

Factors affecting the mental health status of children from multicultural families in South Korea: a cross-sectional descriptive analysis of data from the multicultural adolescents panel study

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Purpose: This study aimed to identify factors affecting the mental health status of children from multicultural families in South Korea. **Methods:** This study was based on Dahlgren and Whitehead's (1991) rainbow model as a conceptual framework and used data from the second phase of the multicultural adolescents panel study conducted by the National Youth Policy Institute. Multiple logistic regression analysis was performed using SPSS version 26.0, with $p < .05$ considered to indicate statistical significance.

Results: In the final model, stress (odds ratio [OR]=0.53, $p < .001$), life satisfaction (OR=2.09, $p = .004$), self-esteem (OR=1.73, $p = .032$), and peer support (OR=1.46, $p = .019$) affected the mental health status of children from multicultural families. The living and working conditions and general socioeconomic, cultural, and environmental conditions did not significantly influence the mental health status of children from multicultural families in the final model. **Conclusion:** As components of Dahlgren and Whitehead's model, individual hereditary and lifestyle factors, as well as social and community networks, affected the mental health status of children from multicultural families. Therefore, in order to improve the mental health of children from multicultural families, efforts are needed to alleviate their stress, increase life satisfaction and self-esteem, and strengthen their social support.

Key words: Mental health; Child; Cultural diversity; Social determinants of health

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INTRODUCTION

In South Korea (hereafter, Korea), multicultural families have been increasing due to the growth in immigrant spouses of international marriages and migrant workers since the 2000s [1,2]. Accordingly, children from international married families began to be born in the mid-2000s, and at this point the number of multicultural children of school age is increasing [1]. The number of students from multicultural families increased three-fold from 46,964 in 2012 to 160,056 in 2021 [3]. In Korea, the total number of students is gradually increasing, but the proportion of multicultural students reached 3.0% as of 2021 from 0.9% in 2013 [3]. Approximately 80% of children from multicultural families are of school age [2]. School age is an important period in which physical, intellectual, and emo-

tional development occurs [4], and children's development is influenced by family lifestyles and culture; therefore, it is necessary to assess the mental health status of children from multicultural families who are exposed to the cultures of both Korea and their foreign parents' countries [4,5]. Although Korea is rapidly becoming a multicultural society, multicultural children are not sufficiently accepted as members of Korean society and experience psychological difficulties [1,6]. In addition, as Korean society emphasizes homogeneity of ethnicity and culture, children from multicultural families have been exposed to prejudice, discrimination, and difficulties in values and identity, showing unfavorable patterns of mental health [1,2,6].

Multicultural children have been found to experience poorer mental health, higher hostility, and more intense anger

than non-multicultural children due to their bullying experiences and negative perceptions of multicultural families [1,2,4,7]. In addition, children from multicultural families tend to express anger in a repressive way rather than through verbal expression, which is closely related to mental health problems such as obsession and depression [4]. Children from multicultural families are raised by foreign parents with an insufficient knowledge of the Korean language, and they experience passive interpersonal relationships and bullying in connection with their communication problems, difficulty in learning, and different skin colors [2,4]. These issues might cause both intrinsic problems (e.g., depression) and external problems (e.g., aggression and flight) [7].

Children's mental health is important because it affects their cognitive and emotional development and transition to adulthood [4]. As multicultural children grow up and become a major component of Korean society, which will affect the national competitiveness, it will be necessary to assess their mental health status [1]. School age is a transitional period of self-growth, where children start to form their self-concept, social views, and values [8]. School-age children experience rapid physical and psychological changes, increasing their likelihood of experiencing internalized behavioral problems such as stress, confusion, and anxiety [8]. Various factors, such as the characteristics of children's households, their relationships with their parents and peers, school life, and the living environment affect children's mental health status [9]. In addition, the mental health of children is influenced by the unique

values or lifestyles of their social class [4,5].

Accordingly, comprehensive considerations are necessary to identify factors affecting the mental health status of children from multicultural families. Therefore, this study used Dahlgren and Whitehead's [10] rainbow model as a conceptual framework to identify the factors affecting the mental health status of children from multicultural families. Dahlgren and Whitehead's [10] rainbow model has been widely used in studies of the mental health status of people in multicultural environments [11], since a holistic perspective is recommended for identifying mental health status because multifaceted factors affecting individual mental health [12]. However, a limitation is that the rainbow model has been mainly used in research conducted abroad [11,12]. Since Korea emphasizes monolithic nationalism, it is necessary to apply this model to the domestic environment. The rainbow model includes social structures and cultural norms beyond individual characteristics [13].

