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Factors Affecting Multicultural Adolescents' Self-rated Health Based on an Ecological Model

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Purpose: This study explored factors influencing the self-rated health of multicultural adolescents by sex using an ecological model. **Methods:** This descriptive cross-sectional study aimed to identify the factors affecting self-rated health in multicultural adolescents, employing the World Health Organization's model of determinants of adolescent health and development as a framework. The study included 1,195 multicultural adolescents who provided data for the eighth wave of the 2018 Multicultural Adolescents Panel Study. Hierarchical analyses were conducted using secondary data from the same wave. T-tests and x^2 tests were performed to analyze data by sex. **Results:** Regarding individual-level factors, sex, body mass index, and depression significantly influenced self-rated health. Including interpersonal factors in the model revealed a significant change in F for men but not for women. Among men, parenting attitudes and relationships with peers were significant, whereas for women, national identity and household characteristics were influential. **Conclusion:** The findings highlight the necessity of a multidimensional approach that considers sex differences in developing effective policies to improve the health of multicultural adolescents.

Key Words: Adolescent health; Multiculturalism; Immigrants; Subjective health

INTRODUCTION

The United Nations has recently highlighted that populational changes are occurring globally and are largely driven by cross-border migration [1]. This is reflected in Korea, which is experiencing an accelerated transition toward becoming a multicultural society [2]. The Korean Ministry of Education [3] reported that the number of multicultural students across all levels in Korea rose to 160,058 in 2021, accounting for 3% of the total student population nationwide and representing a 16.6 % increase compared to 2019. However, the country's total number of students had decreased [3]. Thus, this increase in the number of multicultural students is a significant trend with potentially critical implications for multicultural policies at the national level. Accordingly, this situation requires sustained attention from relevant stakeholders.

In a longitudinal study on immigrant adolescents [4], racial/ethnic differences were found to affect emotional health, revealing that Asian immigrants, including those in Korea, had the highest depression levels, were more prone to perceived discrimination, and reported low self-esteem. These findings suggest that the challenges faced by Asian immigrants, such as cultural adaptation and societal perceptions, may extend to multicultural adolescents in Korea. In particular, despite the key importance of

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adolescent health, Korean adolescents were found to have the lowest self-rated health (SRH) among Organization for Economic Cooperation and Development (OECD) countries [5], thus it is also important to understand how multicultural adolescents in Korea perceive their health status.

Notably, as a simple assessment of overall health, SRH has been widely used as a health indicator in social health research [6, 7]. A significant predictor of actual health status at the individual level [8], it encompasses physical health, as well as emotional and social satisfaction, contributing overall quality of life [9]. A longitudinal study demonstrated the validity of SRH as a predictor of various aspects of health status over time [6]. Furthermore, SRH is an important predictor of mortality and health service use among adolescents [10]. Adolescents' awareness of their initial health status is also a central determining factor of their later health status [11]. Health awareness that is developed in adolescence has been shown to include subsequent greater awareness of physical health conditions and of personal, social, environmental, behavioral, and psychological health-related factors [12].

An and Kim [13] found, in relation to adolescent health, that: (i) psychosocial factors influence adolescent health; (ii) stress and depression can increase susceptibility to health issues; and (iii) gender plays a significant role in addressing adolescent health. Thus, research on gender differences related to adolescent health is necessary. Studies of Korean adolescents have reported variations in health behaviors [14] and the linear change in health status based on gender [15]. Therefore, gender is a determinant of health in relation to differences in health-related psychological factors affecting adolescents [16-18]. Furthermore, previous studies involving adolescents from multicultural families have reported significant gender differences in health behaviors and psychosocial factors [19-21]. Hence, considering the importance of gender differences as a determinant of adolescent health is crucial in related studies. This study attempted to hierarchically analyze the factors differentiating the influence on SRH by gender among multicultural adolescents.

1. Theoretical/Conceptual Framework

Based on the findings of relevant studies and the World Health Organization's (WHO) ecological model, this study proposed a theoretical framework for examining the factors of adolescent health and development (Figure 1). This study analyzed factors at the individual, interpersonal, and community levels and examined how they hierarchically affect the SRH of multicultural adolescents and the gender differences in these effects. Thus, this study aimed to provide basic data for intervention plans to improve the health status of multicultural adolescents.

Specifically, this descriptive cross-sectional study aimed to 1) verify whether there are gender differences in the general characteristics associated with SRH; 2) identify the factors that affect SRH through a hierarchical analysis at the individual, interpersonal, and community levels; and

