

## Research Article

# Manifestations of Sasang Typology according to Common Chronic Diseases in Koreans

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Sasang typology is a traditional Korean medical classification scheme that combines medical management with general medicine and can be applied to chronic diseases. We aimed to analyze differences in Sasang Personality Questionnaire (SPQ) and Sasang Digestive Function Inventory (SDFI) results in patients with diabetes mellitus (DM), hypertension, functional dyspepsia, major depressive disorder (MDD), and adenomyosis. In this cross-sectional study, data were collected at a medical college hospital in South Korea. A total of 248 patients were included: 52 with DM, 47 with hypertension, 36 with functional dyspepsia, 26 with MDD, and 87 with adenomyosis. The subjects took both the SPQ and the SDFI. The outcome measures in this study were body mass index (BMI), SPQ score, and SDFI score. The DM and hypertension groups, which were expected to demonstrate many Taeum-type traits, exhibited high BMI, high SPQ-Behavior and SDFI-Appetite scores, and low SPQ-Emotionality and SDFI-Digestion scores. The functional dyspepsia group showed low BMI and high scores for SPQ-Behavior, SPQ-Emotionality, SDFI-Digestion, and SDFI-Appetite. The MDD group demonstrated high SPQ-Emotionality and SDFI-Digestion scores, low BMI, and low SPQ-Behavior and SDFI-Appetite scores. The adenomyosis group demonstrated high scores for SPQ-Behavior, SDFI-Digestion, and SDFI-Appetite, low BMI, and low SPQ-Emotionality scores. Different characteristics distinguishing Sasang traits according to chronic diseases were ascertained, especially for Taeum and Soeum types.

## 1. Introduction

Several complementary and alternative medical techniques are used in many countries. Particularly in northeast Asia, traditional medicines are often combined with general medicine to enhance patient healthcare [1, 2]. Moreover, as personalized medicine is becoming increasingly important, alternative medical therapies play more prominent roles in the general healthcare environment.

Sasang typology, a traditional Korean medical classification system, is a type of personalized medicine that categorizes individuals as Taeyang-, Soyang-, Taeum-, or Soeum-type depending on a variety of traits [3]. Taeyang-type individuals are generally rash-minded and independent, and they are more likely to have a developed nape of the neck. However, there has been relatively little research on Taeyang-type individuals, as less than 0.1% of the Korean population are categorized as this type. Approximately 20% of the Korean

population are categorized as Soyang type. This type is characterized by an unstable and active mind. In contrast, Taeum-type individuals are characterized by serene and calm minds, good digestive function, thick waists, and high body mass index (BMI). Approximately 50% of the Korean population are characterized as Taeum type. Finally, Soeum-type individuals are characterized by passive and nervous minds, weak digestive function, and low BMI. Approximately 30% of the Korean population are characterized as Soeum type [4, 5].

Tailored medical management according to a patient's individual traits is associated with precision or personalized medicine. There are numerous examples of personalized medicine, including the fact that angiotensin-converting enzyme inhibitors are not used in people of African descent [6], the fact that carriers of specific genetic variations require customized health screenings or lifestyle management because of susceptibilities to certain cancers [7], and the fact that customized meal plans are helpful for some patients [8].

There have been several efforts to standardize the differentiation of types in Sasang typology. The Questionnaire for Sasang Constitutional Classification-II (QSCC-II)—a Sasang-type classification test—consists of 121 questions and has a diagnostic discriminability of 70% [9]. Moreover, there are several other Sasang typology assessment tools, including the Sasang Personality Questionnaire (SPQ) and the Sasang Digestive Function Inventory (SDFI). Both the SPQ and the SDFI are relatively simple and have been shown to be significantly correlated with Sasang type [10–12].

According to Sasang typology, individuals with Taeum type have a high BMI. Therefore, they have high prevalence of lifestyle-related diseases such as hypertension (HTN) and diabetes mellitus (DM) [13–15]. Further, these individuals show low prevalence of major depressive disorder (MDD), which is likely related to their stable personalities [16, 17]. In contrast, Soeum-type individuals are sensitive and passive and thus show higher rates of both digestive system dysfunctions and neuropsychiatric diseases [4, 17, 18].