The model consists of four layers of health determinants (Figure 1). The innermost layer refers to individual hereditary and lifestyle factors such as age, race, disease, eating habits, and physical activities [10]. In this study, general characteristics of sex and age, in addition to stress, life satisfaction, and self-esteem, which correspond to individual psychosocial and health factors based on the classification in the multicultural adolescents panel study (MAPS) user guidelines [14], were added as variables. The second layer comprised social and community networks/interactions, including social relation-

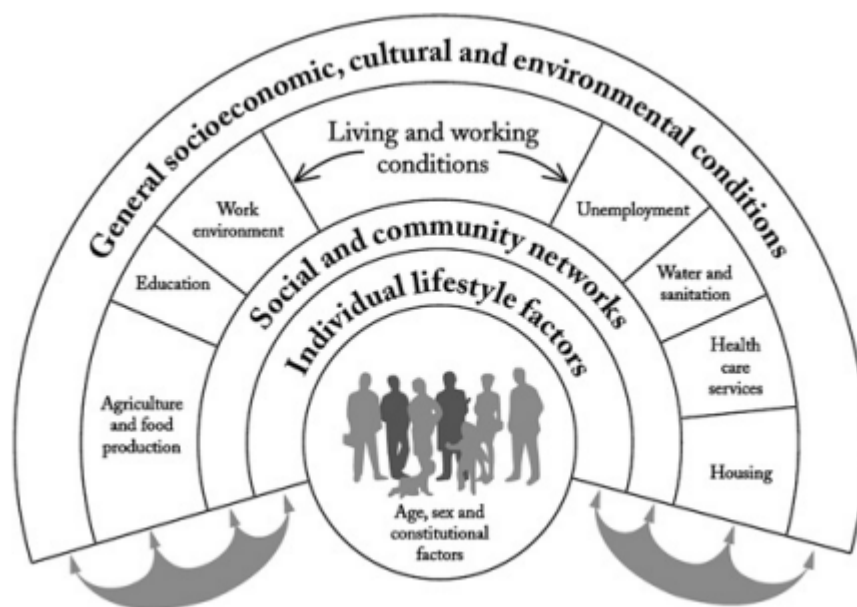


Figure 1. Dahlgren and Whitehead's rainbow model. Adapted: Dahlgren G, Whitehead M. Policies and strategies to promote social equity in health. Background document to WHO – strategy paper for Europe. Stockholm: Institute of Futures Studies; 1991 [10].

ships such as families and friends, which are health-generating elements [10]. Therefore, based on the MAPS user guidelines [14], this study included experiences of discrimination (as a friend-related factor), parental support (as a parental factor), peer support, teacher support, and the presence of someone who helps at or outside of school (as school life-related factors) as variables. The third layer was living and working conditions, referring to physical factors such as residential, working, and educational environments. In this study, residential area and the size of the residential area, which correspond to individual environmental factors based on the classification of MAPS user guidelines [14], were added as variables. The outer layer included general socioeconomic, cultural, and environmental conditions [10]. In this study, based on the MAPS user guidelines [14], the household economic status (corresponding to an individual's family background) and parental nationality, category of multicultural children, bicultural acceptance attitudes, and acculturative stress (corresponding to bicultural experiences) were included in this layer.

METHODS

Ethics statement: This study was conducted after receiving permission for data use from the MAPS. This study received an Institutional Review Board (IRB) review exemption from the IRB of Ewha Womans University (No. ewha-202209-0029-01) due to the use of secondary data with anonymity.

1. Study Design

This was a cross-sectional descriptive study conducted to identify the factors affecting the mental health status of children of multicultural families using raw data from the first wave of the second phase (2019) of the MAPS. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines [15].

2. Data Source and Study Population

The MAPS is a survey conducted by the National Youth Policy Institute to track the development of children from multicultural families [14]. The first phase of the MAPS has been conducted as an annual survey since 2011, and the second phase of MAPS has been conducted since 2019 among a sample of children and mothers of multicultural families who were in the fourth grade of elementary school. The MAPS is representative since it surveys children and mothers from 17 cities and provinces of South Korea. Multicultural children refer to children from international marriage families, immi-

grant youth, and children from families originating in foreign countries [14]. This study used the first wave of the second phase of MAPS, which was conducted among 2,224 multicultural families in 2019.

