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Testing a theoretical model of immigration transition and physical activity

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Abstract

The purposes of the study were to develop a theoretical model to explain the relationships between immigration transition and midlife women's physical activity and test the relationships among the major variables of the model. A theoretical model, which was developed based on transitions theory and the midlife women's attitudes toward physical activity theory, consists of four major variables including length of stay in the U.S., country of birth, level of acculturation, and midlife women's physical activity. To test the theoretical model, a secondary analysis with data from 127 Hispanic women and 123 non-Hispanic [N-H] Asian women in a national Internet study was used. Among the major variables of the model, length of stay in the U.S. was negatively associated with physical activity in Hispanic women. Level of acculturation in N-H Asian women was positively correlated with women's physical activity. Country of birth and level of acculturation were significant factors that influenced physical activity in both Hispanic and N-H Asian women. The findings support the theoretical model that was developed to examine relationships between immigration transition and physical activity; it shows that immigration transition can play an essential role in influencing health behaviors of immigrant populations in the U.S. The theoretical model can be widely used in nursing practice and research that focus on immigrant women and their health behaviors. Healthcare providers need to consider the influences of immigration transition to promote immigrant women's physical activity.

Keywords

Immigration transition; immigrants; physical activity; theoretical model; women

INTRODUCTION

Approximately 40 million foreign-born people lived in the United States in 2010 (U.S. Census Bureau, 2011), and 65.5% of them had migrated from Latin American/Caribbean and Asian countries (Walter & Trevelyan, 2011). These immigrant populations were more likely to have depression and diseases such as diabetes than non-immigrants in the U.S.

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(Sin, Jordan, & Park, 2011). Unfortunately, these same populations participate less in health promoting behaviors such as physical activity than Whites, resulting in many health concerns. Hence, researchers have given their attention to understanding immigrants' health and health behaviors.

Studies have shown that immigration transition, which is equated to acculturation, may influence immigrants' health behaviors such as physical activity (Abraido-Lanza, Armbrister, Florez, & Aguirre, 2006; Meleis, Sawyer, Im, Hilfinger Messias, & Schumacher, 2000). Regarding immigrants' participation in physical activity, previous studies have reported significant associations between acculturation and physical activity. However, the direction of the associations tends to be inconsistent (Berrigan, Dodd, Troiano, Reeve, & Ballard-Barbash, 2006; Marquez & McAuley, 2006; Wolin, Colditz, Stoddard, Emmons, & Sorensen, 2006). This inconsistency makes it difficult for healthcare providers to develop culturally appropriate programs to promote physical activity among immigrant populations, especially immigrant women, who are among the most vulnerable populations in the U.S. health care system (Marshall, Urrutia-Rojas, Mas, & Coggin, 2005). The plausible reason for the inconsistent findings from previous studies might be that few existing theories are designed to explain the relationships between immigration transition and health behaviors, including physical activity (Abraido-Lanza et al., 2006). Some existing theories related to immigration transition/acculturation embed a concept of health and examine the impact of immigration on immigrants' health (Organista, Organista, & Kurasaki, 2003). However, these theories tend to focus on health or health-related outcomes themselves rather than health behaviors and are too complicated to be easily applied in various nursing fields of research and practice. Thus, for this study, we developed a theoretical model of immigration transition and physical activities in midlife women based on existing theories and tested the model by exploring the influences of immigration transition on physical activity in Hispanic and non-Hispanic [N-H] Asian midlife women.

Developing a theoretical model

The middle range transitions theory and the midlife women's attitudes toward physical activity (MAPA) theory were triangulated to develop the theoretical model. Transitions theory has been used to develop a clear, sophisticated framework for studies about various transitions (Im, 2011; Meleis et al., 2000). Transitions theory consists of four major concepts and their related sub-concepts. The major concepts are (a) nature of transitions (type, patterns, and properties), (b) facilitators and inhibitors (personal, community, and society), (c) patterns of response (process indicators and outcome indicators), and (d) nursing therapeutics. These concepts constantly interact to develop the client's unique transition experience and, thus, to enhance healthy responses to transitions (Meleis et al., 2000).

