Original Paper

Acculturation and Cardiovascular Disease Risk in Midlife Immigrant Women From the Former Soviet Union

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This study examines relationships among acculturation, depression, and cardiovascular risk factors in midlife women from the former Soviet Union and identifies factors predicting Framingham Risk Scores. Data were collected at baseline and 1 year later from 218 participants in a longitudinal study of postimmigration health. The leading risk factors were obesity, dyslipidemia, and depression. Older women had lower American Behavioral Acculturation subscale scores, higher Russian Behavioral Acculturation subscale scores, and higher depression scores. Length of residence was significantly correlated with American behavioral acculturation but not Russian behavioral acculturation. Baseline body mass index, both acculturation scores, and depression scores predicted Framingham Risk Scores after 1 year, but serum glucose did not. The results suggest that contrary to findings in other immigrant groups, women from the former Soviet Union may decrease their risk for coronary heart disease as they assume a more American lifestyle. Nursing interventions to address the high cardiovascular disease risk in this population are suggested. (Prog Cardiovasc Nurs. 2004;19:47–55)

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The most significant and potentially modifiable health risks for women during midlife are those that relate to cardiovascular diseases (CVD). Coronary heart disease (CHD) and cerebral vascular incidents are the leading causes of death for adults in the United States and many other developed countries. Although the death rate due to CVD has generally declined in this country over the past few decades, the rate of decline is lower for women and minorities.[1] Because women tend to live longer than men, the absolute number of women who will die of CVD is expected to increase in the coming years as the population as a whole ages. Data from the Framingham Heart Study have shown that women are more likely than men to die following a myocardial infarction and selected cardiac procedures.[2] This may reflect delay in seeking care, differences in presenting symptoms, later diagnosis, and greater disease severity.[1]

Many factors increase the risk of CHD for women individually or in combination. After menopause, women experience changes in risk profiles that are due to hormonal, physical, and psychosocial factors, but it is difficult to separate the impact of menopause from age-related changes.[3,4] With the exception of menopausal status, risk factors are similar for men and women. Some, however, are more prevalent for women or have a greater influence on their health. Risk factors that have special implications for women include systolic hypertension,[5] dyslipidemia,[6] diabetes,[7] obesity,[8,9] and cigarette smoking.[10] Midlife women have notoriously sedentary lifestyles, in part because of perceived lack of time for exercise due to competing social roles.[11] Clinical depression has been associated with CHD and is diagnosed more than twice as often in women than men.[12] The continued search for effective interventions for CVD risk

reduction and health promotion in women is therefore essential and urgent.

Recent research indicates that when women have CHD, the addition of other risk factors contributes significantly to their already high risk of myocardial infarction or death.[13] Profiles and scores that can be used as predictors of developing CHD may have potential in clinical settings for identifying those at particular risk. The Framingham risk scoring (FRS) method was adopted by the National Cholesterol Education Program (NCEP) Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults in 2001 as a useful way to determine 10-year risk for developing CHD.[14,15]

Nurses are increasingly called on to provide culturally appropriate care for diverse groups. Summary scores that identify people at higher risk of developing CHD have clinical implications for targeting interventions to those for whom risk-reducing behavior might be most useful. In addition, they may be useful in nursing research for comparing risk across groups as well as tailoring interventions for persons within these high-risk groups. Investigation of the FRS in relation to other known physical, behavioral, and psychological CHD risk factors is still needed, as is examination of its utility in ethnically diverse and minority populations.