3. Study Variables

1) Dependent variable

The dependent variable of this study was mental health status, which was measured on a 4-point Likert scale (very unhealthy: 1 point, very healthy: 4 points). Responses of "very healthy" and "healthy" were categorized as indicating a healthy mental status, while responses of "unhealthy" and "very unhealthy" were categorized as indicating an unhealthy mental status. The conceptual framework of this study is shown in Table 1.

2) Independent variable

(1) Individual hereditary and lifestyle factors

The first layer was individual hereditary and lifestyle factors, including sex, age, body mass index (BMI), stress, life satisfaction, and self-esteem. BMI was classified according to the criteria of the International Obesity Task Force, which is the standard for the diagnosis of obesity in children and adolescents [16]. BMI was classified into four categories; obesity ($\text{BMI} \geq 30.0 \text{ kg/m}^2$), overweight (if BMI was $\geq 25 \text{ kg/m}^2$ and $< 30 \text{ kg/m}^2$), normal weight (if BMI was $\geq 18.5 \text{ kg/m}^2$ and $< 25 \text{ kg/m}^2$), and underweight ($\text{BMI} < 18.5 \text{ kg/m}^2$). A 4-point Likert scale (strongly disagree: 1 point, strongly agree: 4 points) was used to measure stress (2 questions), life satisfaction (3 questions), and self-esteem (3 questions), with higher scores indicating higher levels of stress, life satisfaction, and self-esteem.

(2) Social and community networks

The second layer was social and community networks, including variables such as the experience of discrimination, parental support, peer support, teacher support, the presence of someone who helps at school, and the presence of someone who helps outside of school. A 4-point Likert scale (strongly disagree: 1 point, strongly agree: 4 points) was used to measure parental support (6 questions), peer support (3 questions), and teacher support (2 questions). A higher score indicated a higher level of parental, peer, and teacher support. The experience of discrimination, the presence of someone who helps at school, and the presence of someone who helps outside of school were divided into two categories (yes/no).

(3) Living and working conditions

The third layer was the living and working conditions, in-

cluding the residential area and size of the residential area. The residential area was divided into five categories (Seoul, Gyeonggi/Incheon, Chungcheong/Gangwon, Gyeongsang, and Jeolla/Jeju Province). The size of the residential area was divided into three categories (metropolitan, medium/small cities, and rural areas).

(4) General socioeconomic, cultural, and environmental conditions

The fourth layer was general socioeconomic, cultural, and environmental conditions, including household economic level, parental nationality, category of multicultural children, bicultural acceptance attitudes, and acculturative stress. A 5-point Likert scale (very low: 1 point, very high: 5 points) was used to measure the household's economic status. Families were classified into three categories according to parental nationality (foreign fathers, foreign mothers, both parents were foreigners) and multicultural children were divided into three categories (children from international marriage families, children from foreign countries, and immigrant youth). A 4-point Likert scale (strongly disagree: 1 point, strongly agree: 4 points) was used to measure bicultural acceptance attitudes (10 questions) and acculturative stress (9 questions). A higher score indicated higher bicultural acceptance attitudes and acculturative stress.

4. Data Analysis

This study performed a multiple logistic regression analysis to identify the factors influencing mental health status of children from multicultural families using SPSS for Windows version 26.0 (IBM Corp., Armonk, NY, USA). *p*-values of less than .05 were considered significant. Participants' mental health status and individual hereditary and lifestyle factors, social and community networks, living and working conditions, and general socioeconomic, cultural, and environmental conditions were analyzed by descriptive statistics such as frequency, percentage, mean, and standard deviation. Mental health status according to individual hereditary and lifestyle factors, social and community networks, living and working conditions, and general socioeconomic, cultural, and environmental conditions were analyzed using the independent t-test and chi-squared test. For categories with fewer than 5 instances, the Fisher exact test was used. A multiple logistic regression analysis was then conducted using variables that showed statistically significant associations with mental health status. The multicollinearity effect was measured before multiple logistic regression.