In this way, Sasang typology is related to disease prevalence within the context of modern medical science. Therefore, relating Sasang typology to modern medicine has the potential to facilitate the discovery of new treatment options.

In the present study, we sought to analyze differences in SPQ and SDFI results in individuals with specific chronic diseases that we would expect to be affected by Sasang traits. The diseases were as follows: HTN, DM, functional dyspepsia, MDD, and adenomyosis.

## 2. Materials and Methods

**2.1. Sample and Data Collection.** This study was conducted at a medical college hospital in South Korea from June 2016 to June 2017. The subjects were outpatients with HTN, DM, functional dyspepsia, MDD, or adenomyosis who agreed to supply medical information and to participate in the surveys. The surveys were conducted by coresearchers who attended to the medical needs of the patients. The

coresearchers obtained each patient's sex, age, height, weight, and lifestyle characteristics (alcohol consumption, tobacco smoking habits, exercise habits, dietary habits, and sleep duration). Additionally, each patient completed both the SPQ and the SDFI. This study was approved by the Keimyung University Dongsan Hospital Institutional Review Board (IRB No. 2016-06-016).

The patients with HTN and DM were selected from among those who were being treated with medicine and who visited the clinic regularly to control their disease. The patients with functional dyspepsia were selected from among those who had received a definite diagnosis according to the Rome IV Criteria [19] and visited the clinic regularly to control their dyspepsia. The patients with MDD were selected from among those who received a definite diagnosis according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) [20] and visited the clinic regularly to control their MDD. The patients with adenomyosis were selected from among those who received a diagnosis of adenomyosis via pelvic sonography and underwent dysmenorrhea management.

**2.2. The Sasang Personality Questionnaire.** The SPQ consists of 19 questions that are intended to determine personality according to Sasang typology. The SPQ is divided into 3 subscales as follows: the SPQ-Behavior (SPQ-B) subscale contains 5 questions, the SPQ-Emotionality (SPQ-E) subscale contains 4 questions, and the SPQ-Cognition (SPQ-C) subscale contains 5 questions. Each subscale score ranges from 1 to 3, while the SPQ-Total score ranges from 19 to 57.

The SPQ-B score determines the presence of passivity or activity. A low SPQ-B score indicates a passive personality, while a high SPQ-B score indicates an active personality. The SPQ-E score is intended to determine the static and dynamic components of personality. A low SPQ-E score indicates a static personality, while a high SPQ-E score indicates a dynamic personality. The SPQ-C score indicates the presence of a meticulous or an easygoing personality. A low SPQ-C score indicates a meticulous personality, while a high SPQ-C score indicates an easygoing personality [12].

**2.3. The Sasang Digestive Function Inventory.** The SDFI consists of 21 questions intended to determine digestive function in Sasang typology. The SDFI is divided into three subscales as follows: the SDFI-Digestion (SDFI-D) subscale consists of 10 questions, the SDFI-Appetite (SDFI-A) subscale consists of six questions, and the SDFI-Eating Pattern (SDFI-E) subscale consists of five questions. Each subscale ranges from 0 to 4, and the SDFI-Total score ranges from 0 to 82.

The SDFI-D score is intended to represent digestive function, with a higher SDFI-D score indicating more problems with digestion. The SDFI-A score is intended to represent appetite, with a higher SDFI-A score indicating a greater appetite. Finally, the SDFI-E score is intended to represent eating patterns: subjects with a higher SDFI-E score have a greater tendency to eat immoderately. The SDFI-Total score is the sum of the above subscale scores. A higher SDFI-Total

