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Influence of Smartphone Dependence, Mental Health, and Resilience on Military Life Adjustment Among Soldiers: A Cross-Sectional Study

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Purpose: This study aimed to examine the influence of smartphone dependence, mental health, and resilience on military life adjustment among soldiers.
Methods: Data from a total of 173 subjects were collected from February 11, 2025 to March 8, 2025, using a self-report questionnaire. The data were analyzed using independent t-tests, one-way ANOVAs, the Scheffé test, Pearson's correlation coefficient, and multiple linear regression analysis.
Results: Resilience (β=.65, p<.001), high-risk smartphone dependence (β=-.17, p=.001), mental health (β=-.14, p=.027), and the experience of difficulties in military life (β=-.12, p=.001) were identified as factors influencing military life adjustment. These variables accounted for 83.0% (F=67.92, p<.001) of the variance in military life adjustment.
Conclusion: The findings of this study demonstrate the necessity of developing integrated intervention programs to enhance military life adjustment among soldiers. In particular, as resilience was identified as the most influential factor, interventions aimed at strengthening resilience, along with strategies for regulating smartphone use, promoting mental health, and alleviating service-related stress, are warranted.

Keywords: Military personnel; Internet addiction disorder; Mental health; Resilience; Psychological adaptation

Introduction

In South Korea, the ages of soldiers performing military service are mostly between 20 and 21 years [1]. Military service refers to performing the military duties imposed by the state, and Korea enforces a conscription system based on this duty of mandatory military service. Under a conscription system, the government legally requires adult male citizens of a certain age to perform compulsory military service for a set period, and thus this military service system is distinct from that of Western countries such as the United States and the United Kingdom, which implement a volunteer military system [2]. In particular, since Korean military has a unique hierarchical structure in the military service environment described above, it requires a higher level of organizational adaptation from soldiers. As a result, soldiers who tend to place importance on autonomy and horizontal relationships frequently experience difficulties in adjusting to military life due to conflicts between such personal tendencies and characteristics of the military organization, and thus, adjustment to this environment has become an important task for soldiers [3,4].

Maladjustment to military life refers to psychological and behavioral difficulties that arise from the interaction between the individual characteristics of a soldier and the environmental factors of the military organization, and it negatively affects both the

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individual and the military [5]. According to 2023 data from the Ministry of National Defense, approximately 20% of enlisted soldiers experience military maladjustment [6], and the number of people discharged early due to this problem reached more than 3,000 [7]. This military maladjustment has been reported to be closely related to mental health problems such as depression and anxiety [8]. As of 2022, the number of psychiatric outpatients receiving treatment at military hospitals approached 40,000, and the number of psychiatric inpatients reached 1,330, a 43.6% increase compared to 2018 [9]. However, the mental health management system for early screening and management of these problems within the military has not yet been sufficiently systematically established, and there is only a limited number of specialized personnel for mental health management of military personnel [9,10]. Additionally, the number of suicide deaths in the military is reported to be 68, accounting for the highest proportion among all deaths in the military [6], and thus, greater attention needs to be paid to the mental health issues of military personnel.

Since July 2020, the Ministry of National Defense has permitted smartphone use after work hours for all military units of the Republic of Korea (ROK) Armed Forces [11]. This policy of permitting smartphone use in the military has led to increased smartphone use among soldiers during off-duty hours on weekdays and weekends, and 35.4% of soldiers have been reported to use their smartphones for more than 10 hours per day during non-working days, such as weekends or public holidays [12]. However, excessive smartphone use has been found to increase the incidence of mental health problems, such as depression, anxiety, and stress [13,14], and it has also been pointed out that especially in the controlled military environment, excessive smartphone use can cause emotional anxiety in soldiers, and thus is a risk factor that hinders their adaptation to military life [15,16]. However, to date, research on smartphone overdependence has been mainly focused on smartphone use among college students [17,18], and there has been limited research on smartphone dependence among soldiers since the system of permitting the use of the smartphone in the military was implemented. Thus, there is a need to examine the level of smartphone dependence among soldiers in the changed military environment.

Resilience is defined as an important psychological resource that helps to maintain psychological stability by effectively coping with and overcoming a negative situation when an individual is faced with such a situation [19]. In soldiers, it has been shown that a higher level of resilience is linked to a higher level of adjustment to military life [20], and it is also associated with improved stress management abilities and a lower level of smartphone dependence [21]. As shown in previous studies, resilience is closely associated with mental health, and has a significant relationship with smartphone dependence and adjustment to military life. Therefore, identification of the level of resilience in soldiers can be an effective intervention strategy for improving their adjustment to military life and promoting their mental health. However, previous studies on adaptation to military life [21-23] either focused on single factors such as depression and anxiety or analyzed the relationship between adjustment to military life and smartphone dependence in a fragmented manner, resulting in a lack of consistency between analysis results. Moreover, there is a lack of integrated analyses that comprehensively analyzed mental health, smartphone dependence, and resilience by simultaneously considering them. Therefore, this study aimed to investigate the levels of smartphone dependence, mental health, and resilience, focusing on adaptation to military life, and to identify the factors influencing adaptation to military life by analyzing the interactions between the variables in order to provide basic data for developing a program to improve the level of adaptation to military life among soldiers. In short, the specific objectives of this study are to examine the levels of smartphone dependence, mental health, and resilience among soldiers and to identify factors affecting adaptation to military life among them.