RESULTS

1. Descriptive Statistics

The descriptive statistics of children from multicultural families based on the conceptual framework are shown in Table 2. Regarding individual hereditary lifestyle factors,

Table 1. Conceptual Framework Based on Dahlgren and Whitehead's [10] Rainbow Model and Related Variables

Four layers	Variables
(1) Individual hereditary and lifestyle factors	<ul style="list-style-type: none"> · Sex · Age · Body mass index · Stress · Life satisfaction · Self-esteem
(2) Social and community networks	<ul style="list-style-type: none"> · Experience of discrimination · Parental support · Peer support · Teacher support · Presence of someone who helps at school · Presence of someone who helps outside of school
(3) Living and working conditions	<ul style="list-style-type: none"> · Residential area · Size of the residential area
(4) General socioeconomic, cultural, and environmental conditions	<ul style="list-style-type: none"> · Household economic status · Parental nationality · Categories of multicultural children · Bicultural acceptance attitudes · Acculturative stress

96.7% of the participants perceived their mental status as healthy. Furthermore, 51.0% of participants were male and 93.9% of participants were aged 10 years. Moreover, 46.2% of participants were underweight and 46.3% were normal weight. The mean score was 1.76 ± 0.73 for stress, 3.35 ± 0.55 for life satisfaction, and 3.29 ± 0.56 for self-esteem. In the analysis of social and community networks, 5.5% of the participants experienced discrimination. The mean score was 3.34 ± 0.54 for parental support, 3.85 ± 0.82 for peer support, and 3.79 ± 0.81 for teacher support. Furthermore, 83.7% had someone who helped at school, and 53.7% of participants had someone who helped outside of school. Regarding living and working conditions, 51.6% of participants lived in medium-size and small cities, 61.1% of participants perceived their household economic status as "middle". Moreover, 81.4% of participants were children of foreign mothers, and 77.2% of participants were children from international marriage families. The mean score for bicultural acceptance attitudes was 2.96 ± 0.44 , and that for acculturative stress was 1.28 ± 0.41 .

2. Mental Health According to Individual Hereditary and Lifestyle Factors

Participants' mental health status according to the individual hereditary and lifestyle factors is shown in Table 3. Statistically significant differences were found between the healthy and unhealthy mental health groups according to sex ($\chi^2=4.85$, $p=.028$), stress ($t=-9.03$, $p<.001$), life satisfaction ($t=7.44$, $p<.001$), and self-esteem ($t=7.10$, $p<.001$).

3. Mental Health According to Social and Community Networks

The mental health status according to participants' social and community networks is shown in Table 3. Statistically significant differences were found between the healthy and unhealthy mental health groups according to the experience of discrimination ($\chi^2=26.33$, $p<.001$), parental support ($t=4.98$, $p<.001$), peer support ($t=7.65$, $p<.001$), teacher support ($t=5.39$, $p<.001$), the presence of someone who helps at school ($\chi^2=10.21$, $p=.001$), and the presence of someone who helps outside of school ($\chi^2=4.26$, $p=.039$).

4. Mental Health According to Living and Working Conditions

Participants' mental health status according to their living and working conditions is shown in Table 3. No statistically significant differences were found between the healthy and unhealthy mental health groups according to living and

working conditions.

5. Mental Health According to General Socioeconomic, Cultural, and Environmental Conditions

The mental health status according to participants' general socioeconomic, cultural, and environmental conditions is shown in Table 3. Statistically significant differences were found between the healthy and unhealthy mental health groups according to bicultural acceptance attitudes ($t=4.28$, $p<.001$), and acculturative stress ($t=-3.58$, $p=.001$).

6. Factors Affecting Mental Health Status

Factors affecting mental health status are shown in Table 4. No multicollinearity was found, as the variance inflation factor was 10 or less and the condition index was 100 or less [17]. Model I included sex, stress, life satisfaction, and self-esteem were included, which were individual hereditary and lifestyle factors related to mental health status. Model II included the experience of discrimination, parental support, peer support, teacher support, the presence of someone who helps at school, and the presence of someone who helps outside of school were included, which were social and community network variables related to mental health status. Model III included bicultural acceptance attitudes and acculturative stress, which were general socioeconomic, cultural, and environmental condition variables related to mental health. Model IV included all variables related to mental health.

In model I, sex, stress, life satisfaction, and self-esteem showed significant effects on mental health status. Girls were 1.87 times more likely to have healthy mental status than boys ($p=.018$). Stress, life satisfaction, and self-esteem showed significant effects on mental health status, with odds ratios (ORs) of 0.51 ($p<.001$), 2.68 ($p<.001$), and 2.22 ($p=.001$), respectively. In model II, discrimination, parental support, and peer support showed significant effects on mental health status, with ORs of 0.35 ($p=.001$), 2.07 ($p=.001$), and 2.03 ($p<.001$), respectively. In model III, bicultural acceptance attitudes and acculturative stress showed significant effects on mental health status, with ORs of 3.68 ($p<.001$) and 0.41 ($p<.001$), respectively. In the final model, stress, life satisfaction, self-esteem, and peer support showed significant effects on mental health status, with ORs of 0.53 ($p<.001$), 2.09 ($p=.004$), 1.73 ($p=.032$) and 1.46 ($p=.019$) respectively.

