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Original Article

Psychosocial Factors and Work-related Musculoskeletal Disorders among Southeastern Asian Female Workers Living in Korea

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Objectives: A rapid increase in the population of migrant workers in Korea has brought new challenges regarding the possible effects of acculturation on health. The purpose of this study was to examine the influence of acculturation- and work-related psychosocial factors on work-related musculoskeletal disorders among migrant female workers living in Korea.
Methods: A cross-sectional survey design was used. A translated, structured questionnaire was administrated to 156 southeastern Asian female full-time workers living in Korea.
Results: About 35% of the participants experienced some type(s) of work-related musculoskeletal disorder(s), which were more prevalent in Vietnamese women than in Thai and Filipino women. Women who preferred to maintain their own heritage and to reject the host country heritage were at risk for work-related musculoskeletal disorders.
Conclusion: Acculturation strategy and nationality were found to be significant factors associated with work-related musculoskeletal disorders. Health professionals need to accommodate acculturation contexts into risk assessment and intervention development for work-related musculoskeletal disorders separately for different nationalities.

Key Words: Acculturation strategy, Acculturative stress, Work-related psychosocial factors, Work-related musculoskeletal disorders, Migrants

Introduction

Korea, which until recently has had a homogenous society consisting of a single ethnic group and single language, has been rapidly changing to a multicultural society since 2000. During the last decade, migrant workers have been filling empty positions in certain job areas as native Koreans have tended to avoid physically demanding jobs, such as in construction, agriculture, and manufacturing industries. According to the 2008 census report by the Ministry of Public Administration and Security in Korea [1], the number of migrant workers was 440,000 people, or 0.9% of the total population of Korea. Of the migrant workers, about 30% were female workers. Southeastern Asian female workers were the second largest group, following the Chinese workers, and about 70% of the southeastern female workers came from Thailand, Vietnam, and the Philippines.

The rapid increase in the migrant worker population, particularly from southeastern countries, has brought new challenges in terms of the possible effects of acculturation on health. Acculturation is defined as a process of cultural and psychological change that results from continual contact between people of different cultural backgrounds [2]. The process of acculturation is explained by two dimensions: a relative attitude and behavior of the individuals involved towards maintaining one's own heritage culture and identity, and a rela-

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tive attitude along with the behavior of the individuals toward becoming involved in the other's heritage culture and identity. Berry proposed four strategies to describe the differences in an individual's acculturation process: assimilation (attitude toward not maintaining one's cultural identity and seeking interaction with other cultures), integration (attitude toward both maintaining one's original culture and having interactions with other groups), separation (attitude toward maintaining one's original culture and at the same time avoiding interaction with other ethno-cultural groups), and marginalization (attitude toward little interest either in cultural maintenance or in having relations with others). Those strategies do not refer to the "level" or "degree" of acculturation but individuals have variable degrees of preference for each of all four categories [3].

A possible result accompanying the process of acculturation is the presence of acculturative stress, which refers to the response on an individual to life events that are rooted in intercultural contact [2]. Migrant workers are exposed to many acculturative stressors, which are characterized by various environmental (e.g., financial, language barriers, lack of access to health care), interpersonal (e.g., loss of social status, family conflict), and societal factors (e.g., illegal status, discrimination) [4]. Prior studies have shown that high acculturative stress from those various stressors was associated with physical and mental health problems, such as the perception of a poor health status [4,5], increased number of chronic health conditions [6], depression [7], psychological distress [8], substance use [9], not receiving hepatitis B vaccination [10], and unhealthy sexual behavior [11], among various ethnic groups. Acculturation-related psychosocial factors have been known to be risk factors for various health problems and behaviors, but, to our knowledge, no prior published studies have addressed whether there is an association between acculturation and work-related diseases, such as work-related musculoskeletal disorders (WMSDs), among migrant workers. In a study of the South Asian minority ethnic groups in the UK, low scores of acculturation increased risks of widespread pain and also interference with work activities [12]. Consistently, an increase in acculturative stress significantly increased the severity of musculoskeletal symptoms among Pilipino migrant workers in Korea [13].