CVD AND HEALTH OF IMMIGRANTS

Culturally relevant, multifocal interventions for CVD and psychological health are high priorities in the United States. Global migration during the past decade has generated an unprecedented amount of cultural diversity in many developed countries and challenges health care providers and systems. Immigrants are believed to be at exceptional risk for physical and mental illness due to premigration conditions, different cultural norms that affect health and health behavior, and limited understanding of the health care system. Rates of CVD in immigrants reported in Western countries demonstrate wide variations across ethnicity and country of origin.[16]

Using data from 1989, Singh and Siahpush[17] found that immigrants had lower rates of CVD than native-born US citizens. Conversely, Dotevall et al.[18] found that immigrants to Sweden had a poorer CVD risk profile than Swedes. In general, new immigrants from Latin America, China, and South Asia tend to have lower CVD mortality rates than those from Africa and Eastern Europe.[19] However, some groups whose health profiles appear better than those of the host country shortly after immigration have increased CVD risks, such as obesity and depression, over time.[20] Most studies focus on Hispanic and Asian immigrants. Few focus on postimmigration women's health, although midlife and older women often have the most difficulty and are at particularly high risk of acculturative stress.[21]

Acculturation and Health

Acculturation includes changes in language, lifestyle, attitudes/values, and cultural identity. It is believed to be related to better adjustment primarily as a result of improved financial status and less social isolation, but language acquisition is more difficult as age increases.[22] Gender and age at immigration are critical factors, with women and older persons tending to experience more acculturative stress. The stress of acculturation may affect health status by increasing anxiety and contributing to depression.[23]

The acculturation process clearly has different effects on health behavior across ethnic groups and host environments.[24,25] Increased levels of acculturation might improve the health of immigrants from countries with less well developed health care systems by improving health knowledge. However, increased acculturation may also lead to abandonment of former cultural practices that promote health. Acculturation has been shown to reduce diet quality and increase selected health problems, including alcohol consumption, obesity, hypertension, and diabetes mellitus in some populations. The disparity among findings may also be due to variations in the measurement of acculturation. Many researchers use time since immigration as their primary indicator of this process, while others assess language and behavior in more detail.

Immigrants From the Former Soviet Union

The risk of CVD mortality in Eastern Europe, particularly in Russia, now exceeds that of the United States and Finland.[26] Between 1989, the collapse of the Soviet Union, and 1994, life expectancy decreased by 6.7 years and 3.4 years in men and women, respectively. This trend has been observed for adults in every age group.[27] The life expectancy for women in the former Soviet Union (FSU) is 68 years, compared with 76 years for women in the United States. Although mortality rates for men are significantly higher than for women, women experience a higher rate of morbidity. Unlike people in Western Europe and the United States, education and socioeconomic status are not significantly associated with self-reported health.[28] In addition to poor health practices, stressful lifestyles contribute significantly to the CVD risk profile of FSU women.[29]

Annual immigration from FSU was slightly over 60,000 in 1998[30] and represented close to 10% of the total number of legal immigrants for that year. This increase in immigration from FSU (which was <2000 people in 1989) was primarily due to the rapid disintegration of the Soviet communist system and ethnic/religious discrimination. More than 25% of immigrants from FSU are women older than age 50 years, and the majority is of Jewish background. Cultural factors have been attributed to

variations in the use of selected health services among older immigrants from FSU.[29] Older immigrants from FSU tend to be isolated from mainstream US culture and represent a growing segment of the population with a particularly high rate of cardiovascular morbidity and depression.[31,32]

As health care needs and behavior differences across ethnic groups are uncovered, it is increasingly important for nurses to provide culturally appropriate interventions to improve patient outcomes. Midlife immigrant women may be at special risk for CVD due to gender, age, and migration factors. This appears to be especially true for women from FSU, although few health-related research studies particular to this group have been reported. Appropriate strategies for immigrants cannot be designed until the variations in health risk profiles and health practices that may be affected by premigration and acculturative experiences are understood. The purpose of this study was to examine relationships among acculturation, depression, and cardiovascular risk factors in midlife women from FSU and to identify factors predicting FRS.

METHODS

Participants

Data were collected at baseline and Round 2 (1 year later) from participants in a 4-year longitudinal study designed to document the influence of acculturation, family adaptation, and health behavior on health status and well-being in midlife women from FSU. The larger study includes baseline and three annual data collection sessions. Women were eligible for enrollment if they were 40–70 years old, immigrated to the United States from FSU less than 8 years before recruitment, were married, and had at least one child living in the United States. This volunteer sample of women resided in urban and suburban neighborhoods of a large, Midwest metropolitan area. The study was approved by the Institutional Review Board of the investigators' university.