Methods

Study design

This study is a descriptive survey research to investigate the levels of smartphone dependence, mental health, resilience, and adaptation to military life, and examine the impacts of smartphone dependence, mental health, and resilience on adaptation to military life among soldiers.

Participants

The participants of this study consisted of 148 Army soldiers, 11 Navy soldiers, and 6 Air Force soldiers. All of them were active-duty soldiers who were currently performing military service mandatory for citizens of the Republic of Korea, and their ranks ranged from private to sergeant. Only those who understood the purpose of the study and voluntarily agreed to participate were included in the study, and full-time reserve personnel and officers were excluded from the study. The sample size of the study was calculated using G*Power 3.1.9.7 by applying a significance level of .05, a medium effect size of .15, a power of .90, and 12 predictors, based on previous research [22]. As a result, the mini-

mum sample size was determined as 157 people. Considering a dropout rate of 10%, a total of 173 participants were recruited. 68 online and 105 offline copies of questionnaires were collected. After excluding 8 participants (3 online and 5 offline questionnaires) due to insufficient responses, data from 165 participants was finally included in the analysis.

Measures

1. Smartphone dependence

The level of smartphone dependence was measured using the Integrated Smartphone Overdependence Scale developed by the National Information Society Agency [24]. This scale consists of 10 items across three subdomains: self-control failure, salience, and serious consequences. Each item is rated on a 4-point Likert scale. According to the classification criteria, a total score of 10 to 23 points was categorized as the normal group, a total score of 24 to 28 points as the potential risk group, and a total score of 29 to 40 points as the high-risk group. Regarding the reliability of this scale, the value of Cronbach's α was reported as .92 in the study by Lee et al. [12], and it was calculated as .93 in this study.

2. Mental health

Mental health was measured using the SCL-47-R, which is a shortened Korean version of the SCL-90-R developed by Derogatis et al. [25]. A standardized Korean version of the SCL-90-R was developed by Kim and Kim [26]. The SCL-47-R used in this study was developed by Lee [27] through the adaptation of the standardized version into a short form and factor analysis. The SCL-47-R contains a total of 47 items across 9 symptom dimensions (subfactors): somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Each item is rated on a 5-point Likert scale. A higher total score indicates poorer mental health, and in this study, the average item scores were used for analysis. As for the reliability of this scale, the value of Cronbach's α was reported as .98 in a previous study by Ha et al. [28], and it was .98 in this study as well.

3. Resilience

The level of resilience was measured using the YKRQ-27 developed by Shin et al. [29]. This scale consists of 27 items, three factors (control, positivity, and sociability), and nine subfactors. Each item is rated on a 5-point Likert scale. A higher score indicates a higher level of resilience. In this study, the average item scores were used in the analysis, and items 9, 10, 13, 16, 20, and 24 were reverse-scored. As for the reliability of the total scale, the value of Cronbach's α was reported as .90 in the study by Kim & Kang [30], and it was calculated as .95 in this study.

4. Adaptation to military life

The level of adaptation to military life was assessed using the Military Life Adjustment Scale developed by Kim and Kim [4]. This scale consists of 32 items across 6 factors, but this study excluded the 'romantic relationship' factor, since it has been found to have no significant direct relationship with adaptation to military life in a previous study [23]. In addition, the 'mental health' factor was excluded because the use of this factor could reduce construct validity and pose a risk of multicollinearity due to the conceptual and content overlap between this factor and the mental health scale used in this study in terms of concepts such as depression, anxiety, and somatization. Thus, this study used only 20 items across four subfactors: military life value, job competence, relationship with seniors, and relationship with colleagues. Each item is rated on a 5-point Likert scale, and a higher score indicate a higher level of adaptation to military life. The average item scores were used in the analysis. Items 8, 9, 11, 13, 14, and 15 were reverse-scored. As for the reliability of the total scale, the value of Cronbach's α was reported as .94 by the developer of the scale [4], and it was also calculated as .93 in this study.

Data collection and analysis

1. Data collection

Data collection was conducted from February 11 to March 8, 2025 by using both online and offline survey modes. To ensure consistency in data collection, research assistants were provided with prior training on the use of the survey tools, participant guidance, and ethical guidelines. In the case of offline data collection, to recruit the participants, the researcher and research assistants explained the purpose and participation procedures of the study to the soldiers in uniform waiting to use a train or the subway in major areas of the Metropolitan area, such as the areas around Munsan Station in Paju, Gyeonggi Province, Seoul Station, and Yongsan Station. As a result, 105 copies of the questionnaires were collected from the participants who voluntarily agreed to participate and gave informed consent. As for online data collection, an online survey was conducted by posting research participant recruitment notices in public facilities and commercial establishments in the above-mentioned areas after obtaining permission from the managers of the relevant facilities, and those who wished to participant in the survey were asked to

participate through the online QR code provided in the notice. Through this process, 68 copies of questionnaires were collected online.