WMSDs are disorders of the nerves, tendons, muscles, and supporting tissues that result from, or are made worse by, working conditions [14] and are the single largest category of work-related health problems in most Asian countries [15], including Korea [16] and migrant female workers in the U.S. [17-19]. Numerous studies have shown that WMSDs are attributed to multiple factors, including physical load and psychosocial factors at work. Although physical load, which is

defined as biomechanical forces occurring in the body resulting from individuals' job tasks [20,21] is a primary factor associated with WMSDs, there is increasing evidence indicating the influence of work-related psychosocial factors on the occurrence of WMSDs. According to Karasek's model [22], which has dominated research relating to WMSDs, four work-related psychosocial factors (high psychological job demands, low decision latitude, low social support, and job insecurity) increase psychological strain, which result in an increased risk of stress-related health problems. These relationships were originally validated in a study of cardiovascular diseases [23] and since then has been recently found in many other WMSD studies of female occupational groups, like nurses and nurses aides [24], flight attendants [25], and hospital cleaners [26].

In this regard, it is possible that the psychosocial context experienced by migrant workers, such as acculturation-related psychosocial factors, may be associated with the occurrence of WMSDs. To date, however, the relationship between the occurrence of WMSDs and work-related psychosocial factors, including acculturation contexts, has not been studied in migrant workers living in Korea. The aims of this study are to: 1) examine WMSDs experienced by southeastern Asian female workers living in Korea, and 2) analyze the influence of acculturation related psychosocial factors, and work-related psychosocial factors on WMSDs among southeastern Asian female workers living in Korea.

Materials and Methods

Participants
A cross-sectional survey was conducted with a convenience sample of 158 southeastern Asian migrant female workers living in Korea who have worked full-time during the past 6 months. According to a power analysis that was performed using a G-Power program [27], the desired sample size was calculated to be 159 for analysis of variance designs with a medium effect size (0.25), 80% power, and a 0.05 alpha level. Women were recruited from multiple settings, including cultural festivals, migrant workers' assistance organizations, and churches, and a total of 169 women voluntary participated in the study. Out of the participants, 13 women (10 Thai, 2 Vietnamese, and 1 Filipino) were excluded because of incomplete items that related to major variables. Thus, a total of 156 women (62 Thai, 28 Vietnamese, and 66 Filipino) remained in the final analysis.

Instruments
A structured questionnaire was used to collect data. It consisted of 5 sections: socio-demographics, acculturation-related psy-

chosocial factors, work-related psychosocial factors, and WMS-Ds. The questionnaire, with the exception of acculturation-related psychosocial scales, which were already validated in other studies, was translated into Vietnamese and Thai by bilingual English and Vietnamese/Thai translators through a one-way translation method. Then the translated questionnaires were pre-tested and wordings and response options were determined to be understandable through focus groups of Vietnamese and Thai female workers. Socio-demographic factors included age, marital status, nationality, job duration in Korea, and daily working hours. The other subscales are described below.

Acculturation-related psychosocial factors include acculturation strategy and acculturative stress. Acculturation strategy is defined as how an individual goes about their life during cultural and psychological change [2]. Acculturation stress refers to the response to life events that based on intercultural contact [2].

Acculturation strategy was measured by the Eastern-Asian Acculturation Measure (EAAM) that was developed by Barry [28], based on Berry's [29] acculturation strategies. It consists of 4 dimensions: integration (5 items), assimilation (8 items), separation (6 items), and marginalization (9 items). One of the original separation dimension items ("I would prefer to go out on a date with an Asian than with an American") was excluded because of its similarity with another item according to feedback from the native experts from each country. The EAAM was translated into Vietnamese and Thai in another study of migrant women living in Korea [30] and its reliability was found to be acceptable (Cronbach's alpha = 0.74 - 0.85). Items were rated by a 5-point Likert scale ranging from 1(strongly disagree) to 5 (strongly agree) and all items were summed and averaged to yield a score ranging from 1 to 5 for each dimension. The Cronbach's alpha coefficient in the total sample was 0.74 and, based on country, the Cronbach's alpha coefficients were 0.70 (Thai), 0.58 (Vietnamese), and 0.80 (Filipino).