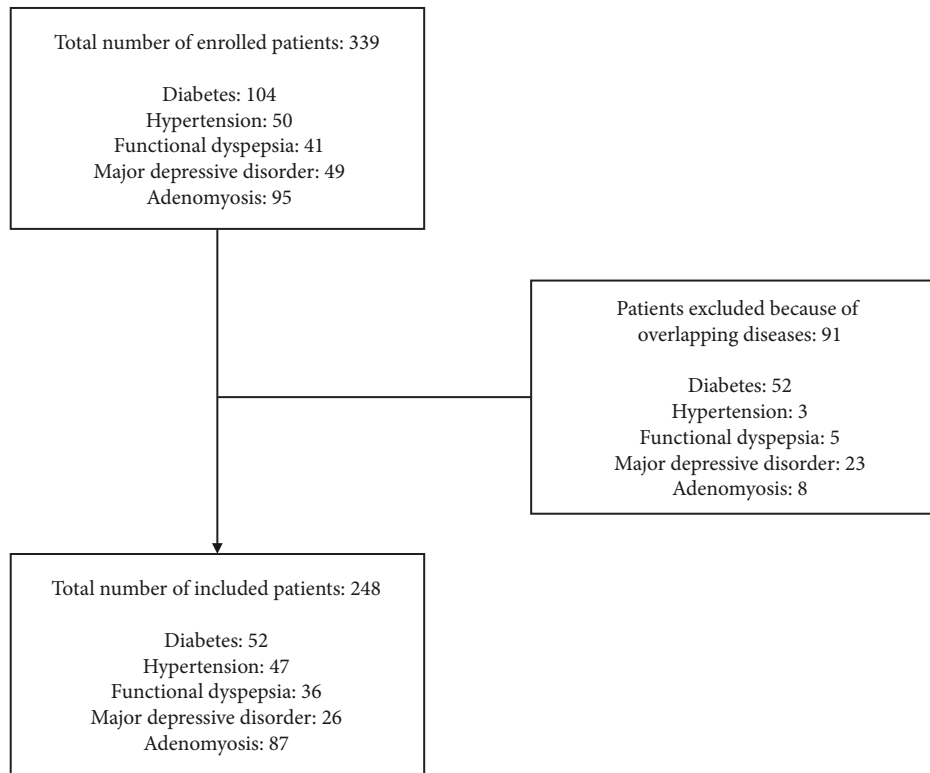


FIGURE 1: A flow diagram showing the detailed participant selection procedure.

score indicates that the subject has more problems with the digestive system overall.

**2.4. Statistical Analysis.** Analysis of variance and the Kruskal-Wallis test were used to assess continuous variables, while Fisher’s exact test was used for nominal variables. All analyses were performed using SPSS Statistics 21.0 (IBM Corp., Armonk, NY, USA), and P values of 0.05 or lower were considered significant.

**3. Results**

A total of 399 subjects enrolled in this study, but 91 were excluded because of overlapping diseases. Among the remaining 248 subjects, 52 had DM, 47 had HTN, 36 had functional dyspepsia, 26 had MDD, and 87 had adenomyosis (Figure 1). 76 were men, while 172 were women. The average BMI was 23.73 kg/m<sup>2</sup>, 9.7% were smokers, and 44.4% consumed alcohol. The average sleep duration was 6.81 hours (Table 1).

We applied post hoc analyses with Bonferroni corrections to analyze differences between the groups of patients. We observed that there was a tendency toward a higher BMI in the DM and HTN groups (24.91 and 25.44 kg/m<sup>2</sup>, resp.). Further, the BMI of the DM group was higher than that of the adenomyosis group, and the BMI of the HTN group was higher than those of the functional dyspepsia and adenomyosis groups (Figure 2).

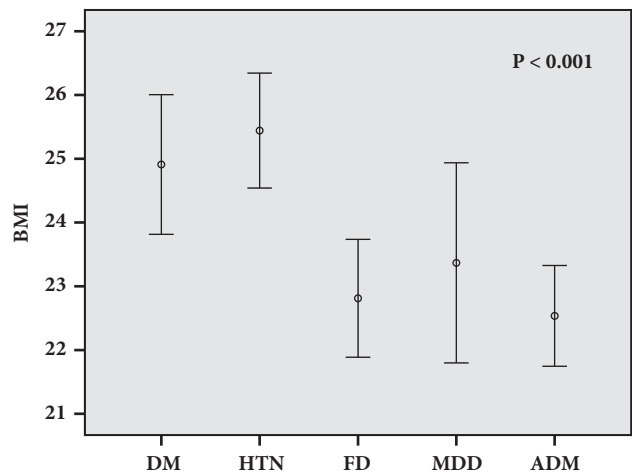


FIGURE 2: A plot showing 95% confidence intervals of the body mass index according to disease (P < 0.001). BMI: body mass index; DM: diabetes mellitus; HTN: hypertension; FD: functional dyspepsia; MDD: major depressive disorder; ADM: adenomyosis.