2. Data analysis

The collected data was analyzed using IBM SPSS Window 25.0. The participants' general characteristics, control variables, and the levels of smartphone dependence, mental health, resilience, and adaptation to military life among the participants were analyzed using descriptive statistics by calculating frequencies, percentages, means, and standard deviations. To verify the significant differences in the levels of smartphone dependence, mental health, resilience, and adaptation to military life according to the general characteristics of the participants and control variables, the independent sample t-test, and one-way ANOVA were performed, and post-hoc tests were conducted using the Scheffé test. The correlations between variables were analyzed using Pearson's correlation coefficient, and multiple linear regression analysis was performed to identify the factors influencing adaptation to military life.

Ethical considerations

This study was conducted after receiving approval from the Institutional Review Board of Jeju National University (IRB No: JJNU-IRB-2025-002-001). Before conducting the study, informed consent was obtained from the participants who understood the purpose and procedures of the study and voluntarily agreed to participate.

Results

General and control variable characteristics

With respect to the general characteristics of the participants, out of a total of 165 participants, regarding military classification, Army soldiers accounted for 89.7% (148 people). In terms of rank, privates first class (47.9%, 79 people) took up the largest proportion of the participants. As for military service duration, those who served in the military for 6 months or more but less than 12 months accounted for 53.9% (89 people), taking up the largest proportion. In the case of military position, combat support branches (57.0%, 94 people) took up the majority. Regarding education level, the majority of the participants were currently college students ('in college') (70.9%, 117 people), and in economic status, the middle economic status group (77.6%, 128 people) took up the majority. With respect to smartphone usage time, average weekday smartphone usage time was 2.65 ± 0.81 hours, and 57.0% (94 people) were found to use the smartphone longer than the average weekday usage time. Average weekend smartphone usage time was 8.35 ± 2.62 hours, and 53.3% (88 people) were found to use the smartphone less than the average weekend usage time. As to the presence of experience of difficulties in military service, 33.9% (56 people) answered 'yes.' Regarding help-seeking target, 'superiors or senior in the unit' (46.2%, 18 people) was found to be the most preferred person that the participants would ask for help. As for future help-seeking intention, 84.8% (140 people) answered 'yes' and for expected help-seeking target, 'superiors or senior in the unit' took up the majority of the responses at 49.6% (70 people) (Table 1).

Differences in the levels of smartphone dependence and mental health according to the general characteristics and control variables of the participants

With respect to differences in the levels of smartphone dependence, mental health, and resilience according to general characteristics and control variables, as for smartphone dependence, there were significant differences in the level of smartphone dependence according to military classification ($F = 4.00$, $p = .008$), rank ($F = 16.31$, $p < .001$), military service duration ($F = 8.33$, $p < .001$), economic status ($F = 12.11$, $p < .001$), and experience of difficulties during military service ($t = 3.69$, $p < .001$). As a result of post-hoc tests, Army soldiers had a significantly higher level of smartphone dependence than Navy soldiers. In terms of rank, privates first class had a significantly higher score for smartphone dependence than corporals and sergeants. In terms of military service duration, those who served for less than 12 months had a significantly higher score for smartphone dependence than those who served for 12 months or more. Regarding economic status, the score for smartphone dependence was significantly higher in the low economic status group than the high and middle economic status groups.

Regarding mental health, there were significant differences in the level of mental health according to rank ($F = 28.20$, $p < .001$), military service duration ($F = 10.93$, $p < .001$), economic status ($F = 21.72$, $p < .001$), average weekend smartphone usage time ($t = 1.98$, $p = .049$), and presence of difficulties during military service ($t = 2.86$, $p = .005$). The results of post-hoc analysis showed that privates first class showed a significantly higher score for mental health than sergeants and corporals. Regarding military service duration, those who served for less than 12 months showed a significantly higher mental health score than those who served for 12 months or more. As to economic status, the low economic status group had a significantly higher mental

Table 1. General Characteristics and Control Variables of the Participants (*N*=165)

Variables	Categories	n (%)	Mean ± SD	Min-Max
Rank	Private first class	79 (47.9)		
	Corporal	63 (38.2)		
	Sergeant	23 (13.9)		
Military service duration (months)	< 6	18 (10.9)		
	6 ≤ x < 12	89 (53.9)		
	> 12	58 (35.2)		
Military position	Combat arms	64 (38.8)		
	Combat support branches	94 (57.0)		
	Confidential	7 (4.2)		
Education level	High school graduate	37 (22.4)		
	In college	117 (70.9)		
	≥ College graduate	11 (6.7)		
Economic status	High	18 (10.9)		
	Middle	128 (77.6)		
	Low	19 (11.5)		
Weekday smartphone allowance·usage (hours)	Allowed time		3.75 ± 0.76	1-6
	Usage time		2.65 ± 0.81	1-5
	< 2.65	71 (43.0)		
	≥ 2.65	94 (57.0)		
Weekend smartphone allowance·usage (hours)	Allowed time		12.19 ± 1.59	1-16
	Usage time		8.35 ± 2.62	1-14
	< 8.35	88 (53.3)		
	≥ 8.35	77 (46.7)		
Difficulties during military service	No	109 (66.1)		
	Yes	56 (33.9)		
Experience of help-seeking	No	17 (30.4)		
	Yes	39 (69.6)		
Help-seeking target	Superiors or senior in the unit	18 (46.2)		
	Peers in the unit	13 (33.3)		
	Peers outside the military	5 (12.8)		
	Family	3 (7.7)		
	Mental health professionals	0 (0)		
Future help-seeking intention	No	25 (15.2)		
	Yes	140 (84.8)		
Expected help-seeking target	Superiors or senior in the unit	70 (49.6)		
	Peers in the unit	32 (22.7)		
	Peers outside the military	15 (10.6)		
	Family	17 (12.1)		
	Mental health professionals	7 (5.0)		