DISCUSSION

The purpose of this study was to identify the factors affecting the mental health status of children from multicultural

Table 2. Descriptive Statistics of Children from Multicultural Families Based on Conceptual Framework (N=2,246)

Variables		Categories/range	n (%) or M±SD
Dependent variables	Mental health status	Healthy	2,172 (96.7)
		Unhealthy	74 (3.3)
Individual hereditary and lifestyle factors	Sex	Male	1,144 (51.0)
		Female	1,102 (49.0)
	Age (year)	9	23 (1.0)
		10	2,109 (93.9)
		11	99 (4.4)
		12	13 (0.6)
		13	2 (0.1)
	Body mass index	Underweight	1,037 (46.2)
		Normal	1,040 (46.3)
		Overweight	142 (6.3)
Obesity		27 (1.2)	
Stress	1-4	1.76±0.73	
Life satisfaction	1-4	3.35±0.55	
Self-esteem	1-4	3.29±0.56	
Social and community networks	Experience of discrimination	Yes	124 (5.5)
		No	2,122 (94.5)
	Parental support	1-4	3.34±0.54
	Peer support	1-4	3.85±0.82
	Teacher support	1-4	3.79±0.81
	Presence of someone who helps at school	Yes	1,881 (83.7)
		No	365 (16.3)
	Presence of someone who helps outside of school	Yes	1,205 (53.7)
No		1,041 (46.3)	
Living and working conditions	Residential area	Seoul	264 (11.8)
		Gyeonggi/Incheon	629 (28.0)
		Chungcheong/Gangwon	396 (17.6)
		Gyeongsang	562 (25.0)
		Jeolla/Jeju Province	395 (17.6)
	Size of the residential area	Metropolitan	755 (33.6)
		Medium/small cities	1,158 (51.6)
Rural area	333 (14.8)		
General, socioeconomic, cultural, and environmental conditions	Household economic status	Very high	112 (5.0)
		High	553 (24.6)
		Middle	1,372 (61.1)
		Low	201 (8.9)
		Very low	8 (0.4)
	Parental nationality	Foreign fathers	56 (2.5)
		Foreign mothers	1,828 (81.4)
		Both foreigners	362 (16.1)
	Category of multicultural children	Children from international marriage families	1,734 (77.2)
		Children from foreign families	362 (16.1)
Immigrant youth		150 (6.7)	
Bicultural acceptance attitudes	1-4	2.96±0.44	
Acculturative stress	1-4	1.28±0.41	

M, mean; SD, standard deviation.

Table 3. Mental Health Status of Children from Multicultural Families According to the Conceptual Framework (N=2,246)

