6.72	6.11(<.001)
Female		553(49.5)	26.8±6.52	
Mother's age	43.1±3.55			
30-39		150(13.4)	28.1±7.23	NS
40-49		921(82.4)	28.0±6.59	
50 and older		47(4.2)	27.7±7.90	
Household income/month (million Korean won)	5.8±3.89			
Low (<4.5)		348(31.1)	28.4±7.36	NS
Medium (4.5 – 6.0)		437(39.1)	28.2±6.25	
High (>6.0)		333(29.8)	27.5±6.64	
Dual-income status				
Dual income		652(58.3)	28.4±6.77	2.00(.046)
Non-dual income		466(41.7)	27.6±6.66	
Maternal education level				
≤High school[a]		287(25.7)	28.7±7.12	5.08(.006)
Some college[b]		333(29.8)	28.5±6.50	c<a
≥University[c]		498(44.5)	27.3±6.59	
Maternal subjective health status				

Unhealthy[a]		143(12.8)	29.1±7.04	6.13(.002)
Relatively healthy[b]		501(44.8)	28.5±6.53	c<a
Healthy[c]		474(42.4)	27.2±6.77	
Parental cohabitation				
Living with both parents		1,059(94.7)	28.0±6.74	NS
Living with mother		57(5.1)	28.0±6.66	
Living with father/others		2(0.2)	28.0±0.00	
Time spent without adults or only with siblings/day				
<1 hour[a]		451(40.3)	26.6±6.74	21.88(<.001)
1 ~ 2 hours[b]		388(34.7)	28.3±6.44	a<b<c
≥3 hours[c]		279(25.0)	29.9±6.61	
Parental supervision level perceived by children[†]	4.6±0.44			
Low[a]		305(27.3)	30.6±6.19	38.59(<.001)
Medium[b]		383(34.3)	28.0±6.22	c<b<a
High[c]		430(38.5)	26.3±6.98	
Maternal parenting stress (range: 1.0-5.0)	2.4±0.61			
Achievement pressure perceived by children[†] (range: 1.0-5.0)	2.3±0.79			
Children's internet addiction				
No (<28)	22.0±3.70	515(46.1)		
Yes (≥28)	33.2±3.93	603(53.9)		
Maternal social support (range: 1.0-5.0)	4.0±0.58			
Instrumental support	4.0±0.65			
Social network support	3.9±0.64			
Informational support	3.9±0.69			
Emotional support	4.0±0.64			

Note. SD = Standard deviation, † answered by children

Table 2. Correlations between Key Variables (N=1,118)

Variables	1	2	3	4	4.1	4.2	4.3	4.4
	r							
1. Maternal parenting stress	1							
2. Achievement pressure perceived by children	.16**	1						
3. Children's internet addiction	.32**	.17**	1					
4. Maternal social support	-.20**	-.04	-.16**	1				
4.1. Instrumental support	-.15**	-.02	-.12**	.90**	1			
4.2. Social network support	-.18**	-.03	-.14**	.92**	.76**	1		
4.3. Informational support	-.17**	-.04	-.16**	.86**	.68**	.71**	1	
4.4. Emotional support	-.20**	-.06	-.17**	.84**	.72**	.70**	.64**	1

Note. ** p<.01

Table 3. Mediation Effect of Achievement Pressure Perceived by Children (N=1,118)

