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# Relationship between Health Behaviors and Marital Adjustment and Marital Intimacy in Multicultural Family Female Immigrants

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**Background:** This study analyzed the relationship between health behaviors and marital adjustment in multicultural couples to evaluate their health status.

**Methods:** Married couples (70 Korean men and their immigrant wives) completed a structured interview on health behaviors and sociodemographic factors, the Revised Dyadic Adjustment Scale (RDAS), and the Marital Intimacy Scale. Based on the cutoff value of the RDAS, respondents were classified into two groups: high or low dyadic adaptation groups. The collected data were compared with health behavior regarding smoking, alcohol consumption, exercise, and weight.

**Results:** The odds ratio (OR) (95% confidence interval [CI]) by logistic regression with adjustment for age, educational level, career, occupation, length of residence in Korea, nationality, religion, age difference between couple, number of children, monthly income, and proficiency in Korean was 1.279 (1.113–1.492) for unhealthy exercise and 1.732 (1.604–1.887) for unhealthy body weight in female immigrants with low marital adjustment. In Korean husbands with low marital adjustment, the OR (95% CI) was 1.625 (1.232–2.142) for smoking and 1.327 (1.174–1.585) for unhealthy exercise. No significant relationship was found between marital intimacy and health behaviors in female immigrants or Korean husbands.

**Conclusion:** More desirable health behaviors were observed in highly adapted couples. Therefore, family physicians should be concerned with marital adjustment and other associative factors to evaluate and improve multicultural couples' health status.

**Keywords:** Family; Health Behavior; Emigrants and Immigrants; Cultural Diversity; Marital Status

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# INTRODUCTION

Health promotion behaviors refer to habits or actions that maintain and promote health. The positive effects of seven health promotion behaviors called the 'Alameda 7'—7 to 8 hours of sleep a day, having breakfast, no snacks, maintaining an appropriate weight, regular exercise, no alcohol, and no smoking—have been reported in disease prevention and health protection studies.[1] In addition, family forms a fundamental backdrop of health protection and has a major influence on individual health. Therefore, it is essential to consider family function in assessing individual health habits.

Openness and globalization in the 21st century have stimulated migration, which has resulted in changes in the family domain. In Korea, international migration has interacted with social phenomena to bring major changes to the traditional family structure and perspectives on marriage. In particular, there has been a rise in international marriages between Korean men and immigrant women, resulting in a new family structure known as 'multicultural families.'

Previous studies have shown that living together, adapting to marriage, and building intimacy with each other have a significant impact on the health of married couples.[2] In particular, the support of a spouse is more influential in the life of a couple in a multicultural family than in a Korean family.[3]

The purpose of this study was to investigate the marital adjustment and affinity of married couples in a special environment, such as multicultural families formed by Korean men and migrant women, and identify the health behaviors associated with them.

# METHODS

## 1. Participants

For 2 months in 2017, 154 participants were selected from multicultural families residing in Daejeon city and Chungcheongnam-do province. It was confirmed that these female immigrants had resided in Korea for more than a year; this sampling was conducted in multicultural support centers in each locality (43 couples in Daejeon city and 10 couples in Chungcheongnam-do province) and Daejeon's migrant medical center (24 couples). The researcher visited these centers to encourage participation and conducted interviews with the consenting couples. Of the 154 consenting participants, 14 were eliminated owing to language barriers during the interview or their unwillingness to respond to certain questions. Therefore, a total of 140 subjects (70 couples) were analyzed (approximately 1.4% of the multicultural families in Daejeon city and Chungcheongnam-do province).[4]

The researcher obtained the approval of the Institutional Review Board at Chungnam National University Hospital prior to data collection (IRB approval no., CNUH 2017-03-008-001). Participants followed a set of instructions to protect their identity and facilitate their understanding of the study's purpose and procedure. The participants were informed of their freedom to withdraw from the study at any time with no penalty. Personal data were encrypted before statistical processing to protect participants' privacy and confidentiality. They were also informed that the results would not be used other than for academic purposes.

