

Somatic Symptoms as Mediating Factors between the Perceived Social Support and the Health-Related Quality of Life in North Korean Defectors

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Objective This study was conducted to examine the mediating effect of somatic symptoms between perceived social support and health-related quality of life among North Korean defectors living in South Korea.

Methods A total of 200 North Korean defectors were assessed using the Multidimensional Scale of Perceived Social Support, the Short-Form 8-Item Health Survey, the Patient Health Questionnaire 15, the PTSD Checklist Civilian Version and the Patient Health Questionnaire 9.

Results Somatic symptoms accounted for physical health-related quality of life after controlling for PTSD and depressive symptoms, but did not for mental health-related quality of life. Moreover, somatic symptoms mediated the relationship between perceived social support and physical and mental health-related quality of life, indicating that perceived social support indirectly affects physical and mental health-related quality of life through somatic symptoms in North Korean defectors.

Conclusion The results of this study suggest that not only intervention for PTSD or depressive symptoms but also for somatic symptoms might be effective to improve physical and mental health-related quality of life for North Korean defectors, especially those who have a lack of perceived social support.

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Key Words Perceived social support, Health-related quality of life, Somatic symptoms, North Korean defectors, Mediating effects.

INTRODUCTION

According to the formal report¹ from government, 28,795 defectors are tallied on December 2015, a little attention to their mental health has heretofore been received. As far as their quality of life is concerned, which is known as the critical component for their adaptation in South Korea,² the Health-related Quality of Life (HR-QoL) might be one of the major markers for prevention of a variety of psychiatric disorders, such as depression and anxiety.³

It is reported that the North Korean defectors experienced various psychological problems before and during defecting to South Korea, as well as after the adaptation. Common mental disorders observed among the defectors were Post-traumatic stress disorder (PTSD), anxiety disorder, and depressive disorders.⁴ In addition to the high prevalence rates of these mental problems, they suffered from somatic symptoms, such as breathing difficulty, palpitation and pseudo-neurological symptoms.⁵ With respect to the somatic symptoms, recent studies have revealed the importance of the somatic symptoms in accounting for the association between physical and mental HR-QoL.⁶ It is because that the somatic symptoms are considered additional avenues that might be provided for clinical intervention.

Another significant factor is the social support, which is one of the well-documented predictors that influence on QoL. Previous studies demonstrated the close association between social support and QoL using different samples, such

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as patients with HIV/AIDS or obesity.^{7,8} As far as North Korean defectors are concerned, they are likely to receive poor social support due to the fact that they do not share similar social backgrounds with South Koreans.^{9,10}

Several publications have provided how social support is associated with PTSD. Specifically, their social support is negatively associated with PTSD¹¹ and depression.¹² With respect to the depression and anxiety symptoms, negative correlation was found in the adolescent samples from North Korean defectors.¹³ Furthermore, the social support as being a pathway for physical health through psychological, behavioral, and physiological process has been taken into account.¹⁰

These previous studies in large part provide significant insight into more systematic research. However, what is not seriously considered is the distinction between the perceived social support and the received social support. The received social support is an actual support received given by others in various interpersonal relations, while the perceived social support is of an individual's belief that he/she may get support from others anytime when it is needed.¹⁴ It seems that there is a consensus that the recipient's perception is more important than the actual provision or presence as social support on health and adaptation.¹⁵ Consequently, no research examined the association between perceived social support and HR-QoL of the North Korean defectors. Moreover, the pathway of the perceived social support on the HR-QoL is not clearly known.

Thus, the aim of this study is to determine contributing factors, including PTSD, depression, somatic symptoms, and perceived social support on the HR-QoL of North Korean defectors. In addition, we will suggest a model that describes how these factors influence on the HR-QoL.

METHODS

A total of 200 subjects aged 19 to 76 years were recruited from health call centers and counseling centers caring for North Korean defectors. Those who were considered having intellectual problems or physical disabilities were excluded in this study. All participants provided a written consent and voluntarily took part in the survey. The subjects were asked to complete the self-administered questionnaires. When the self-administered questionnaires were difficult for them to comprehend, additional explanations were provided by researchers. The study was approved by the National Medical Center's Institutional Review Board.