	Model 1 (DV: Children's internet addiction)				Model 2 (DV: Achievement pressure perceived by children)				Model 3 (DV: Children's internet addiction)			
	B	SE	β	*p*	B	SE	β	*p*	B	SE	β	*p*
(Constants)	1.39	.08		<.001	1.68	.15		<.001	1.27	.08		<.001
Gender (Male)	.13	.02	.15	<.001	.12	.05	08	<.001	.12	.02	.14	<.001
Dual-income status (Dual income)	.00	.03	.00	.935	.05	.05	.00	.935	.00	.03	.00	.966
Maternal education level (Some college)	.02	.04	.02	.618	-.04	.07	-.02	.618	.02	.04	.02	.560
Maternal education level (≥University)	-.05	.04	-.05	.229	.00	.07	.00	.229	-.05	.04	-.05	.224
Maternal subjective health status (Relatively healthy)	.02	.04	.02	.662	-.02	.07	.02	.662	.02	.04	.02	.638
Maternal subjective health status (Healthy)	-.03	.04	-.03	.523	-13	.08	-.03	.523	-.02	.04	-.02	.675
Time spent without adults or only with siblings/day (1 ~ 2 hours)	.09	.03	.10	.001	.02	.06	.10	.001	.09	.03	.10	.002
Time spent without adults or only with siblings/day (≥3 hours)	.19	.03	.18	<.001	-.02	.06	.18	<.001	.19	.03	.19	.<.001
Parental supervision level perceived by children (Medium)	-.14	.03	-.15	<.001	.15	.06	-.15	<.001	-.15	.03	-.16	<.001
Parental supervision level perceived by children (High)	-.21	.03	-.23	<.001	.07	.06	-.23	<.001	-.21	.03	-.23	<.001
Maternal parenting stress	.20	.02	.28	<.001	.18	.04	.14	<.001	.19	.02	.26	<.001
Achievement pressure perceived by children									.07	.02	.12	<.001
F(*p*)	21.99(<.001)				4.56(<.001)				22.14(<.001)			
R^2	.206				.051				.219			

Note. B: unstandardized coefficient, β: standardized coefficient, SE: Standard Error, DV: Dependent variable

Table 4. Moderated Mediation Effect of Maternal Social Support (N=1,118)

Variables	B	SE	β	t	*p*	R^2	F(*p*)
Maternal parenting stress	.19	.04	.14	4.64	<.001	.06	3.58 (<.001)
Maternal instrumental support	.09	.06	.07	1.43	.153		
Maternal social network support	-.01	.06	-.01	-0.22	.827		
Maternal informational support	-.02	.05	-.02	-0.44	.660		

Maternal emotional support	-.07	.06	-.05	-1.17	.242
Maternal parenting stress × Maternal instrumental support	.08	.10	.04	0.82	.415
Maternal parenting stress × Maternal social network support	.19	.10	.10	1.88	.061
Maternal parenting stress × Maternal informational support	-.25	.08	-.15	-3.10	.002
Maternal parenting stress× Maternal emotional support	-.08	.08	-.05	-0.99	.321

Conditional indirect effect	Maternal informational support	B	SE	95% CI
	Mean-SD	.02	.01	.01~.03
	Mean	.01	.00	.01~.02
	Mean+SD	.01	.00	.00~.02

Moderated mediation index: B=-.01, SE=.00, 95% CI; -.02~-.00
Johnson-Neyman significance region: 1.00~4.57
Controlled: Gender, Maternal education level, Maternal subjective health status, Dual-income status, Time spent without adults or only with siblings/day, Parental supervision level perceived by children

Note. B: unstandardized coefficient, β: standardized coefficient, CI: confidence interval, SD: Standard Deviation, SE: Standard Error

4. Discussion

This cross-sectional study used nationally representative data from Korean children to explore mediating and moderating factors in the relationship between maternal parenting stress and children's internet addiction. Guided by Abidin's Parenting Stress Model, findings revealed that maternal parenting stress directly influences children's internet addiction, with achievement pressure perceived by children acting as a mediator. Moreover, maternal social support, especially informational support, buffered the relationship between parenting stress and children's perceived achievement pressure, and was associated with a lower risk of internet addiction in children.

First, maternal parenting stress showed a significant direct effect on children's internet addiction, consistent with studies linking parenting stress to child behavioral problems, including smartphone addiction [7-9]. Since parenting stress affects parent-child interactions and children's media use patterns [28], it is an important intervention target. These findings suggest that high maternal stress is a predictive factor for internet addiction and underline the need for parental stress management strategies to improve child behavioral outcomes. Although causal relationships cannot be confirmed due to the cross-sectional nature of the study, the significant associations suggest that reducing maternal stress could positively impact children's mental health. Enhancing parental support systems to reduce parenting stress could potentially lower the risk of children's internet addiction. National and community-level programs should provide systematic stress management training for mothers experiencing high levels of parenting stress. Such interventions may include mindfulness-based stress reduction, parenting counseling, and group therapy aimed at alleviating parenting-related stress. Second, children's perceived achievement pressure significantly mediated the relationship between maternal parenting stress and internet addiction, in line with previous studies applying Abidin's model [29, 30]. Maternal stress may lead to controlling parenting behaviors— punitive or coercive— that heighten children's pressure to perform, thus increasing behavioral issues [28]. In Korea's competitive, exam-oriented education system, parents often have high expectations, resulting in increased pressure on children [13].