## 2. Procedure

The researcher met with the participants and conducted one-on-one interviews. If there was any difficulty during communication, a volunteer interpreter would intervene.

The collected data consisted of the following demographic and sociological details: age, country of birth, years of residence in Korea, age difference between female immigrants and their Korean husbands, Korean language proficiency of female immigrants, religion, educational level, occupation, family structure, number of housemates and/or children, average monthly family income, weight and height, and subjective health awareness. The American Public Health Association emphasizes preventive healthcare for chronic diseases by focusing on the association between behavioral habits (e.g., smoking, alcohol consumption, obesity, and exercise).[5] Therefore, regarding health behaviors, the interview covered the following four categories: smoking, alcohol consumption, exercise, and body weight. The couples' degree of marital adjustment and intimacy were assessed using the Revised Dyadic Adjustment Scale (RDAS) and Marital Intimacy Scale (MIS). The educational level of the research subjects was categorized into four groups based on the Korean education system: elementary school, middle school, high school, or university.

### 1) Health behaviors

Regarding health behaviors, participants were asked about smoking, alcohol consumption, exercise, and their normal weight maintenance. Participants who answered that they currently smoke were classified as the smoking group. Participants who answered that they had stopped smoking more than 6 months ago or did not smoke originally were classified as the non-smoking group.[6] It was confirmed that those participants who had stopped smoking had quit more than 6 months previously. In terms of alcohol consumption, subjects were asked the three questions suggested by the National Institute on Alcohol Abuse and Alcoholism (NIAAA)[7] in the United States to determine whether they belonged to the moderate drinking group: (1) the average number of times they consumed alcohol in a week, (2) the average amount of alcohol they drank in one sitting, and (3) the maximum amount of alcohol drunk in one sitting. The NIAAA criteria for moderate drinking are as follows: (1) an average of 14 glasses or fewer per week for male adults (seven glasses or fewer for female adults and men aged 65 or above) and (2) a maximum amount of four glasses or fewer in one sitting (three glasses or fewer for female adults or men aged 65 or above). If a participant was judged to be a heavy drinker (with a weekly average alcohol consumption that exceeds the standard of moderate drinking) or a binge drinker (with the maximum amount consumed in one sitting exceeding the standard for moderate drinking), he or she was categorized into the at-risk drinking group. The standard for one glass was defined as containing 14 g of alcohol. Re-

garding exercise, participants were asked, "How many times do you moderately exercise for 30 minutes or longer in a week?" If the participant answered, "5 times a week or more," they were categorized as healthy; otherwise, they were categorized as unhealthy.[8] The heights and weights of the participants were directly measured and converted into their body mass index (kg/m$^2$) to measure their maintenance of normal weight. If this was either less than 18.5 or greater than or equal to 23.0, the subjects were categorized into the unhealthy group for being under or overweight, respectively. The subjects with a body mass index between 18.5 and 23.0 were categorized as healthy.[9]

### 2) Communication

Communication skills were measured via one question: "How would you assess your Korean proficiency?" Responses were measured on a Likert scale from 1, representing 'very poor,' to 5, representing 'very good.' Responses from 1 to 3 were categorized as 'low' and those from 4 to 5 were categorized as 'high.'

## 3. Tools

### 1) Revised Dyadic Adjustment Scale

The initial DAS, devised by Spanier,[10] consists of 32 questions on the following four sub-indicators: (1) dyadic consensus, regarding decisions on important daily matters, (2) dyadic satisfaction with the present relationship, (3) dyadic cohesion, which represents the extent to which the couple participate in activities together, and (4) affectional expression, representing their satisfaction with affection and sex life.