Variables			Mental health status		x ² or t	p
			Healthy (n=2,172)	Unhealthy (n=74)		
			n (%) or M±SD	n (%) or M±SD		
Individual hereditary and lifestyle factors	Sex	Male	1,097 (50.5)	47 (63.5)	4.85	.028
		Female	1,075 (49.5)	27 (36.5)		
	Age		10.05±0.29	10.07±0.25	-0.59	.555
	Body mass index	Underweight	1,002 (46.1)	35 (47.3)	1.65*	.647
		Normal	1,004 (46.2)	36 (48.6)		
		Overweight	139 (6.4)	3 (4.1)		
		Obesity	27 (1.2)	0 (0.0)		
Stress		1.74±0.72	2.51±0.83	-9.03	< .001	
Life satisfaction		3.37±0.53	2.72±0.74	7.44	< .001	
Self-esteem		3.31±0.54	2.73±0.69	7.10	< .001	
Social and community networks	Experience of discrimination	Yes	110 (5.0)	14 (18.9)	26.33	< .001
		No	2,062 (95.0)	60 (81.1)		
	Parental support		3.36±0.53	2.95±0.70	4.98	< .001
	Peer support		3.87±0.80	3.14±0.88	7.65	< .001
	Teacher support		3.81±0.80	3.29±0.96	5.39	< .001
	Presence of someone who helps at school	Yes	1,829 (84.2)	52 (70.3)	10.21	.001
No		343 (15.8)	22 (29.7)			
Presence of someone who helps outside of school	Yes	1,174 (54.0)	31 (41.9)	4.26	.039	
	No	998 (46.0)	43 (58.1)			
Living and working conditions	Residential area	Seoul	257 (11.8)	7 (9.5)	4.40	.355
		Gyeonggi/Incheon	613 (28.2)	16 (21.6)		
		Chungcheong/ Gangwon	378 (17.4)	18 (24.3)		
		Gyeongsang	540 (24.9)	22 (29.7)		
		Jeolla/Jeju Province	384 (17.7)	11 (14.9)		
	Size of the residential area	Metropolitan	729 (33.6)	26 (35.1)	0.09	.957
Medium/small cities		1,121 (51.6)	37 (50.0)			
Rural area		322 (14.8)	11 (14.9)			
General socioeconomic, cultural, and environmental conditions	Household economic status	Very high	8 (0.4)	0 (0.0)	1.23*	.873
		High	196 (9.0)	5 (6.8)		
		Middle	1,323 (60.9)	49 (66.2)		
		Low	536 (24.7)	17 (23.0)		
		Very low	109 (5.0)	3 (4.1)		
	Parental nationality	Foreign fathers	55 (2.5)	1 (1.4)	3.08	.215
		Foreign mothers	1,762 (81.1)	66 (89.2)		
		Both foreigners	355 (16.3)	7 (9.5)		
	Category of multicultural children	Children from international marriage families	1,671 (76.9)	63 (85.1)	2.91	.233
		Children from foreign families	355 (16.3)	7 (9.5)		
Immigrant youth		146 (6.7)	4 (5.4)			
Bicultural acceptance attitudes		2.96±0.43	2.68±0.58	4.28	< .001	
Acculturative stress		1.27±0.40	1.52±0.60	-3.58	.001	

*Fisher exact test; M, mean; SD, standard deviation.

Table 4. Factors Affecting the Mental Health Status of Children from Multicultural Families based on the Conceptual Framework (N=2,246)

Variables		Categories	Model I			Model II			Model III			Model IV		
			OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Individual hereditary and lifestyle factors	Sex	Male (ref.)	1.00	(1.16,	.018									
		Female	1.87	3.13)					1.00	(0.95,	.079	1.60	2.71)	
	Stress		0.51	(0.37,	<.001									
				0.69)					0.53	(0.39,	<.001	0.73)		
	Life satisfaction		2.68	(1.67,	<.001									
				4.29)										
	Self-esteem		2.22	(1.42,	.001									
				3.49)										
Social and community networks	Experience of discrimination	No (ref.)				1.00	(0.18,	.001				1.00	(0.28,	.150
		Yes				0.35	0.66)				0.58	1.22)		
	Parent support					2.07	(1.35,	.001				1.07	(0.64,	.803
							3.18)					1.78)		
	Peer support					2.03	(1.50,	<.001				1.46	(1.06,	.019
							2.75)					2.00)		
	Teacher support					1.21	(0.87,	.252				1.01	(0.72,	.952
						1.67)					1.41)			
Presence of someone who helps at school	No (ref.)				1.00	(0.74,	.335				1.00	(0.64,	.610	
	Yes					1.33	2.40)				1.17	2.14)		
Presence of someone who helps outside the school	No (ref.)				1.00	(0.59,	.957				1.00	(0.53,	.718	
	Yes					0.99	1.66)				0.91	1.55)		
General socioeconomic, cultural, and environmental conditions	Bicultural acceptance attitudes								3.68	(2.24,	<.001	1.79	(0.96,	.068
										6.06)		3.35)		
	Acculturative stress								0.41	(0.27,	<.001	0.93	(0.55,	.795
										0.62)		1.59)		
Cox & Snell R ²				.05			.04			.02			.06	
Nagelkerke R ²				.21			.14			.08			.24	
-2 log likelihood				526.42			570.43			606.09			512.96	

Model I included individual hereditary and lifestyle factors (sex, stress, life satisfaction, and self-esteem) related to mental health status. Model II included social and community network factors (the experience of discrimination, parental support, peer support, teacher support, the presence of someone who helps at/outside of school) related to mental health status. Model III included general socioeconomic, cultural, and environmental condition factors (bicultural acceptance attitudes and acculturative stress) related to mental health. Model IV included all variables related to mental health; OR, odds ratio; ref, reference; CI, confidence interval.

families based on Dahlgren and Whitehead's [10] rainbow model using raw data from the first wave of the second phase of the MAPS. Dahlgren and Whitehead's rainbow model encompasses multifaceted factors related to mental health status [13]. Most of the participants in this study were 10 years old, which is similar to the average age of all children from multicultural families in Korea (9.93 years) [18]. Most of the participants perceived themselves as mentally healthy. This is similar to the findings of a previous study [19] that used panel data of non-multicultural school children from a similar age group.