To address this, balanced parenting education and stress management strategies should be incorporated into community programs. Government-led programs by the Ministry of Gender Equality and Family and the Ministry of Health and Welfare currently offer parenting education to diverse populations [10]. However, they lack focused content addressing achievement-oriented parenting. These programs should include positive parenting strategies and emphasize that excessive pressure may undermine children's self-directed learning and

cause academic stress [31]. Parents need tools to reduce negative behaviors, such as communication skill training [9], to better support their children. Family-level interventions should also target healthy media use and addiction prevention. While prior research has shown that parenting stress is associated with children's behavioral problems such as media addiction [6] and that social support can buffer the negative impact of stress on parenting outcomes [17, 18], most studies have examined these connections separately rather than together.

Few have examined how achievement pressure perceived by children functions as a mediator, or how specific sub-domains of social support—particularly informational support—moderate these relationships. Moreover, although the Panel Study on Korean Children (PSKC) has been widely used to study developmental outcomes [21], no published work has yet applied it to test a moderated mediation model of parenting stress, achievement pressure, and internet addiction in children. This study directly addresses these gaps.

This study also found that informational support significantly moderated the relationship between parenting stress and children's perceived achievement pressure. This supports research indicating that access to reliable parenting information can reduce stress, mitigate negative behaviors, and improve family resilience [11], [28]. Strengthening informational support systems is therefore essential. Local health centers, schools, and digital platforms should offer customized resources for parents, including evidence-based parenting strategies, academic preparation guidelines, and support services for children's mental health. In addition, establishing parenting information hotlines or online services would improve access and help ensure that parents receive timely and reliable assistance. Given the unique academic pressures in Korean society, identifying specific information needs—such as exam resources and mental health support—will help tailor interventions effectively. Notably, over 50% of children in this study were at risk of internet addiction, exceeding the approximately 40% rate reported in a government dataset [31]. While differences in assessment tools and populations limit direct comparisons, rates reported in the U.S. (24.6%) [32], and Taiwan (25.9%) [33] are lower, suggesting a heightened problem in Korea. This may be due to Korea's high smartphone ownership among school-aged children, which reached 81.2% in 2018 [34].

Thus, addressing internet addiction requires a comprehensive approach—beyond education programs—that includes managing maternal parenting behavior and enhancing social support. A broader policy shift may also be necessary, moving away from a competition-focused educational model to one supporting holistic student development.

Despite its contributions, this study has limitations. Its cross-sectional design prevents causal inference. The analysis did not account for paternal involvement or parental self-efficacy, and children's internet addiction was assessed through maternal reports only. Nonetheless, using a nationally representative sample and a sound theoretical framework, this study offers important insights into the mechanisms underlying children's internet addiction and highlights potential intervention points.

Future research should include longitudinal studies to assess causality, and consider additional variables such as type of media device, children's gender, parental education, and household income structure. Data from schools—such as teacher assessments or child self-reports—would also provide a more comprehensive perspective. Given the limited moderating effects found for social support sub-domains, future studies should explore these potential interactions in more depth.

5. Conclusions

This study has significant importance as it utilizes the representative sample from the PSKC survey to examine the mediating and moderated mediation effects of variables influencing children's internet addiction. Expanding on previous research on the impact of parenting stress and behavior on children's internet addiction, this study specifically considers maternal parenting behavior and social support. It provides a model-based investigation into how maternal parenting behavior influences negative behavior in children through the mediation of achievement pressure perceived by children. The achievement pressure perceived by children exhibited a moderated mediation effect depending on maternal social support. The results of this study can serve as foundational data for mental health interventions targeting children and parents to prevent children's internet addiction.

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