Immigration transition is a critical process for immigrant women because it can influence or be influenced by individual-level factors such as health, family, and well-being, as well as community- and society-level factors such as cultural beliefs, attitudes, politics, and economics (Meleis, 2010). In this sense, understanding the unique immigration transition experience of Hispanic and N-H Asian immigrant women and its impact on their health behaviors such as physical activity is critical in facilitating their healthy responses to the

transition process. Thus, transitions theory was suitable as a theoretical basis of the study. Since this theory alone cannot explain the complex dynamics, the MAPA theory, which supports the relationships between acculturation and physical activity, was incorporated into the theoretical framework.

The MAPA theory was developed to explain the influence of midlife women's attitudes toward physical activity on their participation in physical activity (Im, Stuifbergen, & Walker, 2010). The MAPA theory as a situation-specific theory was developed for multi-ethnic groups of midlife women based on multiple sources, including existing theory, findings from a relevant literature review, and findings of a study on physical activity among four major ethnic groups of midlife women (Im et al., 2010). The MAPA theory provides a comprehensive framework to explain multiple and complex predictors of midlife women's physical activity. The theory consists of six major factors: attitudes, self-efficacy, perceived barriers, social influences, health/menopausal status, and background characteristics. This theory assumes that each factor affects midlife women's participation in physical activity. Among these factors, acculturation, which is a type of background characteristic, is considered to affect health behaviors of immigrant midlife women who undergo immigration transition (Im & Yang, 2006). Thus, the MAPA theory provides a framework that explains the association and directionality between immigration transition (acculturation) and immigrant women's physical activity.

A theoretical model was developed to explain the relationships between immigration transition and midlife women's physical activity by triangulating transitions theory and the MAPA theory. As shown in Figure 1, immigration transition in this study consisted of three concepts (nature of transition, facilitator and inhibitor, and patterns of response) and their related sub-concepts (transition properties, personal and outcome indicators). Then, sub-concepts at the variable level were linked to immigration transition, which is quantified with three acculturation attributes: length of stay in the U.S., country of birth, and level of acculturation. Among the transition properties that form the first sub-concept of the theoretical model, transition time is associated with length of stay in the U.S. because the transition time in immigration transition starts at the beginning of migration. Among the personal factors that form the second sub-concept of the model, cultural beliefs are associated with country of birth because cultural beliefs are affected by one's country of origin. Among the outcome indicators, mastery of transition is associated with level of acculturation. Mastery can be conceptualized as how immigrants adapt to the host culture, including its language, foods, and social interaction. In other words, mastery in immigration transition can be operationalized as level of acculturation.

To test the relationships among the major variables of the theoretical model, the three research questions (RQs) of this study were established : (RQ 1) do significant differences exist in the physical activity scores by country of birth in each ethnic group?; (RQ 2) do significant correlations exist among length of stay in the U.S., level of acculturation, and the physical activity scores in each ethnic group?; (RQ 3) are acculturation attributes (country of birth, length of stay in the U.S., and level of acculturation) predictors of midlife immigrant women's physical activity scores in each ethnic group?

METHODS

This study adopted a secondary data analysis to test the theoretical model. The data were retrieved from a national Internet study on midlife women's attitudes toward physical activity (Authors, 2012). Institutional review board approval for the original study was obtained from the university with which the research team is affiliated.

Sample and setting

In the original study, a total of 542 midlife women aged 40 to 60 who identified their ethnicity as Hispanic, N-H Asian, N-H African American, and N-H White participated were recruited through multi-ethnic midlife women's communities on the Internet. Among them, data from 250 women (127 Hispanics and 123 N-H Asians) were retrieved from the original data set because only these two ethnic groups in the original study included immigrant populations.

With an assumed effect size of 3.22 (Kandula & Lauderdale, 2005), at least six participants in each birthplace group in each ethnic group were needed to test RQ 1. With an effect size of .20 (Marquez & McAuley, 2006), 102 participants in each ethnic group were needed to test significant correlations among the variables (RQ 2). To test statistically significant relationships in regression models (RQ 3) with an effect size of .06 (Dergance, Mouton, Lichtenstein, & Hazuda, 2005), 133 participants in each ethnic group were needed. The sample size was large enough to test the research questions except for RQ 3 since the original study had only 127 Hispanics and 123 N-H Asians. We had a limitation in the sample size because the sample size was pre-determined by the original study. All the sample size calculations were conducted using the G*Power 3.1 program with an alpha level of .05 and a power of .80.