health score than the high and middle and economic status groups, indicating poorer mental health in the low economic status group.

With respect to resilience, there were significant differences in the level of resilience according to rank ($F = 12.56$, $p < .001$), military service duration ($F = 6.73$, $p = .002$), economic status ($F = 37.50$, $p < .001$), and experience of difficulties during military service ($t = -2.70$, $p = .009$). The results of post-hoc analysis showed that the score for resilience was significantly higher among corporals and sergeants than privates first class. Also, the score for resilience was significantly higher among those who served for 12 months or more than those who served for less than 12 months. In terms of economic status, the high economic status group had a significantly higher score for resilience than the middle and low economic status groups, and the middle economic status group showed a significantly higher score for resilience compared to the low economic status group.

As for adaptation to military life, there were significant differences in the level of adaptation to military life according to rank ($F = 9.64$, $p < .001$), military service duration ($F = 4.57$, $p = .012$), economic status ($F = 26.07$, $p < .001$), experience of difficulties during military service ($t = 5.02$, $p < .001$), and future help-seeking intention ($t = 2.59$, $p = .011$) among general characteristics and control variables. As a result of post-hoc analysis, in rank, the score for adaptation to military life was significantly higher among corporals and sergeants than privates first class. In terms of military service duration, the score for adaptation to military life was significantly higher in those who served for 6 months or more than those who served for less than 6 months. Regarding economic status, the high economic status group showed a significantly higher score for adaptation to military life, compared to the low and middle economic status groups (Table 2).

Levels of smartphone dependence, mental health, resilience, and adaptation to military life among the participants

Among the participants, the average score for smartphone dependence was 20.19 ± 7.31 points, and as a result of dividing the participants into three groups based on the degree of smartphone dependence, the normal group (107 people, 64.8%) took up the largest proportion, followed by the potential risk group (36 people, 21.8%), and the high-risk group (22 people, 13.3%). The average score of the total items of mental health was 1.93 ± 0.94 points. For the average item score of each of the nine subfactors, 'phobic anxiety' had the lowest mean score at 1.77 ± 0.98 points, and 'obsessive-compulsive symptoms' had the highest mean score at 2.11 ± 1.07 points. The average score of the total items of

Table 2. Differences in Smartphone Dependence, Mental Health, Resilience, and Adaptation to Military Life According to General Characteristics and Control Variables of the Participants (*N*=165)