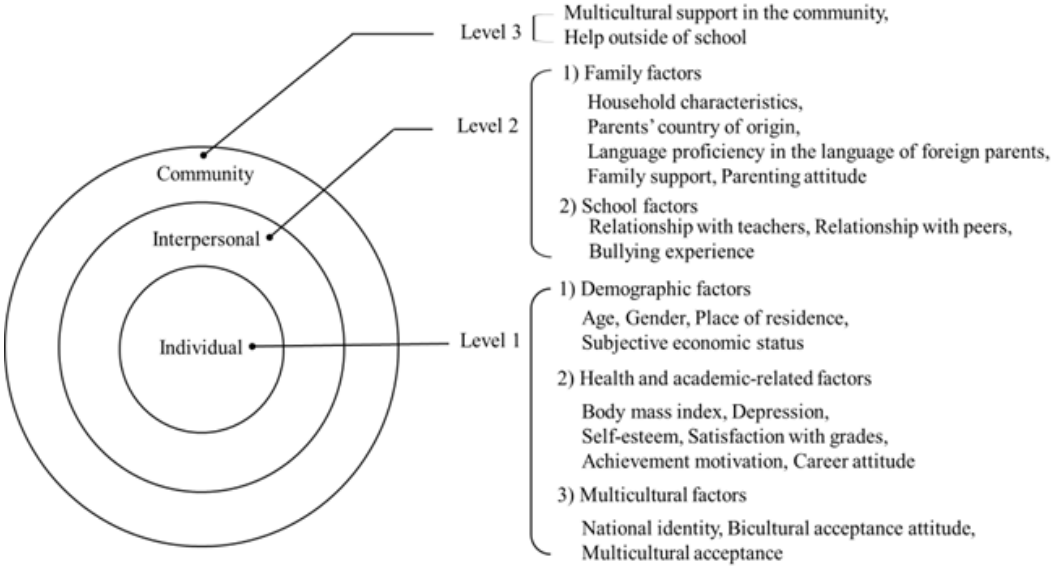

Figure 1. Study framework showing factors associated with the multicultural adolescents' health. The model was adapted from the World Health Organization's ecological model for adolescent health and development determinants.

3) assess any gender differences in terms of their effects on factors at the individual, interpersonal, and community levels in relation to SRH.

METHODS

1. Study Design

This descriptive cross-sectional study aimed at identifying the factors of SRH in multicultural adolescents, employing the World Health Organization's model of determinants of adolescent health and development as a framework. The study included 1,195 adolescents with one or both parents being foreigners and who provided data for the eighth wave of the 2018 Multicultural Adolescents Panel Study. Hierarchical analyses were conducted using secondary data from the eighth wave of the 2018 Multicultural Adolescents Panel Study.

2. Samples

This study utilized data from the eighth wave of the 2018 Multicultural Adolescents Panel Study (MAPS-VIII) conducted by the National Youth Policy Institute. The MAPS-VIII comprised panel data targeting multicultural adolescents (international married families, immigrant adolescents and children from foreign families) residing across 16 municipal and provincial regions of Korea. The survey sample was recruited using a two-stage approach: stratified random sampling (stage 1) and probability proportional to size sampling (stage 2), which increased the extraction rate proportional to the ratio of multicultural adolescents in each school. This approach ensured a self-weighted sampling design. A total of 1,197 adolescents responded to the survey, and data from 1,195 were selected for analysis. Two participants whose parents were both Korean were excluded.

3. Measurements/Instruments and Data Collection/Procedure

1) Dependent variable: self-rated health

SRH was measured by reverse-scoring the following item in the MAPS-VIII questionnaire: "What do you think of your health compared to your peers?" It was rated on a four-point Likert scale, with scores ranging from 1 to 4 (1=very healthy; 4=very unhealthy). As a higher score on this scale indicated lower SRH, it was reverse scored to create a measure where a higher score indicated higher SRH.

2) Independent variables: factors of self-rated health

Factors influencing SRH were classified into individual, interpersonal, and community-level factors based on the WHO model of determinants of adolescent health.

(1) Individual-level factors

Individual-level factors included demographic factors such as gender, age, and place of residence. Subjective economic status was measured using an item on family income rated on a five-point Likert scale, with scores ranging from 1 (very low) to 5 (very high). Responses 1 and 2 were reclassified as 1 (low), 3 (medium), and 4 and 5 (high).

Body mass index (BMI) was categorized into underweight (< 5th percentile), normal (5th to 85th percentile), and over weight (>85th percentile) according to BMI reference values by age and gender obtained from the 2017 Korean Growth Chart for Children and Adolescents [22]. Further, depression was measured using ten items and rated on a four-point Likert scale, with a higher total score indicating a higher level of depression. Cronbach's α for this scale was .910. Self-esteem was measured using the mean score of nine items rated on a five-point Likert scale (1=very low to 5=very high), with the item "I have nothing to be proud of" being reverse scored to create a measure by which a higher score indicates higher self-esteem. Self-esteem was rated on a five-point Likert scale, with scores ranging from 1 (very low) to 5 (very high). Cronbach's α for these items was .881.

Satisfaction with grades was measured on a four-point Likert scale, with scores ranging from 1 (very dissatisfied) to 4 (very satisfied), with a higher score indicating a higher level of satisfaction with grades. Achievement motivation was measured using eight items rated on a four-point Likert scale, with a higher score indicating a higher level of achievement motivation. Cronbach's α for these items was .887. Moreover, career attitude (preparedness) was measured using four items and a four-point Likert scale, including the item: "I want to discuss my career development with someone who has the job I am interested in." A higher total score indicates a more enthusiastic attitude toward one's career. Cronbach's α for these items was .783.

National identity was measured using four items, including the item: "When someone praises Korea, I feel like I am praised." Cronbach's α for these items was .904. Furthermore, bicultural acceptance attitude was measured using 10 items rated on a four-point Likert scale, with a higher total score indicating a more positive attitude toward bicultural acceptance. Cronbach's α for these items was .783. Finally, multicultural acceptance was measured using four items rated on a four-point Likert scale, with

higher total scores indicating a more positive attitude toward multicultural acceptance. Cronbach's α for these items was .888.Interpersonal- and community-level factors

Interpersonal-level factors were subdivided into family and school factors. Family-level factors comprised the following: household characteristics, including single-parent (i.e., parental marital status of divorced, separated, or widowed) and two-parent (i.e., parental marital status of married or living together) families.

The fathers' and mothers' countries of origin were Korea, China (including Korean-Chinese), Southeast Asia (Vietnam, the Philippines, Thailand), Japan, and other countries. Language proficiency in the language of foreign parents was measured by averaging their speaking, writing, reading, and listening scores, rated from 1 to 4 (1=incapable; 4=fluent).