Baseline data were obtained for 222 women who met the criteria for participation. For the second round, only four (1.8%) participants were lost to attrition. Data for this analysis are reported for 218 women for whom baseline and Round 2 measures are complete. Demographic characteristics, including age, length of residence in the United States, education, ethnicity/religion in FSU, and former Soviet Republic from which the women emigrated were obtained from self-report at baseline. The mean age of the women was 56.55±8.42 years; their ages ranged from 40.00 to 70.46 years. The mean number of years in the United States was 3.38±2.28, with a range of 0.09–7.99 years. The women were well educated before immigration to the United States; 163 (74.8%) had completed at least an undergraduate degree at a university or institute, and 49 (22.5%) had completed general, specialized, or technical secondary school.

Consistent with national statistics regarding immigrants from FSU in the United States, the majority of women reported their primary ethnicity/religion in FSU as Jewish (133 women, 61%). The women emigrated from 10 different republics, but the majority came from Ukraine (89 women, 40.8%), Russia (68 women, 31.2%), and Belarus (30 women, 13.8%). These republics have the most emigrants and also had the highest concentration of Jews before the dissolution of the Soviet Union.

Procedures

This volunteer sample was recruited from the community through Russian radio and newspaper advertisements, flyers in neighborhood businesses and clinics, announcements in English as a second language classes, and network sampling. Prospective participants called the project telephone number, which was answered by a voicemail message in Russian. They were screened for eligibility over the telephone by Russian-speaking project staff member who described the study in detail. Appointments were made for women who met criteria and agreed to participate.

Data collection took place individually at participants' homes or in groups of 5–10 at a convenient community meeting room. All questionnaires were administered in Russian. Informed consent forms were signed in the presence of the bilingual staff. A light breakfast was served after fasting blood samples were obtained. Questionnaires were self-administered under supervision, and data for the other physical measures were collected. Completion of the questionnaires and physical measures took approximately 3 hours. Women received written documentation of their physical measures immediately following their assessment. Women with borderline or abnormal findings were referred to their health care providers or other health care facilities. All laboratory and physical measures were administered free of charge. A modest cash payment was provided as travel and time reimbursement after each session.

Instruments and Measures

Physical Measures. Weight was measured in kilograms using a balance scale and recorded to one decimal place. Height was measured in meters using a portable stadiometer and recorded to one decimal place. Participants wore street clothes without shoes. Body mass index (BMI) was calculated by Quetelet's Index (i.e., weight [in kilograms]/height [in meters]^2). This index has a high correlation to body fat and a low correlation to stature; it is believed to be one of the best single indicators of obesity in adults. Waist circumference was

measured at the narrowest part of the trunk, below the rib cage and above the umbilicus, to assess body fat distribution.[33] Measurements were recorded to the nearest 0.1 cm. Serum lipids (total cholesterol, high-density lipoprotein [HDL], low-density lipoprotein [LDL], and triglycerides) and glucose were assessed by fasting blood samples obtained by fingerstick and analyzed using the Cholestech (Gibbco Scientific, Inc., Coon Rapids, MN) blood chemistry analyzer. Blood pressure was measured by sphygmomanometer with appropriate cuff size using guidelines recommended by the National High Blood Pressure Education Program.[34] Two readings separated by at least 2 minutes were averaged. If the readings differed by more than 5 mm Hg, an additional reading at the conclusion of that session was obtained and the two closest measures were averaged.

Self-Report Information and Questionnaires. A self-report health history questionnaire included questions regarding medication for hypertension and amount of cigarette smoking. Menopausal status was assessed using self-report questions from the Massachusetts Women's Health Study.[35] Women were classified as premenopausal if they reported regular menses during the past 3 months with no change in menstrual regularity, perimenopausal if they reported menses in the past 3–11 months with menstrual irregularity or periods of amenorrhea, and postmenopausal if they reported no menses in the past 12 months. Women who had surgical menopause comprised a fourth group.