However, in the years following its development, several studies have identified problems with some of the scale's sub-indicators and individual questions. To resolve the existing issues with the DAS, Busby et al.[11] developed the RDAS, which consists of consensus, satisfaction, and cohesion. The strengths of the RDAS include its multidimensionality, higher correlations with another marital satisfaction scale (the Marital Adjustment Test), distinguishability between normal and clinical groups, lower number of questions (14 rather than 18), and higher feasibility and internal consistency. Each of the RDAS' 14 items asks the respondents to rate certain aspects of their relationship on a 5 or 6-point scale. Scores on the RDAS range from 0 to 69, with higher scores indicating greater relationship satisfaction and lower scores indicating greater relationship distress. The cutoff score for the RDAS is 48, such that scores of 48 and above indicate non-distress and scores of 47 and below indicate marital/relationship distress.[12] In this study, the Cronbach's α coefficients for this scale were 0.813 for immigrant women and 0.839 for Korean men.

### 2) Marital Intimacy Scale

The MIS, as developed by Lee,[13] was used to measure marital intimacy. This scale consists of three subdomains (cognitive, emotional, and sexual), with each question answerable on a Likert scale with five options from 'strongly disagree' to 'strongly agree.' The MIS includes 15 items, each of which asks the respondents to rate certain aspects of their relationship on a 5- or 6-point scale. Scores on the MIS range from 0 to 75, with higher scores indicating greater intimacy and lower scores indicating less intimacy. In this study, the coefficients of Cronbach's α for this scale were 0.904 for immigrant women and 0.892 for Korean men.

## 4. Data Processing and Analysis

All statistical analyses were conducted through IBM SPSS ver. 21.0 (IBM Corp., Armonk, NY, USA). The frequency, percentage, and standard deviation (SD) of each question was calculated. The couples with marital adjustment scores of 48 or more were categorized as the high-adjustment group, while those who scored less than 48 were categorized as the low-adjustment group. Chi-square or t-tests were conducted for comparison to verify the statistical significance of the differences in health behaviors between the high-adjustment and low-adjustment groups. Furthermore, these were performed with marital intimacy using marital intimacy scores, which were continuous values. Health behaviors depending on marital adjustment and marital intimacy were predicted from a logistic regression analysis for variables while controlling for sociological properties, such as age, residence in Korea, age difference between female immigrants and their Korean husbands, educational level, occupation, nationality, religion, number of children, income, and the Korean language proficiency of female immigrants. Age, residence in Korea, and age difference between female immigrants and Korean husbands were used as continuous variables. In the husbands' analysis, residence in Korea and the nationality of immigrant women were excluded from the adjustment variables. All statistical analyses with a P-value less than 0.05 were considered significant.

## RESULTS

### 1. Sociological Properties, Marital Adjustment, and Marital Intimacy

The mean±SD age of the 70 female immigrants was 26.4±4.4 years, and 17.1% had only graduated from high school and 30.0% had only graduated from college, indicating that nearly half of the female immigrants had completed higher education. Most (85.7%) had migrated to Korea for their marriage. The most common occupation of these women was homemaker, and the most common country of birth was Vietnam, followed by the Philippines, other countries, and China, in descending order. More than half of the female immigrants were Christian (52.9%). Twenty-four female immigrants (34.3%) lived with an extended family that consisted of three generations or more. Fifty-three women evaluated their Korean language proficiency as 'low,' while 17 assessed it as 'high.' Regarding the question on subjective health condition, the majority (58.6%) indicated that it was 'moderate.' The mean±SD of the marital adjustment score was 40.94±5.86, while the mean±SD for marital intimacy was 46.91±6.54.

The mean±SD age of the 70 Korean husbands was 42.4±5.4. High school graduates stood at 12.9% while 11.4% had graduated from university. The most common occupations were agriculture, forestry, and