The SPQ-B score was lower in the MDD group than in all other groups. Additionally, the SPQ-C score was higher in the DM group than in the adenomyosis group. The SPQ-E score showed a tendency to be higher in the functional dyspepsia and MDD groups, and the score of the functional dyspepsia group was higher than scores of the HTN and adenomyosis groups. The SPQ-Total score was not significantly different among the subgroups (Figure 3).

TABLE 1: Baseline characteristics of the patients.

|                              | All (248)     | DM (52)       | HTN (47)     | FD (36)       | MDD (26)      | ADM (82)      | p          |        |
|------------------------------|---------------|---------------|--------------|---------------|---------------|---------------|------------|--------|
| Age* (y)                     | 50 (40–62)    | 61 (51–69)    | 63(57–72)    | 38 (32–52)    | 45.5 (25–64)  | 44 (39–48)    | <0.001     |        |
| Sex**                        | Male          | 76 (30.6%)    | 31 (59.6%)   | 25 (53.2%)    | 11 (30.6%)    | 9 (34.6%)     | 0 (0.0%)   | <0.001 |
| Alcohol consumption**        | Yes           | 110 (44.4%)   | 16 (30.8%)   | 21 (44.7%)    | 22 (61.1%)    | 9 (34.6%)     | 42 (50%)   | 0.008  |
| Smoking**                    | Yes           | 24 (9.7%)     | 11 (21.2%)   | 2 (4.3%)      | 4 (11.1%)     | 4 (15.4%)     | 3 (3.6%)   | 0.003  |
| Exercise**                   | Yes           | 193 (77.8%)   | 44 (84.6%)   | 38 (80.9%)    | 29 (80.6%)    | 18 (69.2%)    | 64 (76.2%) | 0.016  |
| BMI* ** (kg/m <sup>2</sup> ) | 23.73 ± 3.62  | 24.91 ± 3.77  | 25.44 ± 3.07 | 22.81 ± 2.73  | 23.37 ± 3.88  | 22.54 ± 3.55  | <0.001     |        |
| Sleep duration* ** (h)       | 6.81 ± 1.58   | 7.07 ± 2.19   | 6.48 ± 1.64  | 6.75 ± 1.19   | 6.60 ± 1.77   | 6.92 ± 1.10   | 0.357      |        |
| SPQ-B* **                    | 10.19 ± 2.95  | 10.42 ± 3.27  | 10.30 ± 2.93 | 10.39 ± 2.63  | 8.23 ± 2.63   | 10.49 ± 2.83  | 0.011      |        |
| SPQ-C* **                    | 9.32 ± 2.46   | 9.94 ± 2.57   | 9.83 ± 2.63  | 9.56 ± 2.41   | 8.88 ± 2.30   | 8.71 ± 2.25   | 0.018      |        |
| SPQ-E* **                    | 7.61 ± 2.16   | 7.58 ± 2.28   | 7.06 ± 2.24  | 8.56 ± 2.08   | 8.50 ± 2.16   | 7.26 ± 1.92   | 0.002      |        |
| SPQ-Total* **                | 27.12 ± 5.68  | 27.94 ± 5.93  | 27.19 ± 6.32 | 28.50 ± 5.27  | 25.62 ± 5.44  | 26.47 ± 5.31  | 0.186      |        |
| SDFI-D* **                   | 14.59 ± 8.88  | 10.76 ± 8.73  | 10.81 ± 6.80 | 18.89 ± 9.62  | 16.56 ± 9.34  | 16.58 ± 7.99  | <0.001     |        |
| SDFI-A* **                   | 13.67 ± 4.67  | 14.63 ± 4.94  | 14.98 ± 3.78 | 14.81 ± 4.64  | 9.40 ± 4.45   | 13.17 ± 4.29  | <0.001     |        |
| SDFI-E* **                   | 7.78 ± 4.38   | 6.96 ± 4.90   | 7.66 ± 3.92  | 9.47 ± 4.35   | 7.92 ± 3.49   | 7.57 ± 4.46   | 0.115      |        |
| SDFI-Total* **               | 36.04 ± 11.26 | 32.35 ± 10.56 | 33.45 ± 9.05 | 43.17 ± 12.83 | 33.38 ± 12.43 | 37.41 ± 10.28 | <0.001     |        |