Acculturative stress was measured by the Acculturative Stress Scale developed by reference [31]. The scale consists of 36 items in seven subscales, including perceived discrimination (8 items), homesickness (4 items), perceived hate (5 items), fear (4 items), stress due to change/culture shock (3 items), guilt (2 items), and nonspecific concerns (10 items). Questionnaires that were translated into Vietnamese and Thai, which were used for Vietnamese and Thai women living in Korea and were found to be reliable(Cronbach's alpha = 0.94) [30], were used. Each item was measured by a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All items were summed and averaged to yield a score ranging from 1 to 5. The

Cronbach's alpha coefficient in the total sample was 0.93 and, based on country, the Cronbach's alpha coefficients were 0.95 (Thai), 0.89 (Vietnamese), and 0.92 (Filipino).

Work-related psychosocial factors were measured by the Korean Occupational Job Stress Scale (KOSS) developed by Chang et al. [32]. The KOSS items were initially developed based on the most popular existing job stress measurement tools, such as the Job Content Questionnaire [33]. Four sub-scales (job demand, insufficient job control, interpersonal conflict, and job security), which addressed most common work-related psychosocial aspects addressed by Karasek et al. [23], were used in this study. All items were rated on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree) and the ratings were scored by a weighted formula. The scores of each dimension were calculated by taking the number of items subtracted from the sum of each score and multiplied by 100. This was divided by the number of items subtracted from the highest score of the total dimension score. Possible total scores ranged from 0 to 100.

Job demand was defined as the effort required to perform one's work. It was measured with 8 items: time pressure, overlapping jobs, increasing workload, responsibility, excessive work, insufficient rest, work-home interface, and multiple functioning. Higher scores indicate greater psychological demands. Cronbach's alpha coefficient was 0.71 at the time of scale development [32]. In this study, the Cronbach's alpha coefficient in the total sample was 0.64 and, based on country, the Cronbach's alpha coefficients were 0.55 (Thai), 0.40 (Vietnamese), and 0.72 (Filipino).

Insufficient job control was defined as the individual's decision authority and potential control over the performance of his or her job. It was measured by a short version of the scale with 4 items: noncreative work, skill underutilization, little or no decision-making, and low control. Higher scores indicated that the respondent was less likely to have control over the performance of his or her own job. Cronbach's alpha coefficient was 0.66 for a full version of the 5 items at the time of scale development [32]. In this study, the Cronbach's alpha coefficient in the total sample was 0.65 and, based on country, the Cronbach's alpha coefficients were 0.63 (Thai), 0.56 (Vietnamese), and 0.57 (Filipino).

Interpersonal conflict was defined as deficits of instrumental and socio-emotional support from coworkers and supervisors. Self-perception of coworkers and supervisor support was measured with 2 items: inadequate coworker help and inadequate supervisor help in performing one's job. Higher scores indicated higher interpersonal conflict. In this study, the Cronbach's alpha coefficient in the total sample was 0.67 and,

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based on country, the Cronbach's alpha coefficients were 0.73 (Thai), 0.36 (Vietnamese), and 0.72 (Filipino).

Job insecurity was defined as a perceived threat or the real threat of job termination or layoff faced by workers; this was measured with 2 items: uncertainty and changes negative to one's job. Higher scores indicated that the respondent perceived the job to be less secure. In this study, the Cronbach's alpha coefficient in the total sample was 0.67 and, based on country, the Cronbach's alpha coefficients were 0.64 (Thai), 0.49 (Vietnamese), and 0.63 (Filipino).

Work-related musculoskeletal disorder was measured by the Korean NIOSH Symptom Survey [34], which consists of questions regarding the presence of work-related symptoms in any of 6 body regions (neck, shoulders, arms, hands/wrists, lower back, and legs/feet) in the prior year, and symptom severity (frequency, duration, and intensity). The frequency of the symptoms was rated on a 5-point scale ranging from 1 (every 6 months) to 5 (daily). The duration of the symptoms was rated on a 5-point scale ranging from 1 (less than 1 day) to 5 (6 months or greater). The intensity of the symptoms was rated on a 5-point scale ranging from 1 (mild pain) to 5 (very severe pain). WMSD cases were defined as symptoms that had occurred at least once a month or lasted at least one week in the past year and with at least moderate pain intensity [35].