Family support was measured using seven items rated on a four-point Likert scale, with a higher total score indicating greater family support. Cronbach's α for these items was .955. Further, parenting attitude (neglect) was measured using six items, with two being reverse scored. Cronbach's α for these items was .828.

Regarding school-level factors, the relationship with teachers was measured using three items rated on a five-point Likert scale, with a higher total score indicating a better relationship with teachers. Cronbach's α for these items was .891. Moreover, the relationship with peers was measured using four items rated on a five-point Likert scale, with a higher total score indicating a better relationship with peers. Cronbach's α for these items was .916. The experience of bullying was assessed using five items rated on a yes-or-no binary scale.

Additionally, community-level factors included multicultural support in the community and help outside of school, which were both rated on a yes-or-no binary scale.

4. Ethical Considerations

This secondary data study received final approval from the institutional review board of the [blinded for review] University in April 2022 (IRB No. [blinded for review]).

5. Data Analysis

All analyses were conducted using SPSS version 25.0 software. Descriptive statistics, t-test, and x^2 test were employed for data analysis to examine the participants' general characteristics and gender differences. Hierarchical regression analysis was performed to explore the factors affecting the SRH of multicultural adolescents and assess F value changes regarding the hierarchical level. Hierarchical regression analysis is a statistical technique used to examine the relative importance of multiple predictor variables based on research hypotheses [23].

RESULTS

1. Participants' General Characteristics

Male adolescents had a significantly higher score for SRH (M=3.26, standard deviation [SD]=0.61) compared to female adolescents (M=3.15, SD=0.59; $p<.001$). Most participants (73.4%) had a BMI within the normal range (between the 5thand 85thpercentile). Female adolescents had a significantly higher score for depression compared to male adolescents (M=1.88.SD=0.57 vs.M=1.69, SD=0.55, respectively; $p<.001$). Regarding the parental country of origin, 96.5% of the fathers were Korean, and 40% of the mothers (the highest proportion among mothers) were from Japan and other countries. Regarding family support, male adolescents reported a significantly higher level of support than female adolescents (M=3.23, SD=0.57 vs.M=3.11, SD=0.57, respectively; $p<.001$) (Table 1).

2. Factors of Multicultural Adolescents' Self-Rated Health

A hierarchical regression analysis was performed to identify the factors of SRH in multicultural adolescents among the individual-, interpersonal-, and community-level factors analyzed (Table 2). Model 1 encompassed the individual-level factors and was statistically significant (F=13.47, $p<.001$). Specifically, SRH was positively influenced by national identity (β=.07, $p=.042$) and bicultural acceptance attitude (β=.10, $p=.003$), while it was negatively influenced by depression (β=-.24, $p<.001$).

In Model 2, interpersonal-level factors were added, including household characteristics, parental country of origin, language proficiency in the language of foreign parents, and parenting attitude. Model 3 included all variables in Model 2 and school-level factors, resulting in a better model fit (adjusted $R^2=.17$). The analysis showed that family support positively affected SRH (β=.10, $p=.010$).

Regarding analyses by gender, for male adolescents, Model 2 had higher goodness of fit than Model 1 (adjusted $R^2=.15>.12$, F change=3.05, $p<.001$). Despite the better fit of Model3 compared to Model2, the change in F was not statistically significant (adjusted $R^2=.16>.15$, F change= 2.54, $p=.056$). Model 4, which included the community-level variables, showed the same fit as Model 3, indicating

Table 1. General Characteristics of Multicultural Adolescents by Gender

Variables	Categories	All (*N*=1,195)	Male (n=586)	Female (n=609)	*p*
		n (%) or M±SD	n (%) or M±SD	n (%) or M±SD	
Health status (range: 1~4)		3.21±0.60	3.26±0.61	3.15±0.59	<.001
Personal level					
Demographic factors					
Age (year) (range: 16~20)		16.96±0.35	16.97±0.34	16.96±0.37	.670
Place of residence	Metropolis	302 (25.2)	160 (27.3)	142 (23.3)	.195
	City	538 (45.0)	263 (44.9)	275 (45.2)	
	Rural	355 (29.7)	163 (27.8)	192 (31.5)	
Subjective economic status	Low	616 (52.5)	300 (51.9)	316 (53.0)	.864
	Middle	532 (45.3)	266 (46.0)	266 (44.6)	
	High	26 (2.2)	12 (2.1)	14 (2.3)	
Health- and academic-related factors					
BMI percentile	<5th	115 (9.7)	72 (12.3)	43 (7.1)	.003
	5th~<85th	874 (73.4)	408 (69.6)	466 (77.2)	
	≥85th	201 (16.9)	106 (18.1)	95 (15.7)	
Depression (range: 1~4)		1.79±0.57	1.69±0.55	1.88±0.57	<.001
Self-esteem (range: 1~5)		3.80±0.67	3.85±0.67	3.75±0.67	.009
Satisfaction with grades (range: 1~4)		2.32±0.72	2.42±0.75	2.23±0.69	<.001
Achievement motivation (range: 1~4)		3.04±0.46	3.05±0.47	3.02±0.45	.214
Career attitude (preparedness) (range: 1~4)		2.98±0.55	2.90±0.55	3.06±0.54	<.001
Multicultural factors					
National identity (range: 1~4)		2.90±0.65	2.90±0.68	2.93±0.61	.222
Bicultural acceptance attitude (range: 1~4)		2.92±0.42	2.90±0.44	2.94±0.40	.143
Multicultural acceptance (range: 1~4)		3.22±0.55	3.15±0.55	3.30±0.54	<.001
Interpersonal level					
Household characteristics	Two-parent family	1,062 (90.5)	527 (91.2)	535 (89.8)	.411
	Single-parent family	112 (9.5)	51 (8.8)	61 (10.2)	
Father's country of origin	Korea	1,105 (96.5)	541 (96.6)	564 (96.4)	.939
	China	3 (0.3)	2 (0.4)	1 (0.2)	
	Southeast Asia	7 (0.6)	3 (0.5)	4 (0.7)	
	Japan and other countries	30 (2.6)	14 (2.5)	16 (2.7)	
Mother's country of origin	Korea	37 (3.1)	17 (3.1)	20 (3.3)	.911
	China	295 (24.6)	142 (24.2)	153 (25.1)	
	Southeast Asia	385 (32.2)	194 (33.1)	191 (31.4)	
	Japan and other countries	478 (40.0)	233 (39.8)	245 (40.2)	
Proficiency in parents' foreign language (range: 1~4)		2.06±0.83	2.03±0.84	2.09±0.82	.251
Family support (range: 1~4)		3.17±0.57	3.23±0.57	3.11±0.57	.001
Relationship with peers (range: 1~5)		4.05±0.73	4.02±0.73	4.08±0.72	.191
Relationship with teachers (range: 1~5)		3.88±0.78	3.95±0.78	3.81±0.78	.001
Parenting attitude (neglect) (range: 1~4)		1.75±0.5	1.77±0.51	1.74±0.49	.387
Bullying experience	Yes	64 (5.3)	38 (6.5)	26 (4.3)	.089
	No	1,131 (94.6)	548 (93.5)	583 (95.7)	
Community level					
Multicultural support in community	Yes	196 (16.4)	86 (14.7)	110 (18.1)	.114
	No	999 (83.6)	500 (85.3)	499 (81.9)	
Help outside of school	Yes	355 (29.7)	180 (30.7)	175 (28.7)	.454
	No	840 (70.3)	406 (69.3)	434 (71.3)	