\*Kruskal-Wallis test (median, interquartile range), \*\*Fisher’s exact test (N, %), \*\*\*ANOVA (mean ± SD).

DM: diabetes mellitus; HTN: hypertension; FD: functional dyspepsia; MDD: major depressive disorder; ADM: adenomyosis; SPQ: Sasang Personality Questionnaire; SDFI: Sasang Digestive Function Inventory; ANOVA: analysis of variance; SD, standard deviation.

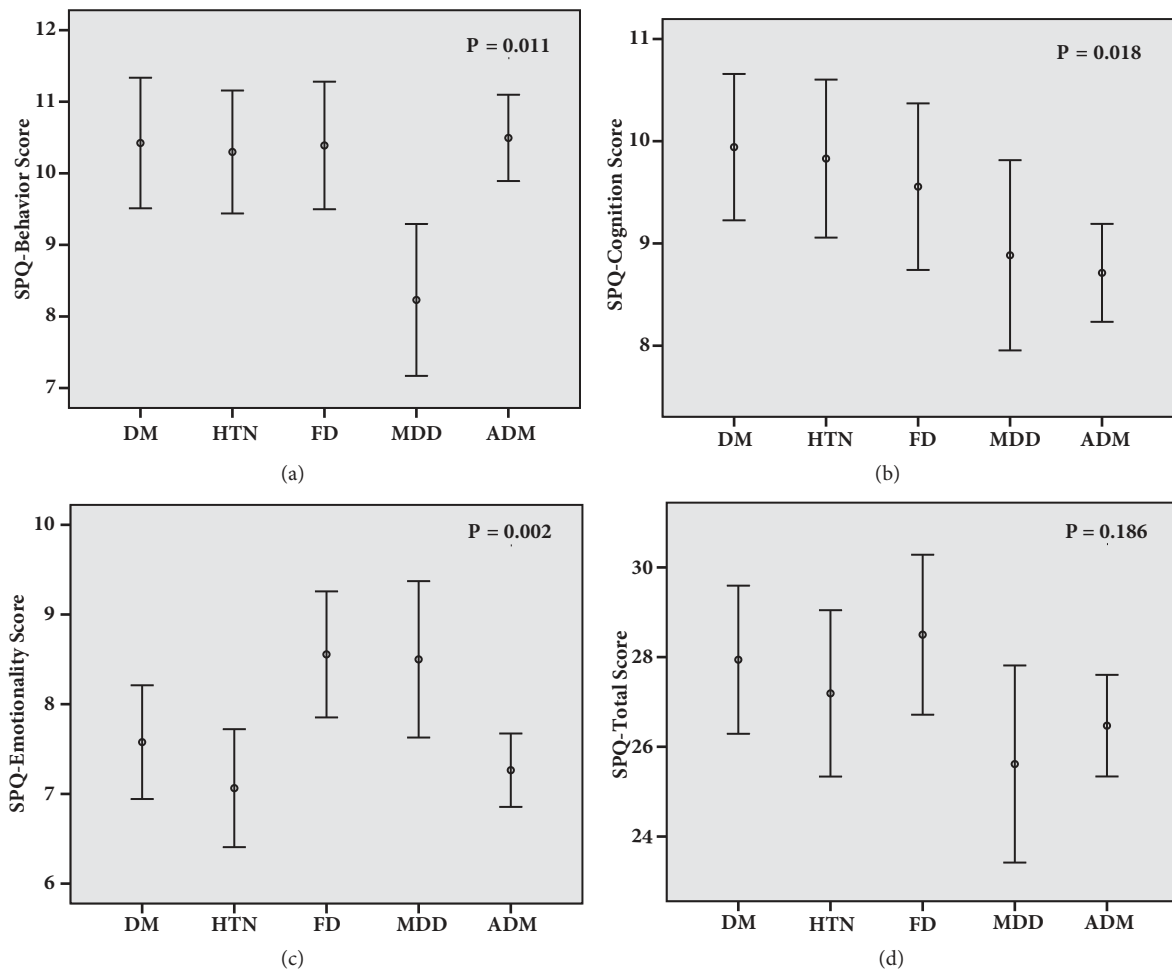


FIGURE 3: Plots showing 95% confidence intervals of SPQ scores according to disease. SPQ: Sasang Personality Questionnaire; DM: diabetes mellitus; HTN: hypertension; FD: functional dyspepsia; MDD: major depressive disorder; ADM: adenomyosis.