Participants' mean score for stress (1.76±0.73) was higher than that reported in a previous study [20] conducted among non-multicultural school-age children (1.56±0.42). The mean score for self-esteem (3.29±0.56) was lower than that of a previous study (3.30±0.52) [21] conducted among school-age children from non-multicultural families using a panel survey. This can be interpreted as indicating that children from multicultural families suffer from externalization and internalization problems due to passive interpersonal relationships, maladjustment to school life, and bullying [7,22]. How-

ever, the mean score for self-esteem in this study (3.29 ± 0.56) was higher than that reported in a previous study (3.13 ± 0.54) [23] conducted among multicultural adolescents using the raw data of the first phase of the MAPS. This discrepancy may have occurred because the mean age in the previous study [23] was 15 years, versus 10 years in this study, since self-esteem tends to decrease as children from multicultural families grow older [24]. In comparison to Choi's study [23] conducted among multicultural adolescents, the mean score for bicultural acceptance attitudes was higher (2.96 ± 0.44 vs. 2.92 ± 0.38), while that of acculturative stress was lower (1.28 ± 0.41 vs. 1.41 ± 0.32). An explanation for this result may be that bicultural acceptance attitudes decrease and acculturative stress increases as children from multicultural families grow older [24].

Among the individual hereditary and lifestyle factors, mental health status was related to sex, stress, life satisfaction, and self-esteem. In this study, boys perceived themselves as mentally unhealthier than girls; an explanation for this may be that girls tend to share their mental difficulties and stress, while boys are reluctant to expose their mental difficulties [9]. The results of this study can be interpreted in light of previous research showing that high stress negatively affects mental health [25] and that people with low self-esteem tend to feel depressed, anxious, and socially isolated [19]. Among the social and community networks, mental health status was related to discrimination experience, parental support, peer support, teacher support, the presence of someone who helps at school, and the presence of someone who helps outside of school. Similarly, previous studies [2,22] conducted among multicultural adolescents found that people who experienced discrimination were more likely to feel loneliness and alienation and tended to have low self-esteem. The mental health status of school-age children was also found to be positive when they perceived that they received more parental, teacher and peer support [8]. No significant difference was found in mental health according to participants' living and working conditions. This result differs from that of a previous study [23] conducted among multicultural adolescents. Among the general socioeconomic, and environmental conditions, mental health status was related to bicultural acceptance attitudes and acculturative stress. This is similar to the results of a previous study [26] conducted among children from multicultural families, which reported that mental health and psychological adaptation were related to bicultural acceptance attitudes. Likewise, another study [27] conducted among international students showed that acculturative stress had a negative effect on mental health. Bicultural stress affects personal characteristics such as social withdrawal and depression [28]. In addition, these findings can be interpreted in light of research stating that acculturative stress can cause mental health

problems, such as depression and somatization symptoms, due to difficulties in interpersonal relationships and social activities [27].

In model 1, sex, stress, life satisfaction, and self-esteem had significant effects on participants' mental health status. Sex is a structural determinant of mental health status [9] that is closely related to socioeconomic status, social position and social roles, which affect mental health status, mental illness, and exposure to risk factors for mental health. Childhood stress increases the risk of mental illness, other behavioral problems, and suicidal thoughts [25], and an earlier study found that children of school age were mentally healthy when their stress level was low [8]. However, life satisfaction is related to the positive aspects of mental health [29]. School age is when self-esteem is formed, and self-esteem is an important factor in improving mental health [25]. In previous studies [6] conducted among multicultural adolescents, self-esteem showed a negative correlation with depression and played a role in relieving stress.

In model 2, the experience of discrimination, parental support, and peer support had a significant effect on healthy mental status. The experience of discrimination as a social minority is an important factor that negatively affects mental health [27], and social support plays an important role in satisfying the basic social needs of humans and providing a sense of control [8]. Social support helps with psychological adaptation, which relieves the stress of multicultural adolescents [6].