Data collection

Data were collected between April and August 2009 in a variety of places in the capital city and in the largest province in South Korea. Potential participants were conveniently contacted in person and screened for eligibility by the investigators and trained research assistants. Women who met the eligibility criteria were told about the purpose of the study, anonymity, confidentiality of all responses, voluntary participation, and time expected to complete the survey, or they were asked to read a cover letter that was developed in Thai, Vietnamese, and English explaining that information. Consent to participate in the survey was verbally obtained. Before starting the survey, the participants were also informed about not writing any personal information on the questionnaires to ensure the anonymous nature. The trained research assistants distributed questionnaires to the women who agreed to participate in the study and collected them right after the completion of the survey. All participants were given a small gift for their time. All of the procedures were approved by the Institutional Review Board of Severance Hospital, Yonsei University College of Medicine, Seoul, Korea.

Data analysis

Stata 10 was used for the statistical analysis. The difference in the demographic variables among Asian subgroups was compared using one way anlysis of variance (ANOVA) and the Scheffé test for post hoc analysis. The presence of work-related musculoskeletal symptoms depending on body region was analyzed using frequency and percentage. The difference in the presence of work-related musculoskeletal symptoms and WMSD among Asian subgroups was analyzed using Chi square. Acculturation-related psychosocial factors were analyzed using mean and standard deviation values. The difference by Asian subgroup was analyzed using one-way ANOVA and the Scheffé test for post hoc analysis. To examine the influence

Table 1. Socio-demographics of southeastern Asian female workers living in Korea (n = 156)

	Subgroup			Total n (%)/mean (SD)	F(p)/χ^2(p)	Scheffé-test*
	Thai n (%)/mean (SD)	Vietnamese n (%)/mean (SD)	Filipino n (%)/mean (SD)			
Age	32.1 (6.05)	28.5 (7.26)	34.9 (7.17)	32.6 (7.11)	9.32 (<.001)	3 > 2
Job duration in Korea (Months)	33.4 (22.23)	29.3 (34.24)	37.1 (41.82)	34.2 (33.77)	0.26 (.575)	
Daily working hours†	10.8 (4.42)	10.5 (1.64)	9.2 (2.75)	10.1 (3.48)	3.62 (.029)	1 > 3
Marital status					0.15 (.927)	
Married	38 (61.29)	16 (57.14)	39 (59.09)	93 (59.62)		
Unmarried	24 (38.71)	12 (42.86)	27 (40.91)	63 (40.38)		
Length of stay in Korea (Months)	44.1 (31.89)	39.4 (43.59)	60.0 (48.40)	50.0 (42.31)	3.42 (.035)	

SD: standard deviation.
*1: Thai group, 2: Vietnamese group, 3: Filipino group.
†Cases with missing values were excluded.

of "acculturation- and work-related psychosocial factors" on WMSDs, logistic regression was utilized. Due to the potential correlation among the same ethnic group, the cluster option was used to estimate correct standard errors in logistic regression in addition to the country fixed-effects variable.

Sample characteristics

Socio-demographic characteristics are shown in Table 1. The mean age of all respondents was 32.6 (standard deviation [SD] = 7.11) years old. The mean ages for women from Vietnam and from the Filipinos were significantly different at 28.5 (SD = 7.26) and 34.9 (SD = 7.17), respectively. The mean job duration in Korea was 34.2 (SD = 33.77) months. The mean length of stay in Korea was 50.0 (SD = 42.31) months. The mean daily working hours was 10.1 (SD = 3.48) hours. There was no significant difference in the length of stay and job duration in Korea among Asian subgroups. However, the number of daily working hours between Thai women and Filipino women had significantly different working hours of 10.8 (SD = 4.42) and 9.2 (SD = 2.75), respectively. Of all respondents, 59.6% were married, and there was no difference in marital status among Asian subgroups.

Results

Prevalence of work-related musculoskeletal disorders

The prevalence of WMSDs among southeastern Asian female workers living in Korea is shown in Table 2. Among 156 women, 54 women (34.6%) had WMSD in at least one of the 6 specified body regions. The prevalence of WMSD was highest among Vietnamese (57.1%), followed by Thai (33.9%) and Filipino (25.8%) (χ^2 = 8.58, p = .014). The lower back was the area most commonly reported to have problems by Vietnamese and

Filipino, while the shoulder area was most commonly reported to have problems overall among the three ethnic groups.