Patient Health Questionnaire 15

The Patient Health Questionnaire 15 (PHQ-15)¹⁶ was used in order to measure 15 somatic symptoms, such as stomach

pain, back pain, headache, dizziness, and nausea. Subjects were asked to rate the severity of 15 symptoms as 0 ("not bothered at all"), 1 ("bothered a little"), or 2 ("bothered a lot") for the last 4 weeks. Thus, total scores of the PHQ-15 range from 0 to 30. Scores of ≥ 5 , ≥ 10 , ≥ 15 represent different levels of somatic symptoms, each of which indicates mild, moderate, and severe levels of the symptoms, respectively. The PHQ-15 has been translated and validated in Korean.¹⁷ The Korean version of the PHQ-15 has shown good validity and reliability.

Patient Health Questionnaire 9

Depressive symptoms were assessed with the Patient Health Questionnaire 9 (PHQ-9)¹⁸ in order to identify severity of the symptoms. Each of the nine PHQ-9 items corresponds to the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) diagnostic criteria that measure the major depressive disorder. Subjects were asked how often had experienced the depressive symptoms over the last two weeks. The subjects rated the severity of 9 symptoms as "not at all", "several days", "more than half the days", or "nearly every day", and scored as 0, 1, 2 and 3, respectively. The total scores of PHQ-9 range from 0 to 27. The PHQ-9 has also been translated and validated in Korean.¹⁹ The Korean version of the PHQ-9 has shown good validity and reliability. A score of 10 is suggested as the optimal cutoff point when screening for depressive disorders using the PHQ-9.

PTSD Checklist civilian version

The PTSD Checklist civilian version (PCL-C), which corresponds to DSM-IV, consists of 17 items and assesses PTSD symptoms.²⁰ A 5-point scale from 1 ("not at all") to 5 ("extremely") was used to rate how much the specific symptom was a problem to them over the past month. The PCL-C total scores with higher numbers are indicative of more PTSD symptoms. A total score of 44 or more suggests probable diagnosis of PTSD among the civilian population.²¹ The PCL-C has also been translated and validated in Korean.²² The Korean version of the PCL-C has shown good validity and reliability.

Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support (MSPSS) was used to assess the perceived social support.²³ The MSPSS consists of 12 items which cover three different types of relations: Family, Friends and Significant others. In this study, the Korean version of the MSPSS was used.²⁴ Items were measured on a 5-point scale from 1 ("strongly disagree") to 5 ("strongly agree"). Items were summed and the higher the score, the higher the perceived social support.

Medical Outcome Short Form 8-Item Health Survey (SF-8)

The SF-8 was developed to measure the health related quality of life.²⁵ How to score and interpret is as follows. First, eight different sub-areas are identified (e.g., Physical Functioning, Role Limitation due to Physical Problems, Bodily Pain, General Health Perceptions, Vitality, Social Functioning, Role Limitation due to Emotional Problems, and General Mental Health). The eight sub-areas yield two representative summaries of the scores, namely, the physical component summary (PCS) and mental component summary (MCS). Each component represents physical health-related quality of life, and mental health-related quality of life, respectively. The range for the summary scores is 0 to 100, respectively. The Korean version of the SF-8 has also been validated.²⁶

Statistical analysis

A statistical analysis was performed using IBM SPSS Statistics version 20.0 (Armonk, NY:IBM Corp; 2011, USA) and IBM SPSS AMOS 20.0 (Arbuckle JL. Chicago: SPSS; 2011, USA). IBM SPSS Statistic version 20.0 was used to descriptive statistics analyses, Pearson's correlation analysis, and hierarchical multiple regression analysis. Pearson's correlation analysis was used to determine the strength of the association among the somatic symptoms, depressive symptoms, PTSD symptoms, perceived social support, and health-related quality of life. Hierarchical multiple regression analysis was used to examine the impact of somatic symptoms on the health-related quality of life even after controlling for depressive symptoms and PTSD symptoms. With structural equation modeling using AMOS 20.0, we examine the role of somatic symptoms mediating the relation of perceived social support to health-related quality of life. A p-value of 0.05 or less was considered as statistically significant.