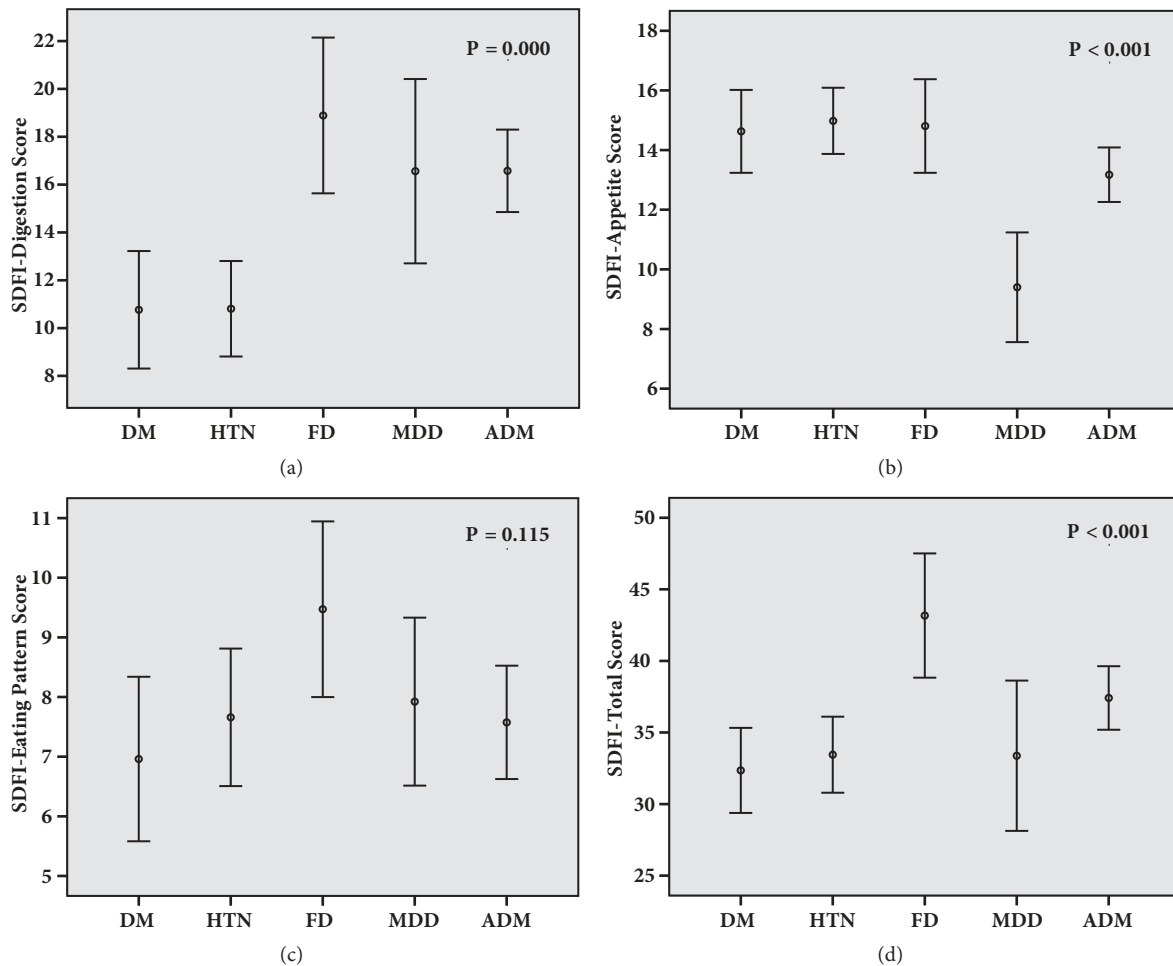


FIGURE 4: Plots showing 95% confidence intervals of the SDFI scores according to disease. SDFI: Sasang Digestive Function Inventory; DM: diabetes mellitus; HTN: hypertension; FD: functional dyspepsia; MDD: major depressive disorder; ADM: adenomyosis.

The SDFI-D score showed a tendency to be lower in the DM and HTN groups. We also observed that the SDFI-D score was lower in the DM group than in the functional dyspepsia, MDD, and adenomyosis groups. Moreover, the SDFI-D score was lower in the HTN group than in the functional dyspepsia and adenomyosis groups, and the SDFI-A score was lower in the MDD group than in all other groups. The SDFI-E score was not significantly different among the subgroups. The post hoc analysis also revealed that the SDFI-Total score was higher in the functional dyspepsia group than in the DM, HTN, and MDD groups (Figure 4).

#### 4. Discussion

In this study, BMI was higher in the DM and HTN groups and lower in the functional dyspepsia, MDD, and adenomyosis groups. A high BMI is a risk factor for lifestyle-related diseases such as DM, HTN, and dyslipidemia. Obese individuals are more likely to have DM and HTN, so the BMIs measured in these groups were expected to be high. Moreover, in Sasang typology, Taeum type is associated with a high BMI [5]. Therefore, we would expect to see

more Taeum-type individuals in the DM and HTN groups, whereas Taeum-type individuals would be expected to be present at lower rates in the functional dyspepsia, MDD, and adenomyosis groups. These low-BMI groups would be expected to contain high proportions of Soyang and Soeum types because Taeyang type is observed in less than 0.1% of the population [4].