M=mean; SD=standard deviation.

Table 2. Hierarchical Multiple Regression Analysis Results for the Factors Affecting Multicultural Adolescents' Self-Rated Health (*N*=1,195)

Variables	Categories	Model 1		Model 2		Model 3		Model 4	
		β	*p*	β	*p*	β	*p*	β	*p*
Individual level									
Demographic factors									
Sex (Ref. Female)		.06	.029	.05	.091	.06	.037	.06	.040
Age		.00	.900	.01	.783	.01	.612	.02	.605
Place of residence (Ref. Rural)	Metropolis	-.00	.906	.00	.995	-.00	.980	-.00	.931
	City	.00	.958	.00	.976	-.00	.950	-.01	.890
Subjective economic status (Ref. High)	Low	-.17	.054	-.18	.060	-.17	.085	-.16	.095
	Middle	-.17	.082	-.17	.081	-.16	.107	-.15	.114
Health- and academic-related factors									
BMI percentile (Ref. Low)	Normal	.14	< .001	.14	< .001	.15	< .001	.15	< .001
	Overweight	.03	.465	.04	.301	.04	.327	.04	.326
Depression		-.24	< .001	-.23	< .001	-.22	< .001	-.23	< .001
Self-esteem		.08	.054	.07	.118	.06	.199	.06	.217
Satisfaction with grades		.03	.304	.02	.497	.03	.357	.03	.324
Achievement motivation		-.02	.649	-.01	.758	-.02	.684	-.02	.642
Career attitude (preparedness)		.00	.915	.00	.928	.01	.868	.01	.863
Multicultural factors									
National identity		.07	.042	.05	.113	.05	.101	.05	.107
Bicultural acceptance attitude		.10	.003	.08	.031	.08	.024	.08	.024
Multicultural acceptance		.00	.961	.01	.744	.01	.861	.01	.842
Interpersonal level									
Family factors									
Household characteristics (Ref. Single-parent family)				.06	.045	.06	.043	.06	.043
Father's country of origin (Ref. Korea)	China			.09	.010	.08	.012	.08	.012
	Southeast Asia			.08	.046	.09	.035	.09	.037
	Japan and other countries			.12	.172	.12	.170	.12	.170
Mother's country of origin (Ref. Korea)	China			.44	.059	.45	.054	.44	.057
	Southeast Asia			.52	.037	.53	.032	.53	.033
	Japan and other countries			.56	.037	.56	.034	.56	.035
Proficiency in parents' foreign language				-.03	.400	-.03	.336	-.03	.309
Family support				.10	.006	.10	.010	.10	.010
Parenting attitude (neglect)				.05	.168	.05	.207	.05	.212
School factors									
Relationship with teachers						-.06	.081	-.06	.073
Relationship with peers						.07	.059	.07	.059
Bullying experience (Ref. No)						-.03	.294	-.03	.308
Community level									
Multicultural support in the community (Ref. No)								-.01	.745
Help outside of school (Ref. No)								.02	.493
F (*p*)		13.47 (< .001)		9.32 (< .001)		8.61 (< .001)		8.07 (< .001)	
△F (*p*)		13.47 (< .001)		2.41 (.008)		2.21 (.086)		0.27 (.764)	
R^2		.16		.18		.19		.19	
Adjusted R^2		.15		.16		.17		.16	
△R^2		.16		.02		.01		.00	

M=Mean; SD=Standard deviation.

that community-level variables did not significantly affect SRH (adjusted R^2=.16, F change=0.93, p=.395). Regarding BMI, the group in the normal range reported more positive SRH than the underweight group (β=.19, p<.001). Furthermore, family support (β=.24, p<.001) and friendship (β=.14, p=.016) had a positive impact on SRH (Table 3).