RESULTS

Descriptive data of subjects

Descriptive statistics including means (M), standard deviations (SD), and range for the all variables are presented in Table 1. Both the mean PHQ-15 (M=12.63, SD=6.67) and PHQ-9 (M=10.60, SD=8.33) scores were moderately in severe range. However, the mean PCL-C score was below the suggested cut-off score of 44 (M=41.20, SD=19.06). Both the mean PCS (M=37.87, SD=10.10) and MCS (M=41.29, SD=11.99) scores were approximately 1 SD below the norm of 50.

Relationships between somatic symptoms, depressive symptoms, PTSD, perceived social support and HR-QoL

Prior to conducting the hierarchical multiple regression

Table 1. Descriptive statistics for the sample

Variables	Mean (SD) or number (%)	Range
Age	47.67 (11.12)	19–76
Gender		
Female	172 (86)	
Male	28 (14)	
South Korea entry year (%)		
2000–2008	40	
2009–2013	60	
Staying period in 3rd country (%)		
Under 1 year	37	
Under 3 years	10	
Under 6 years	18	
6 years or more	35	
Yearly income (10000 KRW)	1252.97 (1120.79)	0–6000
PHQ-15	12.63 (6.67)	0–30
PHQ-9	10.60 (8.33)	0–27
PCL-C	41.20 (19.06)	17–85
MSPSS	41.33 (12.18)	12–60
PCS	37.87 (10.10)	13.40–61.30
MCS	41.29 (11.99)	15.00–61.40

N's range from 100 to 200 due to occasional missing data. PHQ-15: Patient Health Questionnaire 15, PHQ-9: Patient Health Questionnaire 9, PCL-C: PTSD Checklist civilian version, MSPSS: Multidimensional Scale of Perceived Social Support, PCS: Medical Outcome Short Form 8-Item Health Survey Physical Component Summary, MCS: Medical Outcome Short Form 8-Item Health Survey Mental Component Summary

analyses, correlation analyses were performed to examine the relationships between PHQ-15, PHQ-9, PCL-C, MSPSS, PCS, and MCS. The results of these analyses can be found in Table 2. All of the correlation coefficients were statistically significant. Especially, the PHQ-15 scores were positively correlated with the PHQ-9 and PCL-C, $r=0.69, 0.71$, respectively.

Effects of somatic symptoms on the HR-QoL

In the first hierarchical multiple regression analysis, depressive symptoms accounted for 25% of physical health-related quality of life, but PTSD symptoms did not. Somatic symptoms accounted for 8% of physical health-related quality of life, even when controlling for depressive symptoms and PTSD symptoms (Table 3). In the second analysis, 61% of the variance in mental health-related quality of life was accounted by depressive symptoms (47%) and PTSD symptoms (14%). However, when controlling for depressive symptoms and PTSD symptoms, somatic symptoms did not account for mental health-related quality of life (Table 3). We also checked

Table 2. Correlations among PHQ-15, PHQ-9, PCL-C, MSPSS, PCS, MCS

Variables	1	2	3	4	5	6
1. PHQ-15	-					
2. PHQ-9	0.69**	-				
3. PCL-C	0.71**	0.81**	-			
4. MSPSS	-0.36**	-0.50**	-0.46**	-		
5. PCS	-0.55**	-0.50**	-0.44**	0.24**	-	
6. MCS	-0.56**	-0.69**	-0.78**	0.36**	0.30**	-

**p<0.01. PHQ-15: Patient Health Questionnaire 15, PHQ-9: Patient Health Questionnaire 9, PCL-C: PTSD Checklist civilian version, MSPSS: Multidimensional Scale of Perceived Social Support, PCS: Medical Outcome Short Form 8-Item Health Survey Physical Component Summary, MCS: Medical Outcome Short Form 8-Item Health Survey Mental Component Summary