Psychological Measures. American and Russian Behavioral Acculturation subscales were used to assess lifestyle and cultural behavior in the United States. These subscales are part of the Language, Identity and Behavior Acculturation Scale developed by Birman and Trickett,[36] which includes three dimensions of acculturation (i.e., language, identity, and behavior) that relate to postimmigration life. Some items were adapted from existing questionnaires, and others were developed specifically for immigrants from FSU. The Language, Identity and Behavior Acculturation Scale was translated into Russian by the original developers using direct and back translation methods. For this study, only American and Russian Behavioral Acculturation subscales were used; both were administered in Russian.

The two behavioral acculturation subscales include parallel items regarding language commonly used in selected situations, types of foods prepared, ethnicity of health care provider, and so on. Scores on the two subscales are independent. Examples of items on the American Behavioral Acculturation subscale include: How much do you speak English at home? How often do you prepare food like Americans? and How often do you socialize with American friends? Corresponding items on the Russian Behavioral Acculturation subscale are: How much do you speak Russian at home? and How often do you prepare food like Russians? For this study, the items were modified slightly to include 13 statements on each behavioral acculturation subscale. Items were rated on a four-point Likert-type scale (1=not at all to 4=very much), and a mean score was calculated. The possible range of mean scores for each behavioral acculturation subscale was therefore 1–4.

Previously reported internal reliability (Cronbach's α) is 0.77 for the American Behavioral Acculturation subscale and 0.85 for the Russian Behavioral Acculturation subscale). In this study, Cronbach's α levels were 0.85 for the American Behavioral Acculturation subscale and 0.73 for the Russian Behavioral Acculturation subscale. There are no established norms for the scores on these subscales.

The Center for Epidemiological Studies Depression Scale (CES-D), a screening questionnaire for a general population, was used to measure current level of depressed mood.[37] Participants respond on a four-point scale (0=rarely or none of the time to 3=most or all the time) to how they felt or behaved in the past few weeks. The scale includes 20 items, which are added together for a total score. Validity is supported by the significantly higher percentage of psychiatric patients than the general population (21%) scoring at or above an arbitrary cutoff score of 16. Internal consistency of the CES-D was reported to be 0.85 for a general population sample and 0.90 for a psychiatric inpatient sample. Committee and back translation were used to translate original questionnaire items into Russian for this study. The Cronbach's α for the CES-D at baseline in this sample was 0.90.

FRS. FRS for CHD was calculated for each woman.[14] The Framingham scoring method was empirically developed to identify people for whom the risk of developing CHD in the next 10 years is <1% to >30%. Depending on their risk category, different medication and/or lifestyle regimens are recommended to achieve treatment goals. Based on the findings of the Framingham Heart Study, points are assigned using a formula that includes the following factors: age, total cholesterol, HDL, current cigarette smoking, and systolic blood pressure. If a person is on antihypertensive medications, additional points are added to the blood pressure score because of the residual risk of treated hypertension. In addition to being a risk factor on its own, age is considered when assigning points to other risk factors. For example, a woman would obtain seven points for being a smoker if aged 40–49 years, four points if aged 50–59 years, two points if aged 60–69 years, and one point if

Table I. Baseline Values for Physical and Self-Report Measures

	Mean	SD	Range	Recommended Cutoff	% Outside Cutoff
Physical measures					
Body mass index	30.28*	5.39	17.93–50.16	>25[34]	87.2
Waist circumference	35.33*	44.85	24.41–48.62	>35 in[34]	51.4
Systolic blood pressure	118.90	19.61	83–197	>130 mm Hg[14]	22.9
Total cholesterol	219.40*	41.93	123–406	>200 mg/dL[14]	64.7
Low-density lipoprotein	139.15	38.05	60–312	>130 mg/dL[14]	54.6
High-density lipoprotein	56.25*	14.45	24–94	<40 mg/dL[14]	11.9
Triglycerides	120.08	57.21	45–463	>200 mg/dL[14]	23.4
Fasting serum glucose	104.99	23.01	76–264	>110 mg/dL[14]	22.5
Self-report measures					
Currently smoke (No. cigarettes/d) (n=14)	5.86	3.50	1–12	>0[34]	6.0
American BA subscale score	1.92	0.53	1.00–3.77	NA	
Russian BA subscale score	3.13	0.48	1.38–4.00	NA	
CES-D	23.53*	9.80	2–50	>16[37]	77.1

BA=behavioral acculturation; NA=not applicable; CES-D=Center for Epidemiological Studies Depression Scale; *mean score outside recommended value for risk factor

aged 70–79 years. Different scoring criteria have been established for men and women.