Instruments

Sociodemographic characteristics.—In the original study, the participants were asked to answer six questions on sociodemographic characteristics, including age, education, marital status, family income (difficulty in paying for basics like food, housing, and clothing), number of children, and employment status. This secondary analysis also used the data from six questions as in the original study.

Immigration transition.—Immigration transition, which was represented by acculturation as in a previous study (Choi et al., 2008), was operationalized into three attributes: (a) country of birth, (b) length of stay in the U.S., and (c) level of acculturation. In the original study, one question on country of the birth asked whether participants were born in the U.S. To measure the length of stay in the U.S., participants were asked to report how many years had passed since their immigration. Level of acculturation was measured with the modified Suinn-Lew Asian Self-Identify Acculturation Scale (Suinn, Ahuna, & Khoo, 1992) used in the original study. This scale consists of five items, including foods, music, customs, language, and close friends, and each item is measured on five-point Likert scale. The level of acculturation scores were calculated by summing responses to all five items. Higher level of acculturation scores mean that the participants feel like Americans. The Chronbach's

alpha coefficient for the reliability of the scale in the study was .72. For participants who were born in the U.S. but were Hispanic or N-H Asian (second or third generation), their age and 5-scores (exclusively American) were substituted for length of stay in the U.S. and level of acculturation scores, respectively.

Physical activity.—In the original study, the Kaiser Physical Activity Survey (KPAS) was used to evaluate midlife women's physical activity. By using the KAPS, we collected data about four domains of physical activity: (a) housework/caregiving, (b) occupational, (c) living habits, and (d) sports/exercise (Ainsworth, Sternfeld, Richardson, & Jackson, 2000). Each domain of physical activity was calculated by summing the categorical responses, then dividing the total by the number of items; hence, the average value of each domain ranged from 1 to 5 (Schmidt et al., 2006) and the total score of physical activity ranged from 4 to 20. Higher physical activity scores mean that the participants engage in more physical activity.

Data collection procedure

The data were collected from January 1, 2008 through December 31, 2010. In the original study, the whole procedure related to data collection was conducted in a project website. More information on the project website and the data collection procedure can be found in the original study (Authors, 2012).

Data analysis

Descriptive statistics were performed for all the variables. Independent t-tests were conducted to explore significant differences in the physical activity scores by country of birth in each ethnic group (RQ 1). Although the sample sizes were unequal between the group born in the U.S. and the group born outside the U.S. in each ethnic group, two groups satisfied the statistical standard of a Shapiro-Wilk test of normality. Hence, independent t-tests in each ethnic group were performed for RQ 1. Correlation coefficients among length of stay in the U.S., level of acculturation, and the physical activity scores in each ethnic group were calculated using Pearson's correlation analyses (RQ 2). Multiple hierarchical regression analyses were used to identify predictors of the physical activity scores controlling for the sociodemographic factors (RQ 3). The sociodemographic characteristics, including age, education, marital status, family income, number of children, and employment status, were entered in the first step of each regression model. In the second step, country of birth of model 1, length of stay in the U.S. of model 2, and level of acculturation of model 3 were entered in the regression equations.

RESULTS

Description of participants

In this study, midlife women's mean age was 48.4 years, with a standard deviation of 6.0 years. Regarding immigration transition, 72.4% of Hispanic women and 27.6% of N-H Asian women were born in the U.S., and the mean length of stay in the U.S. for Hispanic and N-H Asian women was 43.6 (SD=11.7) and 29.0 (SD=15.4) years, respectively. The

mean level of acculturation of Hispanic women was 4.5 points (SD=0.9) and that of N-H Asian women was 3.4 points (SD=1.1) (see Table 1).

Physical activity and immigration transition

There was no statistically significant difference in the physical activity scores by country of birth in each ethnic group (p=.08 for Hispanic women; p=.24 for N-H Asian women) (data not shown). Correlation analyses showed that the physical activity scores of Hispanic women were negatively correlated with length of stay in the U.S. (r=−.20, p<.02). In N-H Asian women, there was a significant positive correlation between level of acculturation and the physical activity scores (r=.23, p<.01) (see Table 2).