Acculturation-related psychosocial factors and work-related psychosocial factors

The participants had a preference for a marginalization strategy (mean [M] = 20.4, SD = 5.84), followed by separation (M = 18.8, SD = 4.95), assimilation (M = 18.0, SD = 4.84), and integration (M = 15.2, SD = 3.71). Comparison of mean scores of acculturation and acculturative stress by Asian subgroups are shown in Table 3. There was no significant difference in the means of assimilation and marginalization among the Asian subgroups. However, the means of integration and separation showed significant differences among Asian subgroups (p = .012, p = .007). In integration, Filipino female workers (M = 14.3, SD = 4.37) indicated less integration than those from Vietnamese female workers (M = 16.7, SD = 2.93), while Filipino female workers (M = 17.4, SD = 5.10) indicated less separation than those from Thai female workers (M = 19.9, SD = 4.93).

The total mean score of acculturative stress was 2.2 (SD = 0.64). Among the 7 subscales, homesickness (M = 2.8, SD = 0.86) and stress due to changes and culture shock (M = 2.4, SD = 0.88) were given higher scores than the other subscales. Perceived hate (M = 2.0, SD = 0.75) and fear (M = 2.0, SD = 0.77), on the other hand, were given the lowest scores. Regarding each country, the subscale that received the highest score was homesickness for women from all three countries. There was no significant difference in the total mean score of acculturative stress among Asian subgroups. Subscales that showed significant difference among Asian subgroups were perceived discrimination (p = .030), homesickness (p < .001), perceived hate (p = .041), and miscellaneous (p = .017). In the Scheffé

Table 2. Work-related musculoskeletal symptom prevalence among southeastern Asian female workers living in Korea

| Body region | Subgroup | | | Total (n = 156) n (%) | χ^2 (p) |
	Thai (n = 62) n (%)	Vietnamese (n = 28) n (%)	Filipino (n = 66) n (%)		
Neck	11 (17.7)	7 (25.0)	3 (4.5)	21 (13.5)	8.679 (.013)
Shoulders	4 (6.5)	1 (3.6)	1 (1.5)	6 (3.8)	2.113 (.348)
Arms	10 (16.1)	6 (21.4)	6 (9.1)	22 (14.1)	2.819 (.244)
Hands/wrist	12 (19.4)	5 (17.9)	5 (7.6)	22 (14.1)	4.059 (.131)
Lower back	8 (12.9)	7 (25.0)	9 (13.6)	24 (15.4)	2.437 (.296)
Legs/feet	10 (16.1)	6 (21.4)	9 (13.6)	25 (16.0)	0.888 (.642)
Any region	21 (33.9)	16 (57.1)	17 (25.8)	54 (34.6)	8.580 (.014)

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Table 3. Acculturation- and work-related psychosocial factors by ethnic subgroup

	Subgroup			Total (n = 156) Mean (SD)	F (p)	Scheffé-test*
	Thai (n = 62) Mean (SD)	Vietnamese (n = 28) Mean (SD)	Filipino (n = 66) Mean (SD)			
Acculturation-related psychosocial factors						
Acculturation strategy						
Assimilation	17.3 (4.27)	19.4 (4.18)	18.1 (5.49)	18.0 (4.84)	1.86 (.159)	
Integration	15.4 (2.98)	16.7 (2.93)	14.3 (4.37)	15.2 (3.71)	4.60 (.012)	2 > 3
Separation	19.9 (4.93)	19.8 (3.75)	17.4 (5.10)	18.8 (4.95)	5.16 (.007)	1 > 3
Marginalization	19.6 (6.50)	21.3 (4.93)	20.8 (5.51)	20.4 (5.84)	1.02 (.364)	
Acculturative stress						
Perceived discrimination	2.3 (0.89)	1.9 (0.55)	2.0 (0.74)	2.1 (0.79)	3.60 (.030)	1 > 2
Homesickness	2.6 (0.78)	3.4 (0.85)	2.7 (0.84)	2.8 (0.86)	9.30 (<.001)	2 > 1, 3
Perceived hate	2.1 (0.86)	1.7 (0.47)	2.0 (0.71)	2.0 (0.75)	3.25 (.041)	1 > 2
Fear	2.1 (0.82)	1.9 (0.71)	2.0 (0.76)	2.0 (0.77)	0.43 (.650)	
Stress due to changes & culture shock	2.2 (0.91)	2.3 (0.82)	2.5 (0.87)	2.4 (0.88)	1.73 (.181)	
Guilt	2.0 (0.96)	1.7 (0.71)	2.2 (1.01)	2.1 (0.96)	2.89 (.059)	
Miscellaneous	2.5 (0.81)	2.1 (0.54)	2.2 (0.72)	2.3 (0.75)	4.20 (.017)	1 > 2
Total	2.3 (0.71)	2.1 (0.52)	2.2 (0.62)	2.2 (0.64)	0.36 (.696)	
Work-related psychosocial factors						
Job demand	50.0 (15.04)	61.4 (13.16)	45.7 (17.47)	50.2 (16.69)	9.42 (<.001)	2 > 1, 3
Insufficient job control	49.8 (22.13)	29.4 (21.03)	48.5 (20.69)	45.7 (22.51)	9.59 (<.001)	1, 3 > 2
Interpersonal conflict	36.6 (25.22)	51.2 (27.32)	44.2 (27.77)	42.3 (27.05)	3.10 (.047)	2 > 1
Job insecurity	58.3 (27.78)	67.9 (26.92)	39.1 (24.88)	52.0 (28.67)	14.31 (<.001)	1, 2 > 3