The SPQ-B score is an index of a passive or active personality. In this study, the SPQ-B score was low only in the MDD group. This means that patients in the MDD group had more passive personalities than those in other groups. Moreover, it is well known that a passive personality is a characteristic of MDD [21]. A passive personality is also a characteristic of Soeum-type individuals [4] who have been shown to have higher rates of anxiety, depressive mood, and irritable bowel syndrome compared with those with other Sasang types [17, 22–24]. However, the association between MDD and Soeum type has not yet been studied, and further research is needed.

The SPQ-C score is a measure of meticulous versus easygoing personality and has been shown to be low in Soeum-type individuals [10]. In this study, the SPQ-C score

showed a tendency to be higher in the DM and HTN groups. These two groups would be expected to have high proportions of Taeum-type individuals. Although there was a tendency for the MDD group to have a lower SPQ-C score, it was expected that this group would have a high proportion of Soeum-type individuals.

Moreover, the SPQ-C score was low in the adenomyosis group. Adenomyosis is a disease caused by an abnormal distribution of endometrial cells and is closely related to dysmenorrhea and menorrhagia [25]. Patients who experience chronic pain from adenomyosis undergo surgical treatment or medical pain control. These patients have high prevalence of neuropsychiatric diseases that are associated with chronic pain, including depression and anxiety. Chronic pain can be provoked by excessive neurologic conduction due to a reduced sensory nerve threshold that causes greater sensitivity to mild pain. This pathology has been observed in various chronic pain diseases, including adenomyosis [26–29]. These characteristics of chronic pain are also associated with Soeum-type individuals as these patients are known to be emotionally unstable and are more likely to have neuropsychiatric diseases [18]. Because of these features, patients with adenomyosis who regularly visit the hospital for pain control are likely to exhibit Soeum-type traits. However, more research is needed on the association between SPQ-C score and chronic pain.