For female adolescents, Model 4 did not show a significant difference in goodness of fit compared to Models 2 and 3 (adjusted R^2=0.19, F change=0.74, p=.480). Additionally, national identity was shown to positively affect SRH (β=.17, p<.001) (Table 4). In Model 4, SRH was negatively influenced by depression among males (β=-.13, p=.026; Table 3) and females (β=-.29, p<.001) (Table 4).

DISCUSSION

This study aimed to identify the factors influencing multicultural adolescents' SRH utilizing data from the MAPS-VIII. Specifically, by drawing on the WHO's ecological model, the study focused on gender differences and examined relevant variables hierarchically across individual, interpersonal, and community levels. In this study, SRH was used as the dependent variable as it was considered an important indicator of overall quality of life, including emotional and social satisfaction.

Gender is an important influencing factor of SRH during adolescence, as shown in previous studies [14, 24-26] that explored differences in health behavior and health status between male and female adolescents. Our findings similarly showed significant differences in the influence of individual-level factors on SRH by gender, with male adolescents reporting better SRH than female adolescents. In addition, depression was a significant factor affecting SRH in both boys and girls in this study, which is similar to the findings of other studies that have highlighted the importance of psychosocial factors in adolescents SRH differences. Research has generally emphasized the importance of psychosocial factors on differences in SRH among adolescents. For example, Romero et al. [27] examined cultural and linguistic differences as stressors in adolescents' family and school lives. They found that bicultural stress was associated with psychological factors and risk behaviors. Other researchers have shown that psychological characteristics related to SRH may differ by gender among adolescents, with female students experiencing higher levels of perceived stress than their male counterparts [28]. Sex, unlike gender, is typically determined biologically at birth, while views on the gender dichotomy may differ [29], it is important to consider the existence of gender-related differences when analyzing the factors of health based on an ecological model.

Among individual-level factors, BMI significantly affected SRH among male adolescents. Weight-related differences in social, physical, and psychological factors among adolescents have been examined. While no significant difference in physical or social factors by weight was reported in one study, it was found that underweight or overweight/obese boys had lower mental health-related quality of life than their normal-weight counterparts [30].

Regarding individual-level factors for female adolescents, BMI did not significantly influence SRH, but female adolescents showed significantly higher levels of depression. These findings are consistent with those of two prior studies. Specifically, Moksnes et al. [31] identified gender as a moderating variable in the social functioning of adolescents, with boys scoring significantly higher on mental well-being and girls on depression and subjective health complaints, while Derdikman-Eiron et al. [32] reported that girls had significantly higher levels of anxiety and depression.

Psychosocial individual-level variables such as depression may also be influenced by the parental country of origin, which can serve as a cultural background for adolescents. Lower levels of depression and suicidal ideation were reported among multicultural adolescents (i.e., those with Japanese-born mothers) compared to non-multicultural adolescents [33]. As noted, we examined the influence of both depression (an individual-level variable) and parental country of origin (an interpersonal-level factor) on SRH. This study's findings showed that SRH is a broad concept encompassing various individual and interpersonal factors. We found that parental country of origin may influence adolescent health. This aligns with previous research indicating the relevance of foreign-born parents to the mental health of multicultural adolescents [33]. These findings suggest that a multicultural background can positively impact adolescent SRH.

Although no significant results were found regarding the impact of the parental country of origin when analyzed separately by gender, this study found that national identity significantly affected SRH among female adolescents. National identity, which is classified as forming part of one's group identity, provides a sense of belonging and physical and mental stability for multicultural adolescents undergoing various developmental changes, with previous research having also reported gender differences in terms of national identity [34].

Our findings also showed that family support and peer relationships significantly affected SRH in male adoles-

Table 3. Hierarchical Multiple Regression Analysis of Factors Affecting Male Multicultural Adolescents' Self-Rated Health (*N*=586)

Variables	Categories	Model 1		Model 2		Model 3		Model 4	
		β	*p*	β	*p*	β	*p*	β	*p*
Individual level									
Demographic factors									
Age		.01	.844	.03	.523	.04	.319	.04	.321
Place of residence (Ref. Rural)	Metropolis	.02	.648	.02	.638	.04	.425	.04	.469
	City	-.03	.599	-.03	.483	-.03	.517	-.04	.465
Subjective economic status (Ref. High)	Low	-.12	.413	-.10	.500	-.06	.684	-.06	.704
	Middle	-.10	.506	-.07	.643	-.03	.817	-.03	.819
Health- and academic-related factors									
BMI percentile (Ref. Low)	Normal	.19	< .001	.20	< .001	.19	< .001	.19	< .001
	Overweight	.06	.294	.07	.240	.07	.239	.07	.243
Depression		-.16	.003	-.13	.018	-.12	.033	-.13	.026
Self-esteem		.12	.047	.08	.187	.06	.336	.05	.429
Satisfaction with grades		.02	.572	-.01	.872	.00	.972	.00	.939
Achievement motivation		-.04	.452	-.02	.657	-.06	.263	-.07	.205
Career attitude (preparedness)		.06	.221	.05	.302	.06	.194	.06	.221
Multicultural factors									
National identity		-.02	.712	-.04	.369	-.05	.307	-.05	.305
Bicultural acceptance attitude		.13	.008	.09	.077	.10	.066	.09	.076
Multicultural acceptance		.01	.770	.02	.738	.01	.768	.01	.787
Interpersonal level									
Family factors									
Household characteristics (Ref. Single-parent family)				-.01	.873	-.00	.926	-.00	.925
Father's country of origin (Ref. Korea)	China			.09	.064	.09	.054	.09	.050
	Southeast Asia			.07	.242	.09	.139	.08	.167
	Japan and other countries			.03	.812	.05	.713	.04	.773
Mother's country of origin (Ref. Korea)	China			.19	.607	.25	.498	.22	.555
	Southeast Asia			.25	.538	.34	.421	.30	.469
	Japan and other countries			.30	.487	.37	.385	.34	.433
Proficiency in parents' foreign language				-.06	.157	-.07	.126	-.07	.100
Family support				.25	< .001	.23	< .001	.24	< .001
Parenting attitude (neglect)				.11	.029	.11	.028	.11	.028
School factors									
Relationship with teachers						-.05	.346	-.06	.313
Relationship with peers						.14	.017	.14	.016
Bullying experience						-.05	.284	-.04	.309
Community level									
Multicultural support in the community (Ref. No)								.03	.546
Help outside of school (Ref. No)								.05	0.247
F (*p*)		5.87 (< .001)		4.88 (< .001)		4.66 (< .001)		4.41 (< .001)	
△F (*p*)		5.87 (< .001)		3.04 (.001)		2.54 (.056)		0.93 (.395)	
R^2		.14		.19		.20		.20	
Adjusted R^2		.12		.15		.16		.16	
△R^2		.14		.05		.01		.00	