The total FRS is the sum of the points for each risk factor. The higher the number of points, the more likely it is that a person will experience a serious CHD event within the next 10 years. Individuals are categorized into risk groups based on their total FRS. For example, a women with FRS <9 is classified as having a 10-year CHD risk <1%, and a woman with FRS ≥25 is classified as having a 10-year CHD risk ≥30%. These estimates relate to hard CHD events (myocardial infarction and coronary death) and exclude angina pectoris. No specific age-related norms are cited in the NCEP document. Wilson et al.[15] present risk estimates and age-related norms for overall CHD. Using Framingham Heart study data and a slightly different method of calculation, they identify relative risks for total CHD (including angina pectoris). For example, they report a mean of 8% risk for women aged 50–54 years.

ANALYSIS

Data were used from baseline and Round 2. Descriptive statistics were generated for baseline demographic characteristics, CVD risk factors, American and Russian Behavioral Acculturation subscales, CES-D, and FRS. Correlations were used to identify relationships among the CVD risk variables and FRS at baseline and Round 2. FRS change scores were calculated by subtracting Round 2 scores from the baseline scores for each woman. Paired comparison *t* tests were employed to identify significant differences from baseline to Round 2.

A multiple regression model was calculated for Round 2 FRS scores using baseline CVD risk factor values to identify predictors. Because the calculation of FRS scores was so heavily dependent on age and several other risk factors (i.e., total cholesterol, HDL, systolic blood pressure, and smoking), only variables that were not directly or indirectly used to calculate the FRS, such as glucose and BMI, were included in these analyses. In addition, menopausal status, which is highly confounded with age, and variables incorporated into other risk factors (such as weight, which is included in the BMI) were omitted from the final regression analyses.

RESULTS

Cardiovascular Risk Factors

Consistent with the age of the participants, the majority was postmenopausal: 116 (53.2%) were naturally postmenopausal, 31 (14.2%) had surgical menopause, 17 (7.8%) were perimenopausal, and 54 (24.8%) were premenopausal. This risk factor is not included in the FRS, and because of its close relationship with age is not included in the other analyses. Means, standard deviations, and ranges for the eight physical measures and four self-report measures at baseline are summarized in Table I. Recommended risk cutoff values are included for all variables except the acculturation scores. Mean scores for the sample that are outside the recommended values are indicated by an asterisk, and the percentage of women in the sample who had scores outside these recommended values

is also included. At baseline, mean values for BMI, waist circumference, total cholesterol, HDL, and CES-D were outside recommended cutoff scores. Of note, the mean fasting blood glucose was only 5.01 mg/dL below the cutoff score of 110 mg/dL. Only 14 (6%) of the women reported smoking cigarettes.

Correlations among demographic and other variables are presented in Table II. Baseline age was significantly positively correlated with the following CVD risk factors: BMI, waist circumference, triglycerides, total cholesterol, LDL, and systolic blood pressure. Age had a weak but significant positive correlation with length of residence. Age had a significant negative correlation with American Behavioral Acculturation subscale score and a positive correlation with Russian Behavioral Acculturation subscale score and CES-D. Older women were more likely to have lower scores for American Behavioral Acculturation and higher Russian Behavioral Acculturation and depression scores.

Length of residence was not significantly related to any of the CVD risk factors. The only self-report score with which it correlated significantly was American Behavioral Acculturation. The longer women had lived in the United States, the higher their scores for American Behavioral Acculturation.