Variables	Categories	n	Smartphone dependence		Mental health		Resilience		Adaptation to military life	
			Mean ± SD	t/F(*p*) Scheffé	Mean ± SD	t/F(*p*) Scheffé	Mean ± SD	t/F(*p*) Scheffé	Mean ± SD	t/F(*p*) Scheffé
Military classification	Army[a]	148	20.72 ± 7.38	4.00(.008) a > b = c	1.99 ± 0.96	3.00(.053)	3.62 ± 0.77	1.45(.237)	3.58 ± 0.78	2.22(.111)
	Navy[b]	11	13.72 ± 4.60		1.29 ± 0.38		4.01 ± 0.46		4.08 ± 0.45	
	Air force[c]	6	19.00 ± 2.44		1.76 ± 1.76		3.79 ± 0.42		3.57 ± 0.34	
Rank	Private first class[a]	79	23.30 ± 7.35	16.31(< .001) a > b = c	2.42 ± 0.98	28.20(< .001) a > b = c	3.37 ± 0.81	12.56(< .001) a < b = c	3.36 ± 0.84	9.64(< .001) a < b = c
	Corporal[b]	63	17.49 ± 6.09		1.42 ± 0.52		3.95 ± 0.60		3.88 ± 0.59	
	Sergeant[c]	23	16.91 ± 5.98		1.64 ± 0.81		3.80 ± 0.47		3.73 ± 0.61	
Military service duration (months)	< 6[a]	18	23.27 ± 6.99	8.33(< .001) a = b > c	2.48 ± 1.06	10.93(< .001) a = b > c	3.34 ± 0.66	6.73(.002) a = b < c	3.33 ± 0.70	4.57(.012) a < b = c
	6 ≤ ~ < 12[b]	89	21.48 ± 7.65		2.09 ± 0.97		3.54 ± 0.83		3.52 ± 0.84	
	> 12[c]	58	17.25 ± 5.88		1.52 ± 0.67		3.92 ± 0.53		3.84 ± 0.59	
Military position	Combat arms	64	19.37 ± 7.83	1.88(.156)	1.84 ± 1.02	1.96(.144)	3.61 ± 0.89	0.91(.405)	3.62 ± 0.94	0.79(.457)
	Combat support branches	94	21.02 ± 6.94		2.03 ± 0.89		3.65 ± 0.65		3.58 ± 0.64	
	Confidential	7	16.57 ± 6.16		1.42 ± 0.49		4.02 ± 0.45		3.95 ± 0.31	
Education level	High school graduate	37	20.86 ± 8.93	0.47(.628)	2.18 ± 1.18	1.66(.194)	3.53 ± 0.93	0.89(.412)	3.50 ± 1.01	0.52(.594)
	In college	117	20.14 ± 6.82		1.86 ± 0.85		3.67 ± 0.68		3.64 ± 0.67	
	≥ College graduate	11	18.45 ± 6.69		1.83 ± 0.86		3.84 ± 0.74		3.63 ± 0.79	
Economic status	High[a]	18	16.50 ± 6.93	12.11(< .001) a = b < c	1.25 ± 0.37	21.72(< .001) c > b > a	4.29 ± 0.41	37.50(< .001) a > b > c	4.06 ± 0.58	26.07(< .001) a > b = c
	Middle[b]	128	19.71 ± 6.43		1.87 ± 0.82		3.72 ± 0.52		3.69 ± 0.55	
	Low[c]	19	26.94 ± 9.33		3.01 ± 1.21		2.60 ± 1.16		2.61 ± 1.23	
Weekday smartphones usage (hours)	< 2.65	71	19.63 ± 7.64	-0.85(.394)	1.92 ± 1.03	-0.09(.926)	3.58 ± 0.89	0.99(.322)	3.54 ± 0.87	0.98(.330)
	≥ 2.65	94	20.61 ± 7.06		1.94 ± 0.87		3.71 ± 0.61		3.66 ± 0.67	
Weekend smartphones usage (hours)	< 8.35	88	20.51 ± 7.47	0.60(.553)	2.07 ± 0.99	1.98(.049)	3.58 ± 0.81	-1.33(.185)	3.54 ± 0.80	-1.34(.182)
	≥ 8.35	77	19.83 ± 7.16		1.78 ± 0.85		3.74 ± 0.66		3.70 ± 0.71	
Difficulties during military service	No	109	18.74 ± 6.53	3.69(< .001)	1.78 ± 0.83	2.86(.005)	3.78 ± 0.53	-2.70(.009)	3.81 ± 0.56	-5.02(< .001)
	Yes	56	23.01 ± 7.96		2.22 ± 1.07		3.40 ± 0.99		3.22 ± 0.93	
Future help-seeking intention	Yes	140	19.96 ± 7.27	-0.95(.342)	1.89 ± 0.93	-1.30(.195)	3.70 ± 0.74	1.87(.063)	3.67 ± 0.76	2.59(.011)
	No	25	21.48 ± 7.58		2.16 ± 0.96		3.40 ± 0.72		3.25 ± 0.69	

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resilience was 3.65 ± 0.74 points, and for the average scores for each of the three subfactors, 'sociability' had the highest score (3.71 ± 0.85 points), followed by 'positivity' (3.64 ± 0.76 points), and 'control' (3.61 ± 0.77 points). The average score of the total items of adaptation to military life was 3.61 ± 0.76 points, and among the subfactors, 'relationship with colleagues' had the highest score. The average scores for each subfactor were 3.90 ± 0.90 points for 'relationship with colleagues', 3.61 ± 0.92 points for job competence, 3.61 ± 0.86 points for 'military life value', and 3.32 ± 1.01 points for 'relationship with seniors' (Table 3).

Correlations between smartphone dependence, mental health, resilience, and adaptation to military life among the participants

Among the participants, adaptation to military life had a significant negative correlation with smartphone dependence (r = -.734, p < .001) and mental health (r = -.827, p < .001), while it showed a significant positive correlation with resilience (r = .878, p < .001). In other words, a higher level of smartphone dependence and poorer mental health were associated with a lower level of adaptation to military life, but a higher level of resilience was linked to a higher level of adaptation to military life (Table 4).