M=Mean; SD=Standard deviation.

Table 4. Hierarchical Multiple Regression Analysis of the Factors Affecting Female Multicultural Adolescents' Self-Rated Health (*N*=609)

Variables	Categories	Model 1		Model 2		Model 3		Model 4	
		β	*p*	β	*p*	β	*p*	β	*p*
Individual level									
Demographic factors									
Age		-.01	.881	-.00	.969	.00	.931	.00	.910
Place of residence (Ref. Rural)	Metropolis	-.02	.646	-.01	.857	-.02	.725	-.02	.698
	City	.04	.362	.04	.349	.04	.413	.04	.388
Subjective economic status (Ref. High)	Low	-.21	.107	-.22	.097	-.21	.110	-.21	.113
	Middle	-.20	.117	-.22	.095	-.21	.108	-.22	.103
Health- and academic-related factors									
BMI percentile (Ref. Low)	Normal	.07	.264	.08	.198	.08	.220	.07	.242
	Overweight	-.01	.875	.02	.762	.01	.882	.01	.882
Depression		-.31	< .001	-.30	< .001	-.29	< .001	-.29	< .001
Self-esteem		.04	.550	.05	.390	.05	.430	.05	.443
Satisfaction with grades		.04	.313	.04	.320	.05	.221	.05	.244
Achievement motivation		.01	.876	.01	.781	.02	.655	.02	.640
Career attitude (preparedness)		-.05	.291	-.05	.315	-.04	.321	-.04	.321
Multicultural factors									
National identity		.16	< .001	.16	< .001	.17	< .001	.17	< .001
Bicultural acceptance attitude		.07	.142	.05	.328	.05	.312	.06	.293
Multicultural acceptance		-.01	.816	-.01	.914	-.01	.843	-.01	.894
Interpersonal level									
Family factors									
Household characteristics (Ref. Single-parent family)				.12	.102	.10	.012	.10	.013
Father's country of origin (Ref. Korea)	China			.07	.063	.06	.203	.06	.215
	Southeast Asia			.08	.075	.08	.216	.07	.223
	Japan and other countries			.13	.116	.12	.316	.11	.346
Mother's country of origin (Ref. Korea)	China			.52	.484	.49	.128	.47	.142
	Southeast Asia			.61	.579	.58	.083	.56	.092
	Japan and other countries			.63	.081	.59	.103	.58	.112
Proficiency in parents' foreign language				.01	.863	.01	.903	.00	.941
Family support				-.03	.574	-.03	.576	-.03	.612
Parenting attitude (neglect)				-.03	.574	-.03	.514	-.03	.519
School factors									
Relationship with teachers						-.07	.135	-.07	.149
Relationship with peers						.04	.490	.03	.527
Bullying experience (Ref. No)						-.04	.335	-.04	.320
Community level									
Multicultural support in the community (Ref. No)								-.05	.257
Help outside of school (Ref. No)								-.01	.739
F (*p*)		9.34 (< .001)		6.18 (< .001)		5.64 (< .001)		5.31 (< .001)	
△F (*p*)		9.34 (< .001)		1.35 (.199)		1.12 (.342)		0.74 (.480)	
R^2		.20		.22		.23		.23	
Adjusted R^2		.18		.19		.19		.19	
△R^2		.20		.02		.01		.00	

M=Mean; SD=Standard deviation.

cents while household characteristics (two-parent vs. single-parent families) significantly affected SRH in female adolescents. A meta-analysis of studies on divorced households found that household type (i.e., whether a single- or two-parent family) affected adolescents' sense of happiness [35]. It also showed that adolescents with single or divorced parents had lower levels of psychological well-being compared to those with continuously married parents. Furthermore, it has been reported that the parent-child relationship can mediate the effect of individual conflict on adolescent social and psychological health, with parental divorce indirectly influencing these mediating effects, and with gender differences having further effects [36]. In our findings, a significant but minor gender difference in adolescent SRH was identified in terms of household characteristics. The social support system, including support from school or family, is crucial to adolescent physical health, but the presence of gender differences means that support may need to be more appropriately targeted [37]. Our findings and those of past research highlight the key importance of gender when developing interventions to address factors affecting the SRH of multicultural adolescents in their homes, schools, and local community environments.