As expected, most of the CVD risk factors were significantly correlated with each other. In addition, American Behavioral Acculturation subscale scores were significantly, negatively correlated with waist circumference, Russian Behavioral Acculturation subscale scores, and CES-D scores. Women with higher American Behavioral Acculturation subscale scores had smaller waist circumference and lower Russian Behavioral Acculturation and depression scores. Russian Behavioral Acculturation subscale scores were significantly, positively correlated with BMI, waist circumference, LDL, and systolic blood pressure. Weak, but significant, positive correlations were found between CES-D and triglycerides, total cholesterol, and LDL.

FRS

The FRS ranged from 0–20 points at both baseline and Round 2. The mean of the FRS for the entire sample at baseline was 11.62±4.02. As expected, the FRS was significantly correlated with age and all CVD risk factors (Table II). The FRS also had a significant negative correlation with American Behavioral Acculturation subscale scores and significant positive correlations with Russian Behavioral Acculturation subscale and CES-D scores. The higher the FRS, the lower the American Behavioral Acculturation and the higher the Russian Behavioral Acculturation and the CES-D scores.

Twenty four percent of the sample had >1% risk of developing CHD within 10 years using the Framingham criteria; 51% had 1%–2% risk, 22% had 3%–5% risk, and 5% had >6% risk. The mean FRS at Round 2 was 11.50±4.73 points. The mean FRS did not change significantly from baseline to Round 2 for the entire group, as determined from paired comparison *t* tests (mean 0.12±2.50).

For the entire sample, a simultaneous regression analysis was performed that included baseline BMI, serum glucose, American and Russian Behavioral Acculturation subscale scores, and CES-D score as independent variables with Round 2 FRS. (LDL was not included in this regression, as it is so highly correlated with total cholesterol.) The results are shown in Table III. The model was significant ($F_{5,204}$=13.005; p<0.001) with all except serum glucose being significant independent contributors to FRS. This model explained 22.3% of the variance in Round 2 FRS.

To examine the potential confounding effect of ethnic identity in this sample, analyses of variance were performed to identify differences in the characteristics of women who did or did not self-identify as Jewish. Although they did not differ significantly by length of residence in the United States, Jewish women were significantly older than non-Jewish women ($F_{1,216}$=29.21; p<0.001). The mean age of Jewish women was 58.87 years (SD=7.77) and the mean age of non-Jewish women was 52.92±8.14 years. In addition, Jewish women had significantly higher Russian Behavioral Acculturation and FRS scores. When added to the regression analysis for the total sample, being Jewish was a significant independent contributor to Round 2 FRS. However, when age was also included in the model the effect of being Jewish was negated and age was instead significant, indicating that the significant effect of being Jewish was a result of their being older. Because age represents a significant component of FRS, both age and being Jewish were eliminated from the final model.

DISCUSSION

This sample of midlife women from FSU had a mean FRS of 11.50, corresponding to a 1% risk of developing CHD in the next 10 years. This is lower than the mean FRS reported for women by Wilson et al.,[15] which was 8.0%. It is also lower than the mean of 4.4% reported for a sample of African-American, Native-American, and white women aged 30–74 years.[38] However, it is difficult to compare findings because both of these studies were conducted before the publication of the NCEP Adult Treatment Panel III (ATP III) guidelines and used a broader definition of CHD risk instead of the hard CHD risk categories presented in the ATP III document.

The low percentage of women who smoke in this sample may explain the lower than expected scores because the FRS formula gives a great deal of weight

to this risk factor compared with others. Little research has been published so far regarding the use of the FRS as defined in ATP III in diverse populations. A recent study conducted in Sweden[39] found that the major risk factor in a group of patients who were followed for high total FRS (using the most recent ATP III guidelines) was smoking; 80% of those with high FRS smoked. Thus, not smoking may be quite protective for the women in this sample in terms of their FRS. It is too soon to determine whether the mean score on the FRS in this study indicates that there is a lower risk for immigrants from FSU than the general population despite their dietary characteristics, cholesterol levels, and other risk factors that are generally outside recommended values.