Table 3. Influence of depressive, PTSD, and somatic symptom severity on physical and mental health-related quality of life

Models	R ²	R ² change	F change	p
Model 1 (PCS=dependent variable)				
Depressive symptom severity	0.25	0.25	65.87	<0.001
Depressive symptom severity and PTSD symptom severity	0.25	0.00	0.88	0.35
Depressive symptom severity, PTSD symptom severity, and somatic symptom severity	0.33	0.08	23.25	<0.001
Model 2 (MCS=dependent variable)				
Depressive symptom severity	0.47	0.47	177.46	<0.001
Depressive symptom severity and PTSD symptom severity	0.61	0.14	72.18	<0.001
Depressive symptom severity, PTSD symptom severity, and somatic symptom severity	0.61	0.00	0.17	0.68

PCS: Medical Outcome Short Form 8-Item Health Survey Physical Component Summary, MCS: Medical Outcome Short Form 8-Item Health Survey Mental Component Summary

for multicollinearity between depressive symptoms, PTSD symptoms, and somatic symptoms. There was no evidence of multicollinearity among these variables (Tolerance 0.31–0.46, VIF 2.18–3.38).

Path model for the mediating effects of somatic symptoms between perceived social support and physical and mental health-related quality of life

The hypothetical model suggests that somatic symptoms mediate the relation between perceived social support, physical and mental health-related quality of life, and that perceived social support directly affects physical and mental health-related quality of life. In contrast, the competitive model suggests that somatic symptoms fully mediate the relation between perceived social support, physical and mental health-related quality of life, and that perceived social support did not have direct effect on physical and mental health-related quality of life. To examine model fit, comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of the approximation (RMSEA) were evaluated. The overall model fit was good for both models (hypothetical model: CFI=0.98, TLI=0.96, RMSEA=0.09; competitive model: CFI=0.97, TLI=0.95, RMSEA=0.10). Thus, to determine more appropriate models, χ^2 difference test was performed. It indicated that the hypothetical model was superior to the

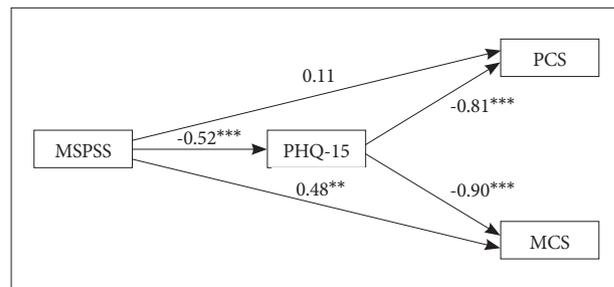


Figure 1. Final model of the relationship between Perceived social support, Somatic symptoms severity, Physical and mental health-related quality of life. **p<0.01, ***p<0.001. MSPSS: Multidimensional Scale of Perceived Social Support, PHQ-15: Patient Health Questionnaire 15, PCS: Medical Outcome Short Form 8-Item Health Survey Physical Component Summary, MCS: Medical Outcome Short Form 8-Item Health Survey Mental Component Summary.

competitive model (χ^2 difference=7.94, df=2, p<0.05). Ultimately, we decided to use the hypothetical model as the final model (Figure 1). Estimated parameters in the final model can be found in Table 4. In the final model, perceived social support accounted for 11% of somatic symptoms. Perceived social support and somatic symptoms explained 31% of the variance in physical health-related quality of life, and 34% of the variance in mental health-related quality of life. Finally, to evaluate the significance of the indirect effects, we performed bootstrap procedure.²⁷ The results show that somatic

Table 4. Parameters of final model

Path	B	SE	β	t	p
Perceived social support → Somatic symptom severity	-0.52	0.11	-0.34	-4.82	<0.001
Somatic Symptoms → Physical HR-QoL	-0.81	0.10	-0.53	-8.48	<0.001
Somatic Symptoms → Mental HR-QoL	-0.90	0.11	-0.50	-8.01	<0.001
Perceived social support → Physical HR-QoL	0.11	0.15	0.05	0.75	0.46
Perceived social support → Mental HR-QoL	0.48	0.18	0.17	2.72	0.007

Physical HR-QoL: Physical health-related quality of life, Mental HR-QoL: Mental health-related quality of life

symptoms have a statistically significant mediating effect (95% CI=0.22–0.67 for physical health-related quality of life and 95% CI=0.24–0.74 for mental health-related quality of life).