**Table 1.** Sociodemographic characteristics of multicultural families

| Characteristic | Female immigrants | Korean husbands |
|---|---|---|
| Age (y) | 26.40±4.4 | 42.4±5.4 |
| 20–29 | 59 (84.3) | 0 |
| 30–39 | 10 (14.3) | 23 (32.9) |
| 40–49 | 1 (1.4) | 39 (55.7) |
| ≥50 | 0 | 8 (11.4) |
| Educational level | | |
| Elementary | 11 (15.7) | 7 (10.0) |
| Middle | 26 (37.1) | 46 (65.7) |
| High | 12 (17.1) | 9 (12.9) |
| College | 21 (30.0) | 8 (11.4) |
| Cause of immigration | | |
| Marriage | 60 (85.7) | |
| Employment | 6 (8.6) | |
| Etc. | 4 (5.7) | |
| Occupation | | |
| Office | 4 (5.7) | 3 (4.3) |
| Service | 6 (8.6) | 7 (10.0) |
| Experts | 0 | 6 (8.6) |
| Manufacturer | 0 | 8 (11.4) |
| Sales | 0 | 6 (8.6) |
| Farming/forestry/livestock | 0 | 19 (27.1) |
| Retail industry | 0 | 8 (11.4) |
| Daily worker | 0 | 9 (12.9) |
| Housewife | 60 (85.7) | 0 |
| Others | 0 | 4 (5.7) |
| Length of residence in Korea (y) | 3.70±3.3 | |
| ≥1, <5 | 55 (78.6) | |
| ≥5, <10 | 9 (12.9) | |
| ≥10 | 6 (8.6) | |
| Nationality | | |
| Vietnam | 42 (60.0) | |
| Philippines | 14 (20.0) | |
| China | 6 (8.6) | |
| Other | 8 (11.4) | |
| Religion | | |
| Buddhism | 5 (7.1) | 5 (7.1) |
| Christianity | 37 (52.9) | 27 (38.6) |
| Catholicism | 12 (17.1) | 11 (15.7) |
| Other | 1 (1.4) | 1 (1.4) |
| None | 15 (21.4) | 26 (37.1) |
| Age difference with spouse (y) | 15.40±4.4 | |
| <10 | 10 (14.3) | |
| ≥10, <20 | 48 (68.6) | |
| ≥20 | 12 (17.1) | |
| No. of children | | |
| 0 | 3 (4.3) | |
| 1 | 27 (38.6) | |
| 2 | 39 (55.7) | |
| ≥3 | 1 (1.4) | |
| Family type | | |
| Nuclear | 41 (58.6) | |
| Extended | 24 (34.3) | |
| Other | 5 (7.1) | |
| Monthly income (million Korean won) | | |
| <1 | 3 (4.3) | |
| 1–2 | 20 (28.6) | |
| 2–3 | 37 (52.9) | |
| >3 | 10 (14.3) | |

(Continued to the next page)

**Table 1.** Continued

| Characteristic | Female immigrants | Korean husbands |
|---|---|---|
| Proficiency in Korean | | |
| Poor | 53 (75.7) | |
| Good | 17 (24.3) | |
| Subjective health status | | |
| Very good | 10 (14.3) | 7 (10.0) |
| Good | 16 (22.9) | 12 (17.1) |
| Not bad | 41 (58.6) | 41 (58.6) |
| Bad | 3 (4.3) | 10 (14.3) |
| Marital adjustment score* | 40.94±5.86 | 49.31±6.19 |
| Marital intimacy score[†] | 46.91±6.54 | 57.83±8.76 |

Values are presented as mean±standard deviation or number (%).
*By Revised Dyadic Adjustment Scale. [†]By Marital Intimacy Scale.

livestock, followed by daily labor, manufacturing and retail, professional services, and sales, in descending order. Like the female immigrant group, the largest Korean husband group (58.6%) responded 'moderate' to the question on subjective health condition. The husbands' mean±SD marital adjustment score was 49.31±6.19, and their mean±SD marital intimacy was 57.83±8.76 (Table 1).

## 2. Relationship between Marital Adjustment and Health Behaviors

The participants were divided into high-adjustment and low-adjustment groups based on the cutoff value of marital adjustment to compare their health behaviors. First, the healthy group of female immigrants regarding physical activities made up 66.7% of the high-adjustment group, and the unhealthy group of female immigrants regarding physical activities accounted for 85.9% of the low-adjustment group, confirming a statistically significant (P<0.001) relationship between marital adjustment and physical activity. In the high-adjustment group of immigrant women, the healthy group of normal weight maintenance accounted for 100%, which was a significantly high proportion (P<0.001). There was no statistically significant relationship between smoking or alcohol consumption and the marital adjustment of female immigrants.