Treatment guidelines in the ATP III also rely heavily on the number of risk factors identified, particularly for those who have two or more risk factors. The mean values for four individual CVD risk measures were found to be outside the recommended ranges (i.e., BMI, waist circumference, total cholesterol, and HDL. Also, 69 of the 84 women (82%) who stated they had been diagnosed with hypertension were taking medications, and this may account for a mean systolic blood pressure well within normal limits. The risk factors that are outside recommended levels indicate a need for lifestyle modification in the clinical setting.

In contrast to reports of other immigrant groups that identify high blood pressure as the leading risk factor,[40] obesity, dyslipidemia, and depression were most prevalent in our study. Obesity and dyslipidemia have been identified as particular problems for immigrants from FSU.[31,32] A high-fat and high-carbohydrate diet in FSU is believed to contribute to these problems.[27] Even with greater availability of foods in the United States, new immigrants from FSU tend to continue to have high-fat diets. Additional research is necessary to truly document the dietary intakes of immigrants from FSU. Whether acculturation in the United States will change these behaviors, and whether there are differences in behavioral improvements by age group, also requires additional research.

Correlations among the CVD risk factors were consistent with other reports in the literature.[8] The relationships among depressed mood and other CVD risk factors are consistent with emerging reports of depression and CHD mortality.[12] The mean score for the CES-D in this sample was 23.53, well over the expected cutoff score when screening for depression in normative US community samples. This finding has been noted in other samples of women from FSU as well.[23] Additional research is needed to determine whether 16 is an appropriate cutoff point for women from FSU. Despite recent findings regarding the association between depression and heart disease, depression is not included in the FRS formula. The effect of

Table II. Correlations Among Baseline Demographic, Self-Report, Physical Measures, and Framingham Risk Scores (FRS)

	Age	Time	BMI	Waist	TRG	Cholesterol	HDLC	LDLC	Serum Glucose	Systolic BP	American BA	Russian BA	CES-D
Residence	0.160*												
BMI	0.198**	0.086											
Waist circum	0.279**	0.062	0.887**										
Triglycerides	0.231**	−0.007	0.335**	0.386**									
Cholesterol	0.217**	−0.005	0.172*	0.157*	0.444**								
HDLC	−0.058	−0.003	−0.317**	−0.389**	−0.381**	0.075							
LDLC	0.197**	0.004	0.206**	0.200**	0.345**	0.941**	−0.174*						
Serum glucose	0.066	0.074	0.279**	0.332**	0.230**	0.151*	−0.224**	0.201**					
Systolic BP	0.417**	0.089	0.380**	0.459**	0.355**	0.282**	−0.125	0.242**	0.267**				
American BA	−0.353**	0.313**	−0.059	−0.146*	−0.111	−0.084	0.057	−0.090	−0.101	−0.112			
Russian BA	0.375**	0.114	0.252**	0.340**	0.120	0.116	−0.117	0.143*	0.055	0.275**	−0.361**		
CES-D	0.233**	−0.105	0.032	0.080	0.159*	0.162*	−0.033	0.145*	0.041	0.060	−0.254**	0.121	
FRS	0.738**	0.066	0.320**	0.383**	0.451**	0.495**	−0.245**	0.507**	0.193**	0.576**	−0.325**	0.386**	0.198**

BMI=body mass index; TRG=trigl acculturation score; CES-D=Center for Epidemiological Studies Depression Scale; circum=circumference; *significant at p=0.05; **significant at p=0.01

Table III. Multiple Regression of Round 2 Framingham Risk Scores on Cardiovascular Disease Risk Factors and Acculturation (N=218)

Risk Factor	β	*P*
Body mass index	0.182	0.006*
Serum glucose	0.090	0.16
American BA	−0.196	0.004*
Russian BA	0.213	0.002*
CES-D	0.147	0.021*
R^2	0.242	
Adjusted R^2	0.223	
$F_{5,204}$	13.005	0.000*

BA=behavioral acculturation score; CES-D=Center for Epidemiological Studies Depression Scale; *significantly different from baseline

the high level of depression found in our sample may not be adequately represented in their risk profiles.