SD: standard deviation.
*1: Thai group, 2: Vietnamese group, 3: Filipino group.

test, Vietnamese female workers (M = 1.9, SD = 0.55) were less likely to feel discrimination than Thai female workers (M = 2.3, SD = 0.89). With respect to homesickness, Vietnamese female workers (M = 3.4, SD = 0.85) felt more homesick than did Thai female workers (M = 2.6, SD = 0.78) and Filipino female workers (M = 2.7, SD = 0.84). Vietnamese female workers (M = 1.7, SD = 0.47) were less likely to perceive hate than Thai female workers (M = 2.1, SD = 0.86).

The scores of each work-related psychosocial subscale ranged from 42.3 (SD = 27.05) to 52.0 (SD = 28.67). Interestingly, Asian subgroups differ significantly by work-related psychosocial factors, which were job demand (p < .001), insufficient job control (p < .001), interpersonal conflict at work (p = .047), and job insecurity (p < .001). In post-hoc comparisons, the job demand of Vietnamese female workers (M = 61.4, SD = 13.16) was higher than those of Thai (M = 50.0, SD = 15.04) and Filipino female workers (M = 45.7, SD = 17.47). However, insufficient job control expressed by Vietnamese female workers (M = 29.4, SD = 21.03) was lower than those expressed by Thai (M = 49.8, SD = 22.13) and Filipino women (M = 48.5, SD = 20.69). In addition, Vietnamese female workers (M = 51.2, SD = 27.32) indicated higher interpersonal conflict at work than did Thai women (M = 36.6, SD = 25.22). Job insecurity of Filipino female workers (M = 39.1, SD = 24.88) was lower than those of Thai (M = 58.3, SD = 27.78) and Vietnamese women (M = 67.9, SD = 26.92).

Table 4. Logistic regression with country fixed effect model for risk factors associated with work-related musculoskeletal disorders

Variables	Odds ratio	95% CI
Nationality (Ref: Thai)		
Vietnamese	3.379	1.465-7.790
Filipino	.913	.775-1.074
Acculturation-related psychosocial factors		
Acculturation strategy		
Assimilation	.942	.805-1.103
Integration	1.031	.977-1.087
Separation	1.041	1.006-1.077
Marginalization	.961	.922-1.002
Acculturative stress	1.533	.976-2.406
Work-related psychosocial factors		
Job demand	.998	.984-1.012
Insufficient job control	1.001	.985-1.017
Interpersonal conflict at work	1.010	.998-1.023
Job insecurity	1.003	.994-1.013

CI: confidence interval.
Adjusted for age, marital status, and length of stay.

Influence of psychosocial factors on WMSDs

The influence of psychosocial factors on WMSDs is presented in Table 4. Country and acculturation strategy had significant effects on WMSDs after controlling for age, marital status, and lengths of stay. When compared to Thai female workers, the Vietnamese (odds ratio [OR] = 3.379, 95% confidence interval [CI] = 1.465-7.790) had significantly more WMSDs. Also, women who preferred the separation strategy were more likely to experience WMSDs (OR = 1.041, 95% CI = 1.006-1.077).