In the high-adjustment group of Korean husbands, the non-smoking group accounted for 100% (P<0.001), while the healthy group regarding physical activity accounted for 63.3%, a significantly high proportion (P<0.001). In the low-adjustment group, the unhealthy habits of smoking and lack of physical activity accounted for significantly high proportions of 57.5% and 95%, respectively (P<0.001, P<0.001). Alcohol consumption was found to have no relation with the marital adjustment of Korean husbands (Table 2).

## 3. Relationship between Marital Intimacy and Health Behaviors

In the female immigrant group, no statistically significant relationship was found between marital intimacy and health behaviors, such as smoking, drinking, exercise, or weight maintenance. In the Korean husband group, the mean±SD for marital intimacy was statistically

**Table 2.** Comparison of health behaviors according to marital adjustment

| Variable | Total | Smoking | | | Alcohol | | | Exercise | | | Body weight | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Non-smoking | Smoking | P-value* | Moderate drinking | At-risk drinking | P-value* | Regular PA | Irregular PA | P-value* | Normal BW | Abnormal BW | P-value* |
| Female immigrants | | | | | | | | | | | | | |
| HDAG† | 6 (8.6) | 6 (100.0) | 0 | 1.000 | 4 (66.7) | 2 (33.3) | 0.202 | 4 (66.7) | 2 (33.3) | <0.001 | 6 (100.0) | 0 | <0.001 |
| LDAG‡ | 64 (91.4) | 60 (93.8) | 4 (6.3) | | 56 (87.5) | 8 (12.5) | | 9 (14.1) | 55 (85.9) | | 44 (68.8) | 20 (31.3) | |
| Korean husbands | | | | | | | | | | | | | |
| HDAG† | 30 (42.9) | 30 (100.0) | 0 | <0.001 | 4 (13.3) | 26 (86.7) | 0.371 | 19 (63.3) | 11 (36.7) | <0.001 | 22 (73.3) | 8 (26.7) | 0.054 |
| LDAG‡ | 40 (57.1) | 17 (42.5) | 23 (57.5) | | 9 (22.5) | 31 (77.5) | | 2 (5.0) | 38 (95.0) | | 20 (50.0) | 20 (50.0) | |

Values are presented as number (%).

PA, physical activity; BW, body weight; HDAG, high dyadic adaptation group; LDAG, low dyadic adaptation group.

*From chi-square test or Fisher's exact test. †Who scored 48 (cutoff value) or more on the Revised Dyadic Adjustment Scale. ‡Who scored less than 48 on the Revised Dyadic Adjustment Scale.

**Table 3.** Comparison of health behaviors according to marital intimacy

| Variable | Smoking | | | Alcohol | | | Exercise | | | Body weight | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Non-smoking | Smoking | P-value* | Moderate drinking | At-risk drinking | P-value* | Regular PA | Irregular PA | P-value* | Normal BW | Abnormal BW | P-value* |
| Female immigrants | | | | | | | | | | | | |
| No. (%) | 66 (94.3) | 4 (5.7) | 0.230 | 60 (85.7) | 10 (14.3) | 0.162 | 15 (21.4) | 55 (78.6) | 0.087 | 50 (71.4) | 20 (28.6) | 0.350 |
| Mean±SD† | 46.68±6.41 | 50.75±8.50 | | 46.47±6.67 | 49.60±5.23 | | 47.24±6.15 | 46.37±5.22 | | 47.38±6.88 | 45.75±5.60 | |
| Korean husbands | | | | | | | | | | | | |
| No. (%) | 47 (75.7) | 23 (24.3) | <0.001 | 13 (18.6) | 57 (81.4) | 0.935 | 23 (32.9) | 47 (67.1) | <0.001 | 42 (60.0) | 28 (40.0) | <0.001 |
| Mean±SD† | 60.38±7.95 | 49.88±6.08 | | 58.54±10.23 | 57.67±8.49 | | 65.67±4.72 | 52.60±5.36 | | 59.90±7.93 | 54.71±9.17 | |

PA, physical activity; BW, body weight.