Table 3. Level of Smartphone Dependence, Mental Health, Resilience, and Adaptation to Military Life (N=165)

Variables	Categories	n (%)	Mean ± SD	Min-Max
Smartphone dependence	Normal group	107 (64.8)		
	Potential risk group	36 (21.8)	20.19 ± 7.31	10-40
	High-risk group	22 (13.3)		
Mental health	Total item score		1.93 ± 0.94	1.00-4.64
	Obsessive-compulsive symptoms		2.11 ± 1.07	1.00-5.00
	Depression		2.06 ± 0.99	1.00-4.40
	Interpersonal sensitivity		2.02 ± 1.04	1.00-5.00
	Somatization		1.95 ± 0.92	1.00-4.67
	Anxiety		1.92 ± 1.05	1.00-5.00
	Psychoticism		1.86 ± 1.03	1.00-4.75
	Paranoid ideation		1.83 ± 1.03	1.00-5.00
	Hostility		1.78 ± 0.92	1.00-4.33
	Phobic anxiety		1.77 ± 0.98	1.00-5.00
Resilience	Total item score		3.65 ± 0.74	1.00-5.00
	Sociability		3.71 ± 0.85	1.00-5.00
	Positivity		3.64 ± 0.76	1.00-5.00
	Control		3.61 ± 0.77	1.00-5.00
Adaptation to military life	Total item score		3.61 ± 0.76	1.00-4.95
	Relationship with colleagues		3.90 ± 0.90	1.00-5.00
	Job competence		3.61 ± 0.92	1.00-5.00
	Military life value		3.61 ± 0.86	1.00-5.00
	Relationship with seniors		3.32 ± 1.01	1.00-5.00

Factors affecting adaptation to military life among the participants

Multiple linear regression analysis was performed to identify factors significantly affecting adaptation to military life among the participants. The independent variables were entered into the regression model in the order of general characteristics that had a significant impact on adaptation to military life (rank, military service duration, economic status), control variables (experience of difficulties during military service, future help-seeking intention), and major independent variables (smartphone dependence, mental health, resilience). Among these variables, categorical variables such as rank, military service duration, economic status, experience of difficulties in military life, future help-seeking intention, and smartphone dependence were converted into dummy variables before entering them into the regression model (Table 5).

As a result of testing basic assumptions of multiple linear regression analysis, the skewness and kurtosis values were within the acceptable range of ± 2, indicating that normality was met, but the two variables of mental health and adaptation to military life did not meet the linearity and homoscedasticity assumptions. Thus, a natural log transformation was applied to the two variables, and after the transformation, all the assumptions of regression analysis were met. As a result of performing testing for multicollinearity, the Durbin-Watson statistic of the regression model was 1.99, which is close to the criterion value of 2, indicating that there was no autocorrelation and the assumption of independence of residuals was met. In addition, the tolerance values were all greater than 0.1, ranging from 0.27 to 0.91, and the VIF values were all less than 10, ranging from 1.09 to 3.65, so it was determined that there was no problem of multicollinearity. As a result

Table 4. Correlations among Smartphone Dependence, Mental Health, Resilience, and Adaptation to Military Life (N=165)

Variables	Smartphone dependence	Mental health	Resilience
	r(p)		
Mental health	.751(<.001)	1.00	
Resilience	-.701(<.001)	-.817(<.001)	1.00
Adaptation to military life	-.734(<.001)	-.827(<.001)	.878(<.001)

Table 5. Factors Influencing Adaptation to Military Life (*N*=165)

Variables	B	SE	β	t	*p*	VIF
(Constant)	0.49	.07		5.12	< .001	
Rank (ref. Private First Class)						
Corporal	-0.05	.03	-.05	-0.92	.359	2.48
Sergeant	-0.02	.04	-.02	-0.37	.710	2.71
Military service duration (ref.6 ≤ ~ < 12)						
< 6	0.02	.03	.03	0.71	.478	1.17
> 12	0.01	.03	.01	0.25	.807	2.52
Economic status (ref. Middle)						
High	-0.06	.03	-.07	-1.94	.054	1.18
Low	-0.05	.03	-.06	-1.60	.112	1.57
Difficulties during military service (ref. No)						
Yes	-0.07	.02	-.12	-3.47	.001	1.18
Future help-seeking intention (ref. Yes)						
No	0.01	.03	.01	0.34	.733	1.09
Smartphone dependence (ref. Normal group)						
Potential risk group	0.01	.03	.01	0.21	.832	1.61
High-risk group	-0.13	.04	-.17	-3.42	.001	2.37
Mental health	-0.08	.04	-.14	-2.24	.027	3.65
Resilience	0.24	.02	.65	11.08	< .001	3.33
R^2 = .843 adjusted R^2 = .830 (F = 67.92, p < .001) *Durbin-Watson* = 1.99						

of regression analysis, resilience (β = .65, p < .001), high-risk smartphone dependence (β = -.17, p = .001), mental health (β = -.14, p = .027), and experience of difficulties during military service (β = -.12, p = .001) were identified as the factors influencing adaptation to military life. This regression model was statistically significant (F = 67.92, p < .001), and explained 83.0% of the variance in adaptation to military life. In other words, a higher level of smartphone dependence, poorer mental health, and experience of difficulties during military service were found to be associated with a lower level of adaptation to military life. On the other hand, a higher level of resilience was associated with a higher level of adaptation to military life (Table 5).

Discussion

This study attempted to investigate the levels of smartphone dependence, mental health, resilience, and adaptation to military life among military soldiers, and to identify factors influencing adaptation to military life. The discussion below will be focused on the factors influencing adaptation to military life.