Correlation between the two behavioral acculturation subscales and physical measures has not been reported previously in the literature. Most studies of acculturation and health in immigrants use length of residence as a proxy for acculturation or use scales that rely heavily on language acquisition. The subscales used in this study emphasize behavior and suggest that, contrary to some other ethnic groups, women from FSU may decrease their risk for CHD as they make changes that reflect a more American lifestyle. Similar findings from Australia also suggest that the acculturation process and immigrant and host country factors lead to different results across ethnic groups.[24] Further research needs to be done to elucidate what those behavior changes might be (e.g., food choices or ingredients, physical activity, access to health care).

Although length of residence was significantly correlated to American Behavioral Acculturation subscale score (the longer length of residence in the United States, the higher the American Behavioral Acculturation subscale score), it was not correlated significantly to Russian Behavioral Acculturation subscale score. In addition, age was significantly correlated with both behavioral acculturation subscales—older women had lower American Behavioral Acculturation scores and higher Russian Behavioral Acculturation scores in spite of the significant relationship between age and length of residence. As noted consistently in the literature, language acquisition and changes in lifestyle such as food preference and preparation are much more difficult for older adults. The older people are at time of immigration, the more likely they are to remain more aligned with their native culture than to the new culture. In the United States, ethnic groups bring characteristic cultural attitudes, behaviors, and language patterns, but even these are modified in a new environment. New immigrants acculturate not only to the new cultural characteristics but may also acculturate to the way their previous culture is transformed and experienced in the host country. It is clear that the two subscales do not merely measure opposite points on a single continuum.

Nursing Implications

The FRS offers a method of quantifying risk from measurements commonly gathered in clinical settings, and the ATP III provides guidelines for lifestyle as well as medication treatment that focuses on reducing risk factors. Consumer-centered online forms are available to assist people in calculating FRS, and these can be recommended and used by nurses as a foundation for discussing behavior strategies to improve CVD health with patients and clients. It is important to note that the use of the FRS does not reduce the importance of considering other factors, such as body composition or depression, that are not included in the calculations but contribute to CVD in immigrant populations.

The contribution of behavioral acculturation to the FRS is of particular interest to nursing and has important implications for clinical and community settings. The study findings suggest that nurses must focus screening and intervention efforts on older immigrant women who are relatively isolated from mainstream US society and who tend to maintain strong ties to their native culture. Within the context of maintaining ethnic identity in a multicultural milieu, interventions may take the form of dietary and physical activity programs, stress management and family counseling, and assistance with language and specific skills (e.g., shopping, transportation, access to health care) that are necessary during the transition to American daily life. Even those with adequate English in social situations may find their ability to communicate breaks down when under stress or if the topic is unfamiliar, such as illness. Adequate translation and interpretation services are essential to ensure understanding.

Food preferences, which may influence blood pressure, lipids, glucose level, and obesity, are often determined by food availability in one's native country and ethnic customs. Community-based classes might be designed to teach women to substitute more healthful ingredients in traditional recipes. Physical activity programs that integrate traditional Russian exercises with aerobic and weight training might be conducted in Russian and English, using both Russian and American music to add bicultural themes. A large proportion of our sample has Jewish ethnic roots that influence these risk factors, as their diets are high in saturated fat, carbohydrates, and salt. Differences may also exist between non-Jewish women who emmigrated from large cities and tend to have marital or community connections to Russian-Jewish culture, as in our sample, and those who represent a recent wave of Russian immigrants who do not have those ties.

Attention to the high depression level in the study sample is imperative. Interventions directed toward reducing the effects of individual and family stressors are harder to implement in busy health care settings, but stress management and family or group counseling around specific adjustment issues might be useful. Acculturation issues might be incorporated into health behavior interventions as well. Efforts to reduce isolation and increase sense of belonging and language competence may contribute to decreasing the depression and demoralization that have been documented in this and other immigrant populations. Culturally tailored nursing interventions to reduce CVD risk factors can provide a context for enhancing the transition for new immigrants.

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