*By the t-test. †The value calculated by the Marital Intimacy Scale.

significantly higher in the non-smoking group than the smoking group (P<0.001). The mean±SD for marital intimacy was statistically significantly higher in the healthy group for physical activity (P<0.001) and body weight (P<0.001) than the unhealthy group. No relationship was found between marital intimacy and drinking in the Korean husband group (Table 3).

### 4. Predicting Health Behaviors Based on Marital Adjustment and Marital Intimacy

According to the logistic regression analysis for categorical and continuous variables on health behaviors based on marital adjustment and intimacy while controlling for sociological properties (including age, educational level, occupation, residence in Korea, nationality, religion, age difference, number of children, income, and Korean language proficiency), the female immigrant group with low marital adjustment was statistically 1.279 times (95% confidence interval [CI], 1.113–1.492) more likely to belong to the unhealthy group for physical activity and 1.732 times (95% CI, 1.604–1.887) more likely to deviate from the normal weight. At-risk drinking and smoking were found to be unrelated to marital adjustment. Additionally, the Korean husband group with lower marital adjustment had 1.625-fold (95% CI, 1.232–2.142) and 1.327-fold (95% CI, 1.174–1.585) higher levels of smoking and a lack of physical activity, respectively. No clear relationship was found between marital adjustment and risks concerning drinking or body weight (Table 4). In addition, no significant relationship was found between marital intimacy and health behaviors in either the female immigrant or Korean husband groups (Table 5).

## DISCUSSION

In Korea, international marriages between Korean men and foreign women have been on the rise since the mid-1990s, mainly through marriage brokers. According to the Korean Ministry of Justice, there were 125,137 female immigrants eligible for marriage in Korea at the end of June 2015. This number was reduced from 128,749 in the same period in 2014 owing to the strengthened visa requirements for marriage immigrants imposed by the government in April 2014.[14] However, the frequency of international marriages is expected to increase in the future. This study investigated the marital adjustment and intimacy of multicultural families formed by the marriages of Korean men with female immigrants and analyzed their subsequent health behaviors.

Preceding studies have reported a lower level of functioning in multicultural families compared with that of traditional Korean families.[15] Multicultural families are currently rising in prevalence in Korea, so the country's medical community should study this subject. The issues and health of multicultural spouses have not yet been studied sufficiently, even if they are at the forefront of change owing to their exposure to the fusion of family structures. Their marital adjustment and intimacy are major factors that will directly impact how their families function. Therefore, it is important to measure the degree of spousal support in multicultural families and the subsequent extent of their health behaviors to promote their functioning and health promotion behaviors.

This study investigated marital adjustment and marital intimacy in multicultural families formed by marriages between Korean men and female immigrants and the extent of their subsequent health behav-

**Table 4.** Logistic regression analysis of health behaviors according to marital adjustment

| Variable | No. (%) | Smoking | At-risk drinking | Irregular physical activity | Abnormal body weight |
|---|---|---|---|---|---|
| Female immigrants | | | | | |
| HDAG* | 6 (8.6) | 1 | 1 | 1 | 1 |
| LDAG† | 64 (91.4) | 1.178 (0.863–1.347) | 3.500 (0.549–22.304) | 1.279 (1.113–1.492) | 1.732 (1.604–1.887) |
| Korean husbands | | | | | |
| HDAG* | 30 (42.9) | 1 | 1 | 1 | 1 |
| LDAG† | 40 (57.1) | 1.625 (1.232–2.142) | 1.887 (0.521–6.841) | 1.327 (1.174–1.585) | 2.750 (0.992–7.621) |