Factors influencing the women's physical activity

Among Hispanic women, each of the three acculturation attributes was a significant factor of the physical activity scores in three separate regression models (p=.02, partial R^2=.04 for country of birth of model 1; p<.01, partial R^2=.04 for length of stay in the U.S. of model 2; p=.02, partial R^2=.07 for level of acculturation of model 3). In N-H Asian women, country of birth (p=.02, partial R^2=.04) of model 1 and level of acculturation (p<.01, partial R^2=.05) of model 3 were significant factors that influenced the physical activity scores. However, length of stay in the U.S. did not influence the physical activity scores (p=.20) (see Table 3).

DISCUSSION

The findings of the study support the relationships among the major variables of the theoretical model that was developed to explain the relationships between immigration transition and physical activity in two ethnic minority groups of midlife women. As assumed in the theoretical model, the findings indicate that immigration transition is significantly associated with immigrant midlife women's physical activity and that it plays an essential role in influencing health behaviors of immigrant populations in the U.S. Interestingly, the directional relationships among the major variables revealed ethnic-specific patterns.

Although few studies exist on the association between physical activity and country of birth in N-H Asians in the U.S., the findings of the regression model for N-H Asian women are consistent with those of a previous study that reported that foreign-born Asian Americans were less likely to participate in leisure-time physical activity (Kandula & Lauderdale, 2005). This may be related to the sedentary culture that is common to many Asian countries (Ma, 1999). Since N-H Asian women born outside the U.S. may be affected by their culture of origin, they might be more physically inactive than their U.S.-born counterparts. The finding on the association between physical activity and country of birth in Hispanic women shows a significant relationship as well, but it reports a different direction than the literature indicating that foreign-born individuals have a lower level of leisure-time physical activity than second-generation immigrants for multi-ethnic groups, including Hispanics, N-H African Americans, and N-H whites (Wolin et al., 2006). The different direction from the previous study on Hispanic women may be attributed to the methodology used in each study. The regression analyses in this study were conducted by ethnicity and by country of birth, unlike the previous study's analyses based on immigration generation

without stratification by ethnicity (Wolin et al., 2006). Also, Hispanic women born in the U.S. may be exposed to the typical U.S. environment, which, for example, offers fewer opportunities for walking (Unger et al., 2004). Although the different direction for Hispanic women should be interpreted with caution because more Hispanic women than N-H Asian women in the study were born in the U.S., the finding suggests that immigrants' background information, such as ethnicity and birthplace, is an imperative source of data for lifestyle modification programs including physical activity.

Consistent with previous studies, the findings of this study demonstrate a significant relationship between level of acculturation and physical activity in both N-H Asian and Hispanic women. For example, a previous study reported that more acculturated Korean American women participated more often in physical activity such as walking and gardening (Lee, Sobal, & Frongillo, 2000) than less acculturated women. Less acculturated N-H Asian women may confront barriers to participation in physical activity such as lack of fluency in English, lack of appropriate information on feasible facilities, and lack of social support from their neighborhood or community. Unlike N-H Asian women, more acculturated Hispanic women were less likely to participate in physical activity, consistent with previous studies (Berrigan et al., 2006; Marquez & McAuley, 2006). As mentioned above, as Hispanics become more acculturated to U.S. culture, they tend to become non-manual workers and to have fewer opportunities to walk (Marquez & McAuley, 2006). Moreover, Hispanic women in their culture perceive physical activity as a waste of time (Im et al., 2010). In other words, Hispanic culture and acculturation to U.S. culture may coexist in Hispanic immigrant women's daily lives and this synergistic relationship may negatively influence Hispanic women's physical activity. The findings on the association between level of acculturation and physical activity lead to the need for different suggestions for each ethnic group. For N-H Asian women, it is essential to provide available information on physical activity and social support to increase their physical activity. In contrast, for Hispanic women, it is necessary to emphasize the importance of physical activity and consider culture-specific approaches to increase physical activity.