Discussion

To our knowledge, this is the first study to examine the influence of acculturation contexts on WMSDs among southeastern Asian migrant workers living in Korea. In Korea, in spite of the rapid increase in migrant workers and acceleration into becoming a multicultural society, there has not been much health research directed toward integrating the acculturation context into physical and psychosocial health outcomes. As noted earlier, migrant workers are exposed to many acculturation stressors, such as discrimination and insufficient social sup-

port. They are more vulnerable in terms of dangerous and poor work environments, for example, long working hours, repetitive and awkward movements, and poor ventilation in dusty small spaces. These are all possible risk factors that may be associated with work-related health problems among migrant workers. However, there has been little research on work-related health problems and risk factors for these problems among migrant workers in Korea. Thus, this study attempted to examine the influence of acculturation on a major work-related health problem, WMSDs, and the study might open the way for researchers to better understand the multifactorial nature of WMSDs among migrant workers. In addition, the evidence will contribute to expanding the scope of acculturation research in Korea, which currently rarely focuses on work-related health problems.

The prevalence of WMSDs, which are symptoms that occur at least once a month or that have lasted at least one week in the past year with at least moderate intensity, was 34.6% in this study. When compared to migrant women in Korea from more than 10 countries who participated in a different study [36], the WMSD percentages of female migrant workers in the current study were not much different (32.8% vs. 34.6%). This supports the idea that WMSDs are key work-related health problems among southeastern Asian female workers living in Korea, which is consistent with earlier studies of migrant workers in the U.S. [17-19]. In comparing WMSD prevalence among workers from different countries, it is important to note that Vietnamese female workers reported more WMSDs than did Thai or Filipino female workers. This evidence indicates the need for further studies to examine the associations between risk factors, including job tasks and WMSDs by nationality separately with sufficient sample sizes.

As expected, in the current study, acculturation was associated with the occurrence of WMSDs. The findings from this study are consistent with those from earlier work in terms of the influence of acculturation on musculoskeletal pain or similar outcomes. Widespread pain among minority ethnic groups in the UK increased with a decrease in acculturation attitudes (e.g., fear of loss of cultural identity and religious beliefs) and behavior (e.g., participation in important cultural festivals of home countries and clothing preference) [37]. Out of four acculturative strategies, marginalization was the most prevalent strategy, followed by separation, assimilation, and integration among the current study population. However, only the separation strategy, which leans toward maintaining the original culture and rejecting relationships with the host group, was significantly associated with the increased risk for WMSDs among southeastern Asian female workers. This supports the evidence that the separation strategy was related to increased depression

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and anxiety among migrant workers who came from Turkey and Morocco to the Netherlands [38]. Consistently, Vietnamese Americans who were more involved with their own culture used more separation strategy, leading a decrease in self-esteem [39]. In another study [40], Latino female migrant adolescents who preferred to use the separation strategy were more likely to be current alcohol users. Migrant workers might insist on having their own social networking through church and ethnic organizations within their community rather than receiving support from native Koreans or migrant workers from other countries at work. The negative influence of the separation strategy on WMSDs in this study suggests that there is a need for interventions that will encourage migrant female workers to interact with host country populations and to participate in joint activities.

Further, a challenge arises from the possibility of differences in the relationship between the separation strategy and WMSDs by ethnic group. Social norms, culture, and values may be somewhat similar across 3 southeastern Asian countries, but the acculturation process may be different depending on one's country of origin. This is in line with our findings from the comparison of acculturation scores among Thai, Vietnamese, and Filipino women. Filipino female workers preferred integration significantly less than Vietnamese female workers, and they preferred separation less than Thai female workers, indicating different manners directed towards to the acculturation process and a resultant difference in influence on WMSDs. Thus, it is suggested that future studies need to determine the risk factors for WMSDs in each ethnic context.