DISCUSSION

The current study examined the associations among the several variables that influence on the HR-QoL in North Korean defectors. We suggested a model for the mediation effect of somatic symptoms on the relation between social support and HR-QoL. The followings are the detailed results we have found.

First, depressive symptoms, PTSD severity, and somatic symptoms were positively correlated with each other among North Korean defectors. It is consistent with previous studies^{28,29} demonstrating the positive associations between PTSD severity and somatic symptoms. Indeed, a study found that the rate of somatic illness was 81.8% in the samples of the North Korean defectors.² The present study also found that depressive symptoms and somatization are likely to affect each other as a risk factor.³⁰

Second, we were able to expect that the severity of the somatic symptoms can account for physical HR-QoL after controlling for PTSD and depressive symptoms, which are consistent with a previous study's findings.⁶ Contrary to our expectation, the somatic symptoms were not identified as factors that accounted for mental health HR-QoL after controlling for PTSD and depressive symptoms. In fact, a study also found that the incremental accounts of somatic symptoms was only 3.38% on mental HR-QoL after controlling for PTSD and depressive symptoms, while 17.7% on physical HR-QoL.⁶ Thus, it suggests that somatic symptoms may have a differential effect on physical as well as mental HR-QoL.

Third, we confirmed that somatic symptoms mediated the relation between the perceived social support and the QoL, suggesting that lower perceived social support might increase somatic symptoms resulting in decreased physical and mental HR-QoL. However, perceived social support had not a direct effect on the physical HR-QoL while had a significant direct effect on the mental health HR-QoL. This result is inconsistent with the previous study³¹ that perceived social

support had a direct effect on pain severity, one of the sub-components of the physical HR-QoL. However, the finding of the present study is consistent with which didn't predict the physical HR-QoL in patients with acute myocardial infarction.³² Given this results, there might be a variety of another pathway in the association between the perceived social support and the physical HR-QoL.

Finally, these results suggest that there is a need to concern for the quality life of North Korean defectors by means of improving social support, and clinical interventions for the somatic symptoms, depression, and anxiety. In particular, we should attempt to develop and provide a somatic symptoms-focused intervention to improve mental health among North Korean defectors. Specifically, an intervention needs to include a cognitive restructuring as well as psychoeducation for somatic symptoms.

This study has several limitations that should be noted. First, due to the lack of sample representativeness, 86% of total participants were women. Thus, the present study may not be generalized to all the North Korean defectors have equal status of affairs. Second, we used only self-report methods to measure the variables of interest, which might lead to either underestimate or overestimate psychiatric symptoms. Moreover, we did not consider another issue, such as cultural and linguistic background of North Koreans, except for the PCL-C assessing PTSD.²² Third, when testing the structural equation modeling with several intervening variables, one cannot determine which pathway works more significant. Because of this problem, we did not include depression and PTSD severity in the structural equation models, but examined the factors that influence on the severity of HR-QoL using hierarchical regression analysis. Finally, although the causal relationship among related variables was confirmed, we could consider the hypothesis that defectors with poor physical and mental health have more somatic symptoms, and because of the distress from somatic symptom, they perceived less social support. Consequently, a future study which is more comprehensive could enlighten the temporal sequence of the related-variables.

In sum, this study demonstrated that the associations among PTSD, depressive symptoms, somatization, social support, and

quality of life in North Korean defectors. It also found that somatization tendency mediated the relation between social support and quality of life. Accordingly, there is a need to pay attention to somatic symptoms and develop alternatives to improve mental health among North Korean defectors. Specifically, an intervention for increasing social support can result in reduction of somatic symptom, and then enable better the quality of life in North Korean defectors.

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