In model 3, bicultural acceptance attitudes and acculturative stress had a significant effect on mental health. Bicultural acceptance attitudes influence stress levels [6]; thus, the findings of this study can be interpreted as showing that bicultural acceptance attitudes affected mental health status. This is similar to a previous study [26], according to which the degree of bicultural acceptance attitudes influenced the depression of children from multicultural families. Acculturative stress is defined as distress and psychological difficulties that occur in the process of an individual or group adapting to another culture [30], and it is a major factor that explains psychosocial adaptation [6]. Acculturative stress makes social integration difficult for migrants, which in turn causes anxiety, depression, and alienation and is a factor that causes high somatization symptoms [26]. This result is similar to the finding of a previous study [22] conducted among multicultural adolescents that higher acculturative stress was associated with higher depression and lower coping ability. People are more mentally healthy when they accept both the mainstream culture and their birth culture; thus, mental health differs according to bicultural acceptance and acculturative stress [26].

In the final model, stress, life satisfaction, self-esteem, and

peer support had significant effects on mental health status. Stress in childhood affects mental illness, other behavioral problems, and suicide [25]. School age is the period when self-esteem is formed [8], and self-esteem is an important factor in improving mental health [25]. Life satisfaction is a positive dimension of mental health, which relieves suicidal thoughts and improves the overall mental health status [29]. Social support has been found to affect mental health, since school-age children enter into an expanded social domain compared to early childhood by forming relationships with friends and teachers while spending time at school [8]. In particular, children with higher perceptions of social support have been found to show lower levels of negative emotions such as stress, anxiety, and depression, and fewer behavioral problems [8]. Multicultural characteristics such as bicultural acceptance attitudes and acculturative stress were found to have no effect on health in the final model, which is a similar result to a previous study [26], according to which the influence of multicultural characteristics on the mental health of multicultural children is weaker than that of environmental and personal characteristics.

In this study, individual hereditary and lifestyle factors and social and community networks influenced the mental health status of children from multicultural families, while multicultural factors did not affect their mental health status. Therefore, in order to improve the mental status of multicultural children, education and interventions focusing on their general development stage are recommended, rather than a discriminatory approach focusing on their multicultural characteristics. In addition, it is recommended to develop education and intervention programs that can relieve stress and improve life satisfaction and self-esteem among children from multicultural families. Finally, since peer support was found to affect the mental health status of children from multicultural children, it is necessary to educate children from non-multicultural families to improve their awareness of multicultural families.

This study is meaningful in that the factors affecting the mental health of children from multicultural families of school-age were identified based on Dahlgren and Whitehead's [10] rainbow model. In addition, this study used raw data from the MAPS, which is a representative survey. However, the following limitations should be noted. First, since secondary data were used, there are limitations to the variables included in the analysis, and the explanatory power was relatively low. Thus, it is necessary to conduct further studies including more variables that could increase the explanatory power, such as physical activity and academic achievement, which were identified as factors affecting mental health in previous studies. Second, it was not possible to conduct a

comparative analysis with the mental health of children from non-multicultural families; thus it is necessary to conduct further studies to compare the factors affecting mental health between these populations. Finally, measuring mental health as a single item was a limitation. Since mental health status is influenced by multiple factors, a multidimensional measurement tool should be developed and applied.

CONCLUSION

This study used raw data from the first wave of the second phase (2019) of the MAPS [14] to identify the factors influencing the mental health status of multicultural children in South Korea. The study was based on Dahlgren and Whitehead's rainbow model, which consists of four layers, as a conceptual framework. Mental health status was significantly different according to sex, stress, life satisfaction, and self-esteem in the first layer (individual hereditary and lifestyle factors); the experience of discrimination, parental support, peer support, teacher support, the presence of someone who helps at school and outside of school in the second layer (social and community networks); and bicultural acceptance attitudes and acculturative stress in the fourth layer (general socioeconomic, cultural, and environmental conditions). Stress, life satisfaction, self-esteem, and peer support had significant effects on the mental health status of multicultural children.

The following suggestions are made based on the results of this study. Since individual hereditary and lifestyle factors and social and community networks influenced children's mental health status, it is recommended to focus on their developmental stage rather than focusing on multicultural factors. In addition, it is recommended to develop interventions and education to relieve stress and enhance life satisfaction and self-esteem among children from multicultural families and to improve the awareness of multicultural families among children from non-multicultural children.

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Authors' contribution

All the work was done by Sunyeob Choi.

Conflict of interest

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Data availability

Please contact the corresponding author for data availability.

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