The average smartphone usage time of the participants of this study was 2.65 hours out of 3.75 hours, the total allowed time for smartphone use on weekdays and 8.35 hours out of 12.19 hours, the total allowed time for smartphone use on weekends, which were approximately 70.7% and 68.5% of the total allowed time for smartphone use on weekdays and weekends, respectively. Compared to the results of a previous study of conscripted Navy soldiers [23], weekend smartphone usage time was somewhat lower, while weekday smartphone usage time in this study was similar. However, these results show that soldiers spend a considerable amount of time using smartphones. This study found that, differently from the past when smartphone use was completely banned, the actual smartphone usage rate in the current institutional environment is approximately 70% of the time when using the smartphone is permitted. In this respect, the present study has significance since the results of this study objectively presented the importance and impact of smartphone use in military life after the implementation of the system officially permitting smartphone use in the military. In this study, the potential risk group and the high-risk group for smartphone dependence took up 21.8% and 13.3% of the participants, respectively, and these proportions are higher compared to the results of a previous study of general adults [31], which reported that the proportions of the potential risk group and the high-risk group were 18.7% and 4.2%, respectively. In addition, comparison with other previous studies also showed that the proportion of the potential risk group in this study was similar to the results of previous studies, but the proportion of the high-risk group in this study was two

times higher compared to 2.4% in the study of conscripted soldiers by Lee et al. [12] and 6.5% in the study by Kim and Lee [32]. These smartphone usage patterns and levels of smartphone dependence among soldiers indicate the need for tailored intervention strategies that consider various characteristics of soldiers as well as the military environment. In addition, considering that the purpose and context of smartphone use may have a more significant impact on mental health than the absolute amount of smartphone usage time, future research should consider analyzing the purposes and patterns of smartphone use by using digital log records.

The average score for mental health was 1.93 points, which was higher than the average score of 1.58 points in a previous study on conscripted soldiers [21], indicating that the participants of this study were relatively more vulnerable in mental health. Among the subfactors of mental health, 'obsessive-compulsive symptoms' had the highest score at 2.11 points, and these results are believed to be due to the psychological tension and obsessive thoughts that soldiers may experience in a situation where soldiers who value autonomy and communication experience gaps in communication within the hierarchical structure of the military [3,11]. The results of this study revealed that military soldiers have complex mental health vulnerabilities, such as depression and interpersonal sensitivity as well as obsessive-compulsive symptoms, and these findings are consistent with a previous study of conscripted Army soldiers [28]. Despite the Ministry of National Defense's efforts to innovatively improve military culture and implement supportive measures for stable military service [11], major mental health problems such as depression, anxiety, and suicide are still on the rise among soldiers. Therefore, there is a need for customized interventions and involvement to primarily address vulnerability factors in mental health such as obsessive-compulsive symptoms, depression, and interpersonal sensitivity in military personnel.

In this study, the average score for resilience was 3.65 points, which is similar to the results of a previous study on conscripted Air Force soldiers [22]. The level of resilience among the participants of this study is thought to show that although the military environment causes them to experience psychological burdens due to limitations on autonomy and the hierarchical organizational structure of the military, soldiers maintain a certain level of resilience through the process of repeatedly experiencing and adapting to various stressful situations. These study results support the applicability of strategic intervention programs to systematically enhance resilience.

The average score for adaptation to military life was 3.61 points. A comparison with the results of previous studies on conscripted soldiers showed that this score is a similar level to the mean score of 3.63 points in a study of Army and Air Force soldiers by Lim & Kim [33], but it is lower than the mean score of 3.78 points in Park's study of Navy soldiers [23]. These differences in the research results about the level of adaptation to military life may be attributed to differences in working conditions and environments between military branches. Therefore, to effectively support adaptation to military life, it is required to implement tailored interventions that reflect the structural differences in working conditions, characteristics of missions, and lifestyles between the Army, Navy, and Air Force.

In the analysis of significant differences in adaptation to military life according to the general characteristics and control variables of the research participants, rank was found to have a significant impact on adaptation to military life. More specifically, sergeants and corporals showed a higher level of adaptation to military life than privates first class. This finding is consistent with a previous study of conscripted soldiers [34], and suggests the need for a rank-specific, tailored intervention designed to provide support for soldiers in the early stages of military service [34]. However, it should be noted that privates who had served for less than two months were excluded from the data collection process in this study, and thus, the characteristics of privates were not reflected in the interpretation of the research results by rank. In addition, the results of this study showed that experience of difficulties during military service was associated with a lower level of adaptation to military life. This finding is consistent with previous studies [12,21,28] reporting that increased stress levels and limited social support resources can lead to maladaptive behaviors. Therefore, in view of the above findings, early identification of soldiers who experience difficulties in adapting to military life is required, and it is necessary to help such soldiers adapt smoothly to the military organization through continuous attention and support.

In multiple linear regression analysis, resilience was found to have the most significant impact on adaptation to military life, followed by high-risk smartphone dependence, mental health, and experience of difficulties in military life in descending order. In other words, resilience was found to be the strongest influencing factor for adaptation to military life, and this finding is consistent with the results of previous studies of conscripted soldiers [22,28]. Although resilience was identified as a key factor in promoting adaptation to military life, soldiers who served for less than 12 months showed an overall vulnerable pattern not only in resilience but also in adaptation to military life and mental health.