Adolescent health is a valuable societal resource, and policies that embrace diversity are critical in a multicultural society. Accordingly, in the context of increased immigration, such as in Korea, a better understanding of multicultural adolescents is a priority for effective policy development and implementation. SRH is a valid predictor of mortality as it provides a comprehensive overview of individual health status [6]. This study differed from prior literature by hierarchically analyzing variables influencing SRH based on an ecological model of gender disparities. This study examined the gender-dependent effects of various influential factors of SRH on multicultural adolescents and found gender-specific patterns for the effect of various factors. Therefore, a multidimensional approach to policy development that considers gender as an important variable is necessary to promote adolescent health in a society that embraces diversity.

This study has some limitations. First, the data used in the study were taken solely from the MAPS-VIII. Although this is a representative data source for multicultural variables, the data could only be used for secondary analysis, limiting the use of some variables necessary for a full analysis based on the ecological model—specifically, community-, organizational-, environmental-, structural-, and macro-level variables. In particular, as the community level was not a significant as a limited variable in the secondary analysis, follow-up studies must be conducted to identify other policy implications. Consequently, the analyses were limited to only a portion of the ecological model. Second, although the study included variables related to psychosocial aspects that significantly impact adolescent SRH, variables related to adolescents' physical health behaviors and objective health data were not used in the study. Nonetheless, the selected variables have been shown to impact adolescent SRH. Finally, the cross-sectional descriptive design limited the ability to elucidate causal relationships.

CONCLUSION

The study findings indicate that individual- and interpersonal-level factors had gender-specific influences on SRH in multicultural adolescents. Regarding individual-level factors, BMI significantly influenced male adolescents' SRH, with the normal-range group reporting higher SRH than the underweight group. Female adolescents reported higher levels of depression than their male counterparts. Among interpersonal-level factors, family support and peer relationships significantly affected SRH in male adolescents, while household characteristics (two-parent vs. single-parent families) influenced SRH in female adolescents. The study confirmed that some interpersonal -level factors have gender-specific effects on SRH, emphasizing the need to adopt a multidimensional approach to policy development that considers gender to promote adolescent health in a society that embraces diversity.

CONFLICTS OF INTEREST

The authors declared no conflict of interest.

AUTHORSHIP

Study conception and design acquisition - PHN, BEJ, JAR and YJY; Data collection - PHN and YJY; Analysis and interpretation of the data - PHN, BEJ, JAR and YJY; Drafting and critical revision of the manuscript - PHN, BEJ, JAR and YJY.

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REFERENCES

1. United Nations Department of Economic and Social Affairs

Population Division. World population prospects: Highlights, key findings and advance tables. New York, NY: United Nations; 2019.
2. Yoon IJ. Making Korea greater with migrants. Health and Welfare Policy Forum. 2022;2:2-5.
3. Korean Educational Development Institute. Basic Education Statistics 2021 [Internet]. Jincheon: Korean Educational Development Institute; 2021 [cited 2023]. Available from: https://kess.kedi.re.kr/mobile/publ/publFile?survSeq=2021&menuSeq=3894&publSeq=79&menuCd=89637&menuId=0_1&itemCode=02#detail
4. Lo CC, Hopson LM, Simpson GM, Cheng TC. Racial/ethnic differences in emotional health: A longitudinal study of immigrants' adolescent children. Community Mental Health Journal. 2017;53(1):92-101. https://doi.org/10.1007/s10597-016-0049-8
5. Yeum YS. Korean Children and Youth Well-Being Index Survey, 2021: Middle school and high school students. Seoul: Yeonsei University Social Development Institute; 2021. https://doi.org/10.22687/KOSSDA-A1-2021-0010-V1.0
6. Choi YH. Is subjective health reliable as a proxy variable for true health? A comparison of self-rated health and self-assessed change in health among middle-aged and older South Koreans. Health and Social Welfare Review. 2016;36(4):431-59.
7. Jylhä M. What is self-rated health and why does it predict mortality? Towards a unified conceptual model. Social Science & Medicine. 2009;69(3):307-16. https://doi.org/10.1016/j.socscimed.2009.05.013
8. Breidablik HJ, Meland E, Lydersen S. Self-rated health in adolescence: A multifactorial composite. Scandinavian Journal of Public Health. 2008;36(1):12-20. https://doi.org/10.1177/1403494807085306
9. Lee MJ, Yoon KC, Lee KS. Subjective health status of multimorbidity: verifying the mediating effects of medical and assistive devices. International Journal for Equity in Health. 2018;17(1):164. https://doi.org/10.1186/s12939-018-0880-3
10. Goodman E, Huang B, Schafer-Kalkhoff T, Adler NE. Perceived socioeconomic status: A new type of identity that influences adolescents' self-rated health. Journal of Adolescent Health. 2007;41(5):479-87. https://doi.org/10.1016/j.jadohealth.2007.05.020
11. Boardman JD. Self-rated health among U.S. adolescents. Journal of Adolescent Health. 2006;38(4):401-8. https://doi.org/10.1016/j.jadohealth.2005.01.006
12. Vingilis ER, Wade TJ, Seeley JS. Predictors of adolescent self-rated health: Analysis of the National Population Health Survey. Canadian Journal of Public Health. 2002;93(3):193-7. https://doi.org/10.1007/BF03404999
13. An JS, Kim HJ. A study on the determinants of children and adolescents' health inequality in Korea. Studies on Korean Youth. 2013;24(2):205-31.
14. Park MH, Jeon HO. Relationships between health behaviors, mental health and internet addiction by gender differences among Korean adolescents. Journal of the Korea Academia-Industrial cooperation Society. 2013;14(3):1283-93. https://doi.org/10.5762/KAIS.2013.14.3.1283
15. Choi Y-J, Kim H-Y. Analyzing changes and determinants of self-rated health during adolescence: A latent growth analysis. Child Health Nursing Research. 2018;24(4):496-505. https://doi.org/10.4094/chnr.2018.24.4.496
16. Kim J-S. Suicidal ideation and associated factors by sex in adolescents. The Journal of the Korea Contents Association. 2012;12(12):261-8. https://doi.org/10.5392/JKCA.2012.12.12.261
17. Ko CH, Yen JY, Chen CC, Chen SH, Yen CF. Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. The Journal of Nervous and Mental Disease. 2005;193(4):273-7. https://doi.org/10.1097/01.nmd.0000158373.85150.57
18. Lee KY, Choi SC, Kong JS. The effects of parents-children dysfunctional communication and academic stress on adolescents' suicide ideation - Focusing on the mediating effects of depression and gender differences. Korean Journal of Youth Studies. 2011;18(5):83-108.
19. Jin EY. Mediating effect of bicultural competence in the relationship between acculturative stress of children in multi-cultural families and psychosocial adjustment: Focusing on gender difference. Journal of School Social Work. 2015;32:303-26. https://doi.org/10.20993/SSW.32.12
20. Lee R-H, Chang H-L. The mediating role of depression in the association between smoking behavior and suicidal ideation among adolescents in multicultural families in South Korea: Focusing on gender difference. Journal of Korean Society of Child Welfare. 2018;62:29-59. https://doi.org/10.24300/jkscw.2018.06.62.29
21. Lee RS, Kim JS. The influence of violence victimization on smoking behavior among adolescents in multicultural families - focusing on the moderating role of gender. Korean Journal of Youth Studies. 2019;26(1):27-53. https://doi.org/10.21509/KJYS.2019.01.26.1.27
22. Korea Disease Control and Prevention Agency. 2017 Pediatric and Adolescents Growth [Internet]. Cheongju: Korea Disease Control and Prevention Agency; 2017 [cited 2023]. Available from: https://knhanes.kdca.go.kr/knhanes/sub08/sub08_01.do
23. Petrocelli JV. Hierarchical multiple regression in counseling research: Common problems and possible remedies. Measurement and Evaluation in Counseling and Development. 2003;36(1):9-22. https://doi.org/10.1080/07481756.2003.12069076
24. Kim EG, Yoo HN. Health behaviors and health status by gender differences of adolescents in multicultural families. Journal of