Values are presented as odds ratio (95% confidence interval)‡, unless otherwise stated.
HDAG, high dyadic adaptation group; LDAG, low dyadic adaptation group.
*Who scored 48 (cutoff value) or more on the Revised Dyadic Adjustment Scale. †Who scored less than 48 on the Revised Dyadic Adjustment Scale. ‡From logistic regression with adjustment for sociodemographic characteristics including age, educational level, occupation, length of residence in Korea, nationality, religion, age difference, number of children, monthly income, and proficiency in Korean (age, residence in Korea, and age difference between female immigrants and Korean husbands were used as continuous variables. In the husbands' analysis, residence in Korea and the nationality of immigrant wives were excluded from the adjustment variables).

**Table 5.** Logistic regression analysis of health behaviors according to marital intimacy*

| Total score of MIS | Smoking | At-risk drinking | Irregular physical activity | Abnormal body weight |
|---|---|---|---|---|
| Female immigrants | 1.128 (0.936–1.359) | 0.995 (0.892–1.109) | 1.052 (0.963–1.194) | 0.946 (0.868–1.031) |
| Korean husbands | 1.241 (0.098–1.403) | 1.010 (0.941–1.084) | 1.259 (0.722–1.465) | 0.930 (0.874–1.990) |

Values are presented as odds ratio (95% confidence interval)†, unless otherwise stated.
MIS, Marital Intimacy Scale.
*The variation of the odds ratio of health behaviors is analyzed according to a 1-point change in MIS score. †From logistic regression with adjustment for sociodemographic characteristics including age, educational level, occupation, length of residence in Korea, nationality, religion, age difference, number of children, monthly income and proficiency in Korean (age, residence in Korea, and age difference between female immigrants and Korean husbands were used as continuous variables. In the husbands' analysis, residence in Korea and the nationality of immigrant wives were excluded from the adjustment variables).

iors to evaluate the couples' health status.

Compared with Korean husbands in multicultural families, immigrant wives scored approximately 10 points lower for marital adjustment and marital intimacy, probably due to their struggles with the language barrier, economic hardships, loneliness, cultural differences, childrearing requirements, education, and so on. Each local government has tried to assist their adjustment in Korea by establishing a support center under the leadership of the central government to provide them with various welfare programs and lessons in the Korean language, cooking, history, and more, but a large number of female immigrants still reportedly experience difficulties.[16] Several studies have suggested that female immigrants struggle to adapt to Korean society owing to their Korean husbands' inappropriate ideas regarding marriage and lack of understanding of or disdain toward their wife's home country.[17-19] Therefore, it is important to offer diverse programs on marriage preparation and to educate couples through immigrant marriage support centers before or after submitting applications for international marriages. Offering more information on immigrant wives' home countries and cultures will be a major source of support for the settlement of immigrant women, as this can increase the couples' mutual respect for and acceptance and understanding of their spouse's culture, leading to higher marital satisfaction.

The female immigrant group with high marital adjustment practiced appropriate health behaviors in the categories of physical activity and normal weight maintenance. The Korean husband group with the highest marital adjustment and marital intimacy had appropriate health habits in terms of smoking, physical activity, and normal weight maintenance. According to previous studies, the family is a dynamic and interdependent unit that affects physical, emotional, and social development and a primary social environment that affects health and health behaviors.[20] Therefore, the extent of marital support needs to be established as grounds for the improvement of family function and appropriate health behavior.

The female immigrant group with low marital adjustment was found to have a higher odds ratio of exposure to abnormal weight than the group with higher marital adjustment. Female marriage immigrants are likely to undergo many changes in their health due to various difficulties in adapting to and living in Korean society. The results of this study are similar to those of previous studies, in which married immigrant women were exposed to nutritional deficiencies or nutritional overload due to differing food cultures and eating habits and thus did not maintain proper weight.[21] Taking account of the report linking a healthy diet with seasonal food and the higher subjective health status of female immigrants who have adjusted well to Korea,[22] it can be concluded that female immigrants will likely have a healthy diet if they have positive support from their Korean spouses and do not experience much difficulty when settling in Korea.