This theory-testing study has some limitations. First, the samples were pre-determined because this was a secondary analysis. Second, the study considered only two groups regarding the country of birth, women born in the U.S. and those born outside the U.S., as in previous studies. However, this carries potential risks for excluding second- or third-generation immigrants who experience immigration transition.

CONCLUSION

Based on the theoretical development and findings of the study, we can suggest several implications for nursing research and practice. First, to develop from the theoretical model of the study into nursing theories such as situation-specific theories, the model would need to enhance the theoretical basis by using rigorous theorizing methods such as Im's (2005) integrative approach to theory development. Second, nurses who plan to develop physical activity promotion programs should weigh the immigration transition status of their target populations, and ethnic-specific considerations should be taken into account in planning such programs for immigrant women. In particular, through accurate assessment

of immigrant women's background information and their level of acculturation, nurses might be able to provide ethnic-specific and culturally tailored physical activity promotion programs to them. Finally, future studies are needed to study immigration generation as an independent variable for immigration transition rather than birthplace because second-generation immigrants may be regarded as non-immigrants based on their birthplace even though they could still undergo immigration transition.

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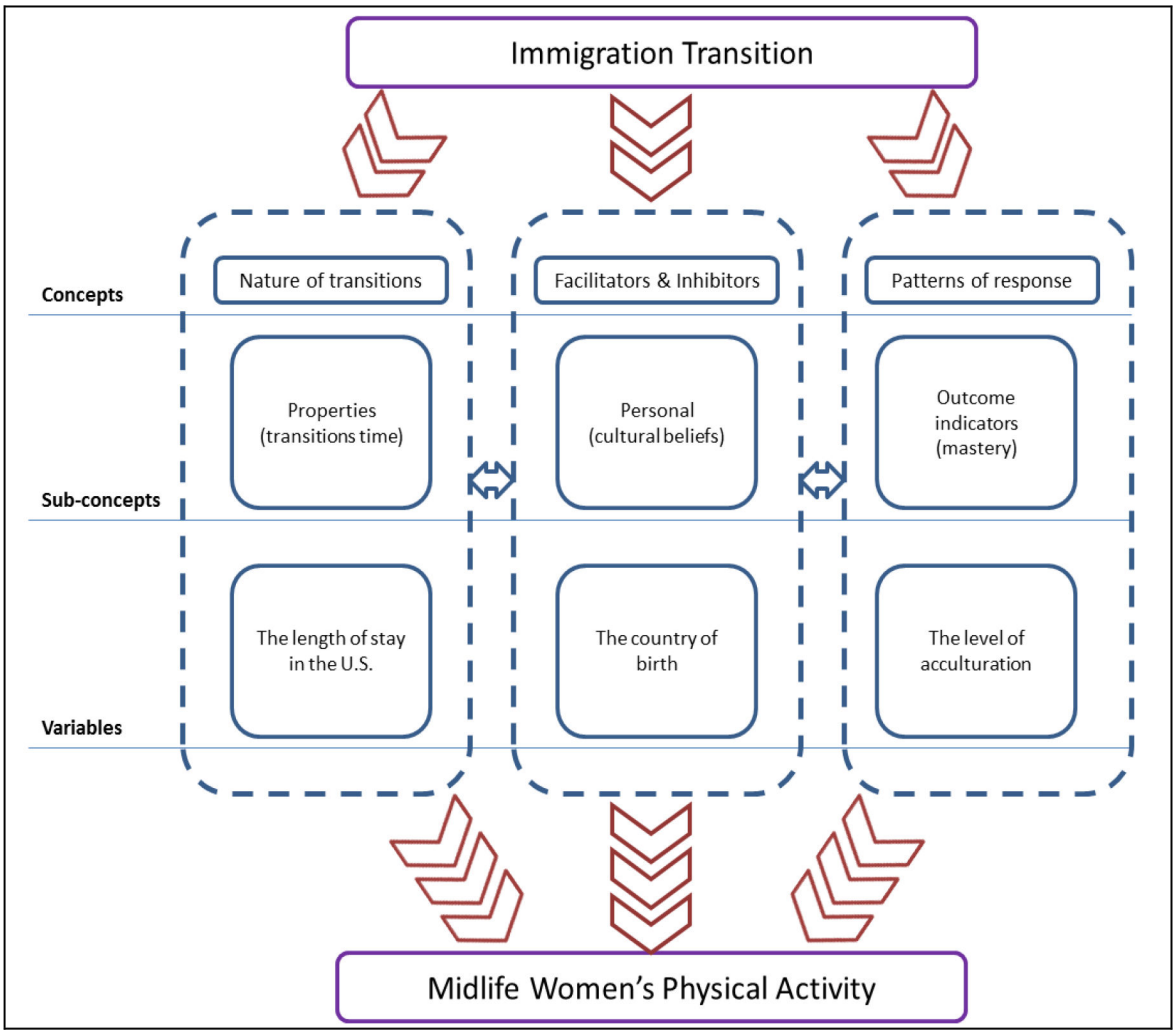