The SPQ-E score is an index of static versus dynamic personality. A high SPQ-E score indicates that a subject has a dynamic personality and would be expected to exhibit few Taeum-type traits [10, 30]. In this study, the SPQ-E score showed a tendency to be lower in the DM and HTN groups, indicating greater prevalence of Taeum-type traits in these groups. However, the high SPQ-E score in the MDD group conflicted with our expectations regarding Soeum-type characteristics. A previous study reported greater heterogeneity in SPQ-E scores compared to SPQ-B and SPQ-C scores, and further research is needed to better understand these inconsistencies [10].

There was no significant difference among the subgroups in the SPQ-Total score, despite the fact that the SPQ-E score heterogeneity that we observed would be expected to influence the SPQ-Total score. This may be due to the small sample size or a study design limitation, such as the fact that this study did not confirm Sasang type for individual patients.

The SDFI is a Sasang test of digestive health. A high SDFI score indicates that there could be a problem with digestive functions or habits [11]. Digestive health is closely related to Sasang typology. Digestion tends to be healthy in Taeum-type individuals and poor in Soeum-type individuals [31].

The SDFI-D score is an index of digestive function. A high SDFI-D score implies poor digestive function. In this study, the SDFI-D score was low in the DM and HTN groups, which were expected to exhibit greater prevalence of Taeum-type traits, while it was high in the functional dyspepsia, MDD, and adenomyosis groups, which were expected to exhibit many Soeum-type traits. Thus, the SDFI-D scores reflected the results that would be expected from Sasang typology.

A high SDFI-A score indicates an excessive appetite. On this subscale, the MDD group showed low results, similar to

the results for the SPQ-B score. This result can be explained by the well-established relationship between depression and appetite [32].

A high SDFI-E score indicates a tendency toward eating immoderately. In this study, there was no significant difference among the subgroups, although there was a tendency toward a higher score in the functional dyspepsia group. Additionally, the SDFI-E-related results of previous studies have not been consistent [11, 30]. Therefore, further research or reconsideration is needed regarding the SDFI-E score.

The SDFI-Total score was low in the DM and HTN groups, which were expected to exhibit many Taeum-type traits. This finding is consistent with the results of previous studies [13–15]. Moreover, a high SDFI-Total score was observed in the functional dyspepsia group, which has been reported to exhibit higher prevalence of Soeum-type traits [4]. However, these differences seemed to mainly result from differences in the SDFI-D score. Thus, it is unclear whether SDFI-A and SDFI-E scores are necessary for Sasang typology.

This study attempted to apply Sasang typology to precision medicine, similar to its application to personalized nutrition [8]. In this study, we hoped to confirm the validity of applying Sasang typology to common chronic diseases that benefit from personalized management. The DM and HTN groups consistently showed results indicating Taeum-type traits, suggesting that Sasang typology can be applied to lifestyle-related diseases. The characteristics of Soeum-type traits were somewhat consistent, suggesting that it might be useful to apply Soeum-type management to functional dyspepsia and neuropsychiatric diseases. Additional study is needed regarding Taeyang-type traits, Soyang-type traits, and the various subsections of the SPQ and SDFI.

This study aimed to validate the existence of different manifestations of Sasang-type traits in different chronic medical diseases. There are some limitations to the study, the first of which is that we could not confirm the Sasang subtypes but could only ascertain differences in characteristics between the subtypes based on the presence of specific chronic diseases. Second, many parts of this study depended on patient memory. Third, the prevalence of other diseases was not investigated. Therefore, several unintended biases could have influenced this study. Fourth, the sample size was small, which limited the ability of this study to obtain significant results. However, these limitations can be mitigated in future studies. In particular, several methods can be used to distinguish Sasang subtypes, including the QSCC-II, which is a self-reported survey, and the Sasangin Diagnosis Questionnaire (SDQ) [3], which is a doctor-reported survey. While there are still deviations in the diagnosis of Sasang subtypes, even between Sasang typologists [33], this can be controlled via expert consensus from a Sasang typologist group.

## 5. Conclusions

A combination of Sasang typology and general modern medicine could be useful for the prevention and management of chronic diseases and could potentially improve general

healthcare management. Moreover, a diagnostic method for Sasang typology seems to be necessary to develop a practical Sasang typology program.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

## Acknowledgments

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