The Vietnamese nationality was significantly associated with WMSDs. The findings from the present study could be challenged due to the small sample size for the Vietnamese as well as due to the use of convenient sampling. Nevertheless, the results offer insights to the importance of culturally tailored interventions for Vietnamese migrant female workers. Participants of the Vietnamese group were younger and stayed for shorter durations in Korea compared to the other two groups. At the beginning, it may be relatively difficult for Vietnamese migrant females to find employment in Korea that corresponds to the level of work experience from their countries, indicating that they would be employed in jobs that require physically demanding tasks and have poor psychosocial working environments. In fact, the Vietnamese participants in this study perceived higher job demand, had more interpersonal conflict, and perceived higher job insecurity than did the Thai and/or Filipino participants. In the analysis of acculturative stress by subdomain, however, Vietnamese female workers perceived significantly lower discrimination, homesickness, feelings of

hate, and miscellaneous factors than did Thai female workers. In an earlier study [40], an increase of host group relationship and original culture maintenance was indicated to decrease acculturative stress among migrant workers in Italy. The acculturative strategy reported by the Vietnamese women in the current study indicates the tendency of maintaining their own culture and having social interactions with Korean society. This can be explained by similar cultural and traditional features based on Confucianism between the two countries. Compared to Thailand and the Philippines, Korea has had an active international relationship with Vietnam for a long time through the Vietnam War, economic development, and cultural exchange. Again, better understanding of how the acculturative stressors differ across ethnic groups is important to for the development of intervention programs specific to each ethnic group.

Migrant workers are exposed to many undesirable work environments that put them at risk for WMSDs, such as excessive work demands, time pressure to complete job tasks, less support from supervisors, and job insecurity. Specific work-related psychosocial factors, such as getting along with supervisors and concerns about job security, were found to be significantly associated with more chronic health conditions, including back problems, among Filipino migrant workers [41]. However, the present study failed to confirm the negative influence of work-related psychosocial factors on WMSDs among southeastern Asian female workers living in Korea. The migrants may underestimate those poor conditions less significantly because they view many stressors at work as inherent parts of their jobs and have little choice but to continue to work as migrants. There may also be less exposure to certain types of work-related psychosocial factors because of the types of jobs that these women work. Many female migrants in Korea work in small factories with few colleagues or work alone in home settings as home care assistants or caregivers, where there are few conflicts with decision authority and control over their work performance. Thus the influence of work-related psychosocial factors on WMSDs needs to be further studied, limiting analyses to a specific type of job or a comparison study with native Korean workers in the same setting.

There is an important limitation to this study that should be noted. Physical loads from biomechanical forces in the body induced by job tasks are known to be a primary risk factor for WMSD from extensive reviews of WMSD studies [20, 21]. Physical load factors were not collected in the present study since the aim of this study focused on whether there is an association particularly between acculturation-related psychosocial factors and WMSDs. The findings from the current study without measures of physical load factors, therefore, provide a clue

to understanding the nature of multiple WMSD risk factors among the migrant population in Korea, rather than generating conclusive evidence on the relative impact of acculturation on the development of WMSDs.

In addition, compared to the internal consistency reliabilities of the original scales for job demand, the translated version from the original Korean version to the Vietnamese version exhibited relatively lower reliability. The low reliability of the translated instrument may be due to the one-way translation procedure that was used in the current study because of financial and time constraints of the study. It is also possible to misinterpret the meaning of the scale items due to language structure and meaning differences. Although the Vietnamese migrant workers have ethnically similar cultures compared to other minority groups, the Vietnamese might have different conceptions of the meanings of job demand items. Attention to the translation process, including a selection of qualified translators and more comprehensive translation procedures, such as a translation committee and back translation methods, are required. It is also important to interpret this study with caution because of possible selection bias. In the present study, the participants were conveniently selected from various community settings, such as church services and multicultural fairs. This might lead to the exclusion of migrant workers who do not prefer to interact with other ethno-cultural groups or participate in community activities in Korea. Further studies with more sophisticated sampling designs and larger sample sizes are suggested to ensure generalizability.

In conclusion, although the physical load is the most important factor with respect to the etiology of WMSDs among female migrant workers, nursing researchers will have to expand their focus to psychosocial factors, including acculturation and work-related psychosocial factors. These are likely to be successful guides to assessing multiple WMSD risk factors and developing intervention programs for migrant workers, who have heretofore been an under-addressed population. In the unique contexts of the environment in which migrant workers work, a broader perspective may enable occupational health professionals to enhance WMSD interventions by targeting physical load factors (e.g., proper lifting technique, use of light weight in-flight items) and by including other types of interventions (e.g., stress management, change of organizational culture). Migrant workers who prefer to use the separation strategy (prefer to maintain their own heritage and to reject the host country heritage) and were found to be at risk for WMSDs may be a priority group for WMSD interventions among southeastern Asian female workers living in Korea.

Conflict of Interest

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

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