Figure 1.
The theoretical model of immigration transition and physical activity

Table 1.

Sociodemographic characteristics of the participants (n=250)

	Hispanic	N-H Asian	Total
Characteristics (range)	***n* (%) or M±SD**		
Total	127(50.8)	123(49.2)	250(100)
Age (years)	48.9±5.6	48.0±6.3	48.4±6.0
Educational level			
High school graduate or less	14(11.0)	14(11.4)	28(11.2)
Associate's degree	41(32.3)	17(13.8)	58(23.2)
Bachelor's degree	72(56.7)	92(74.8)	164(65.6)
Marital status			
Married/partnered	83(65.4)	101(82.1)	184(73.6)
Non-married/separated	44(34.6)	22(17.9)	66(26.4)
Family income (Difficulty in paying for basics)			
Very hard	15(11.8)	10(8.1)	25(10.0)
Somewhat hard	56(44.1)	47(38.2)	103(41.2)
Not hard	56(44.1)	66(53.7)	122(48.8)
Number of children			
None	30(23.6)	21(17.1)	51(20.4)
1–2	52(40.9)	77(62.6)	129(51.6)
3 or more	45(35.4)	25(20.3)	70(28.0)
Employment			
Yes	107(84.3)	82(66.7)	189(75.6)
No	20(15.7)	41(33.3)	61(24.4)
Country of birth			
United States	92(72.4)	34(27.6)	126(50.4)
Outside the U.S.	35(27.6)	89(72.4)	124(49.6)
Length of stay in the U.S. (years)	43.6±11.7	29.0±15.4	36.4±15.4
Level of acculturation (1–5)	4.5± 0.9	3.4± 1.1	4.0±1.1
Physical activity scores (4–20)	10.5±2.3	9.9±2.1	10.2±2.2

Table 2.

Correlation coefficients among the level of acculturation, the length of stay in U.S., and the physical activity scores

	Physical activity scores, r (*p*)	
	Hispanic	**N-H Asian**
Level of acculturation	−.14(.10)	.23(.01) *
Length of stay in the U.S.	−.20(.02) *	.14(.13)

Note:

** $p<.01$

* $p<.05$

Table 3.

Hierarchical regression analyses according to the acculturation attributes

	Model 1 β	Model 2 β	Model 3 β
	Hispanic		
Born outside the U.S. (referent)			
Born in the U.S.	−1.08 *	-	-
Length of stay in the U.S.	-	−.06 **	-
Level of acculturation	-	-	−0.51 *
R^2	0.22	0.24	0.21
Δ R^2	0.04	0.06	0.03
F_{ch} (p for F_{ch})	6.18 *	10.05 **	5.53 *
Variables	Model 1 β	Model 2 β	Model 3 β
	N-H Asian		
Born outside the U.S. (referent)			
Born in the U.S.	0.99 *	-	-
Length of stay in the U.S.	-	−.25	-
Level of acculturation	-	-	0.50 **
R^2	0.25	0.23	0.21
Δ R^2	0.04	0.02	0.26
F_{ch} (p for F_{ch})	5.69 *	3.38	7.68 **

Note. Adjusting for demographic variables: Model 1 for the country of birth, Model 2 for the length of stay in the U.S, and Model 3 for the level of acculturation:

** p<.01

* p<.05: Δ R^2 = change of R^2 : F_{ch} = change of F value