This study also observed that both groups (Korean husbands and female immigrants) with lower marital adjustment were more likely to have a lack of physical activity, probably due to inadequate family function or a lack of family leisure time. Family leisure can be defined

as spare time that parents and children spend together for recreation to maintain their physical and psychological health and develop various skills.[23] According to the 'family status report' by the Korean Ministry of Gender Equality & Family, the most frequently quoted reasons for difficulty in spending spare time with family were 'financial burden (29.2%),' 'being busy with work (22.4%),' and 'conflicting schedules of family members (16.9%),' in descending order.[24] These limitations can be overcome by actively utilizing communal sports spaces, including the sports training centers, sport parks, complex sport facilities for agricultural and fishing communities, sport facilities for villages, and youth centers that have been established since the late 1990s to expand sport spaces for citizens and welfare infrastructure. The active use of such facilities may enhance family functioning and health promotion in multicultural families.

In the group of Korean husbands with low marital adjustment, the likelihood of smoking was higher than in the group with high marital adjustment. As an inclusive concept that encompasses spousal consensus, satisfaction with the relationship, participation in activities, affectionate expression, and so on, marital adjustment measures the extent of spousal support. Therefore, the relationship identified in this study between husbands' marital adjustment and smoking can be seen in the same context as the previous findings that emphasized the importance of spousal support in quitting smoking.[25] Planning for spousal support is suggested during smoker assessment in medical situations to ensure the efficacy of anti-smoking strategies.

No clear relationship was found between marital adjustment, marital intimacy, and at-risk drinking and smoking in the female immigrant group, and no statistically significant relationship was found with at-risk drinking in the Korean husband group. In a survey of alcoholics and research on the rehabilitative model by the Korean Ministry of Health and Welfare in 2008,[26] the risk factors of smoking and drinking for Korean adults were identified as follows: (1) men, (2) divorce/separation, death of a spouse, or being unmarried, and (3) having less than 12 years of education. As this study was conducted on (1) married couples living in one family and (2) who had mostly completed higher education, it excluded the risk factors for smoking and drinking. Therefore, no clear findings were drawn from this study, as most participants belonged to the low-risk group for smoking and drinking in the analysis of health behavior.

No significant relationship was confirmed between marital intimacy and the health behavior of immigrant wives and Korean husbands in this study. As an indicator of mutual closeness and sharing, marital intimacy encompasses affection, sex, dedication, and cognitive elements. In other words, it is a concept that represents the emotional relationship between spouses. According to previous studies, marital intimacy holds greater interpretative value for middle-aged couples who have spent most of their lives together, as it refers to the aspects of mutual emotional, cognitive and physical closeness, and dedication more than marital adjustment.[27] The mean±SD age of immigrant wives was as low as 26.4±4.4, which explains their incomplete establishment of an emotional marital relationship. Thus, it was difficult to identify the

interpretative value of marital intimacy.

Through this study, a relationship was found between high marital adjustment in multicultural families, healthy physical activity, and proper weight maintenance. In addition, it was found that smoking and marriage adjustment were related in the Korean husband group from multicultural families. Based on these results, it can be seen that when planning the health promotion of multicultural families, we should consider not only their biomedical health but also their psychosocial health, including marital well-being. This comprehensive approach to multicultural families can ultimately contribute to improving their quality of life.

This study has several limitations. It did not represent multicultural families across the whole country, only focusing on subjects residing in Daejeon city and Chungcheongnam-do province. We did not know the change in health behaviors of immigrant women and Korean men before and after marriage. Therefore, the causality between health behavior and the degree of marital adjustment or marital intimacy is not clear. Furthermore, it is more objective for Korean husbands to assess the communication skills of their migrant wives than for migrant women to assess their own communication skills.

Despite these limitations, considering the present lack of research on multicultural families and couples in particular, this study can be utilized as a baseline to increase the appropriate health behaviors of married female immigrants and their families and improve their quality of life.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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