Therefore, it is necessary to develop a modular resilience enhancement program that reflects the characteristics of soldiers depending on the military service duration and to prioritize soldiers in their early stages of service who were found to be particularly vulnerable in military life adjustment and mental health as a target group for the intervention program. Furthermore, in this study, regarding the help-seeking target that soldiers will ask for help when they have some difficulties during military service, the proportions of superiors, senior soldiers, and peers in the unit were higher than external resources such as peers outside the unit, health care experts, or the family. Considering these results, it is thought that group-based interventions that promote support among peer soldiers may be more effective than unilateral interventions centered on superiors.

The high-risk group for smartphone dependence showed a low level of adaptation to military life, and this result is consistent with a previous study of conscripted soldiers [21]. In particular, since smartphone dependence has been found to be associated with increased levels of stress and negative emotions as well as the deterioration of military service attitudes and a decline in the sense of belonging [35], systematic interventions to address psychological factors that can cause excessive smartphone use are required along with continuous monitoring of smartphone usage time for the high-risk group of smartphone dependence. In this study, it was also found that soldiers' smartphone usage time reached 68% to 70% of the total allowed time for smartphone use. Thus, based on these results, it is necessary to establish a basis for systematic monitoring of smartphone usage time, and it is also required to provide individual feedback and implement interventions to address the psychological causes of smartphone dependence, based on the monitoring results. Furthermore, poorer mental health among soldiers was found to be associated with a lower level of adaptation to military life. This finding is consistent with the results of a number of previous studies on conscripted soldiers [10,21,22]. Mentally unstable soldiers may show a tendency to be passive in asking for help or receiving support [10], which may lead to failure in adapting to military life. In this study, among the subfactors of mental health, 'obsessive-compulsive symptoms' was found to have the highest score, and among the subfactors of resilience, 'control' had the lowest score. These results suggest that soldiers experience a lack of psychological control as well as difficulty in emotional regulation due to the unique environmental factors of the military organization. Additionally, to complement the limitations of the current military mental health screening system, it can be considered as an alternative to introduce a standardized mental health screening tool that enables continuous monitoring of psychological difficulties that soldiers may experience during military service. In addition, each unit should be manned by specialized personnel, including psychiatric-mental health nursing officers, to create an environment where soldiers can express their psychological problems in a non-judgmental and safe environment.

In this study, experience of difficulties during military service was found to be associated with a lower level of adaptation to military life among soldiers. These results are consistent with a previous study on conscripted soldiers [10], which found that control, surveillance, and isolation within the military organizations can lead to psychological exhaustion and maladaptive behavior. Since soldiers tend to be reluctant to share their difficulties with others or ask for help, it is necessary to foster an open organizational culture and create communication channels that soldiers can turn to for communication without a psychological burden. In particular, the results of this study revealed that soldiers primarily perceive their senior soldiers and superiors in the unit as help-seeking targets. Therefore, training and education for senior soldiers and officers are needed to strengthen their mental health awareness and response capabilities. The participants of this study showed a low score for 'relationship with seniors' among the subfactors of adaptation to military life, and these results suggest that formal relationship networks may not function as effective emotional support resources. Therefore, there is a need for qualitative enhancement of the support systems that can provide active support based on trust.

Conclusions

This study was conducted to investigate the impact of smartphone dependence, mental health, and resilience on soldiers' adaptation to military life, and to provide basic data for developing programs to improve the level of adaptation to military life among soldiers. The results of this study revealed that resilience was the most significant influencing factor for military life adaptation, followed by high-risk smartphone dependence, mental health, and experience of difficulties during military service. These findings are expected to serve as a fundamental data for the development of nursing intervention programs and policy making to support soldiers' adaptation to military life.

However, this study measured smartphone usage time by a self-report method and did not reflect the purpose and pattern of smartphone use in the analysis. In addition, as the participants were selected from soldiers serving in a specific region by the convenience sampling method, this study did not include privates in

the early stage of military service, so this study has limitations in the generalization of research results. Therefore, it is suggested that follow-up studies should include samples across all ranks, and employ digital log data to objectively measure smartphone usage behaviors. In addition, follow-up research is needed to develop and validate nursing intervention programs that reflect key variables such as smartphone dependence, mental health, and resilience. Additionally, in future studies, there is a need to conduct an in-depth exploration of the context of adaptation to military life through mixed-methods research. The main significance of this study lies in the fact that the present research has presented the actual levels of smartphone use among soldiers under the current military policy of limitedly permitting smartphone use in the military, and has also provided a basis for developing nursing interventions by comprehensively analyzing the relationship between key factors such as smartphone dependence, mental health, and resilience and adaptation to military life.

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Authors' contributions

Soonnam Shin contributed to conceptualization, data curation, formal analysis, methodology, validation, visualization, and writing-original draft, review & editing. Kyungja Kang contributed to conceptualization, formal analysis, methodology, validation, and writing-review & editing.

Data availability

Please contact the corresponding author for data availability.

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