the Korean Society of School Health. 2018;31(1):10-7.
25. Park S.-J. The longitudinal effects of youth social capital on self-rated health. Studies on Korean Youth. 2018;29(2):241-69. https://doi.org/10.14816/sky.2018.29.2.241
26. Yoo IY, Lee JA. Subjective health status and happiness of adolescents in multi-cultural family environments. Journal of Korean Living Environment System. 2013;20(5):699-707.
27. Romero AJ, Martinez D, Carvajal SC. Bicultural stress and adolescent risk behaviors in a community sample of Latinos and non-Latino European Americans. Ethnicity and Health. 2007; 12(5):443-63. https://doi.org/10.1080/13557850701616854
28. Rudolph KD. Gender differences in emotional responses to interpersonal stress during adolescence. Journal of Adolescent Health. 2002;30(4 Suppl 1):3-13. https://doi.org/10.1016/s1054-139x(01)00383-4
29. Frohard-Dourlent H, Saewyc E, Veale J, Peter T, MacAulay M. Conceptualizing gender: lessons from the Canadian trans youth health survey. Signs: Journal of Women in Culture and Society. 2020;46(1):151-76. https://doi.org/10.1086/709302
30. Bonsergent E, Benie-Bi J, Baumann C, Agrinier N, Tessier S, Thilly N, et al. Effect of gender on the association between weight status and health-related quality of life in adolescents. BMC Public Health. 2012;12(1):997. https://doi.org/10.1186/1471-2458-12-997
31. Moksnes UK, Bjørnsen HN, B Eilertsen ME, Espnes GA. The role of perceived loneliness and sociodemographic factors in association with subjective mental and physical health and well-being in Norwegian adolescents. Scandinavian Journal of Public Health. 2022;50(4):432-9. https://doi.org/10.1177/1403494821997219
32. Derdikman-Eiron R, Indredavik MS, Bratberg GH, Taraldsen G, Bakken IJ, Colton M. Gender differences in subjective well-being, self-esteem and psychosocial functioning in adolescents with symptoms of anxiety and depression: Findings from the Nord-Trøndelag health study. Scandinavian Journal of Psychology. 2011;52(3):261-7. https://doi.org/10.1111/j.1467-9450.2010.00859.x
33. Bahk JW, Kim AM, Khang YH. Associations of multicultural status with depressive mood and suicidality among Korean adolescents: the roles of parental country of birth and socioeconomic position. BMC Public Health. 2017;17(1):116. https://doi.org/10.1186/s12889-017-4044-y
34. Jang EA, Chung HH. Exploring multicultural adolescents' developmental patterns of national identity and their predictors. Korean Journal of Youth Studies. 2022;29(2):121-54. https://doi.org/10.21509/KJYS.2022.02.29.2.121
35. Amato PR. Children of divorce in the 1990s: An update of the Amato and Keith (1991) meta-analysis. Journal of Family Psychology. 2001;15(3):355-70. https://doi.org/10.1037/0893-3200.15.3.355
36. Borgers N, Dronkers J, Van Praag BMS. The effects of different forms of two- and single-parent families on the well-being of their children in Dutch secondary education. Social Psychology of Education. 1996;1(2):147-69. https://doi.org/10.1007/BF02334730
37. Yoo BI. The analysis on structural relationships with bullying stress, depression, social support and physical health of adolescents. Journal of the Korea Society for Wellness. 2022;17(4): 521-6. https://doi.org/10.21097/ksw.2022.11.17.4.521