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Socioeconomic factors, immigration status, and cancer screening among Mexican American women aged 75 and older

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Abstract

To explore the association between socioeconomic factors and acculturation with cancer screening methods, we analyzed data from the Hispanic Established Population for the Epidemiologic Study of the Elderly, on 1,272 women aged 75 and older residing in the United States in 2004-2005. We found that lower Pap smear or mammography uses were associated with older age, lower education, and having public health insurance compared to private. Other factors associated with mammography use were depressive symptoms, cognition and functional limitations. In sum, socioeconomic factors and health insurance coverage determine cancer screening utilization in very old Mexican American women but not acculturation.

Keywords

Mammography; Pap Smear; Hispanic EPESI; Older Women; Cancer Screening

Hispanic American women have the highest invasive cervical cancer incidence rates of any group other than Vietnamese American women (American Cancer Society, 2009; Parker, Davis, Wingo, Ries, & Heath, 1998). Underutilization of Pap smear screening in this population is the main factor related to higher mortality from cervical cancer among Hispanic women residing in the United States (US) (Parker, et al, 1998) or Latin America as well as women residing in developing countries (Arrossi, Sankaranarayanan & Parkin, 2003; Sankaranarayanan, Budukh & Rajkumar, 2001). On the other hand, even though Hispanic women have lower rates of breast cancer compared to non-Hispanic white women or black women, breast cancer is the leading cause of cancer death among Hispanic women (American Cancer Society, 2009; Parker et al., 1998). Similarly, underutilization of a mammography for screening is also a crucial factor for late detection of breast cancer among Hispanic women residing in the US (Parker, et al, 1998) or Latin America as well as women residing in developing countries (Robles & Galanis, 2002; Bosetti, Malvezzi, Chatenoud, Negri, Levi & La Vecchia, 2005).

Overall, older Hispanic women have higher incidence rates of cervical cancer but lower incidence rates of breast cancer than older non-Hispanic white women in the US. Indeed, Hispanic women aged 65+ have higher incidence rates of cervical cancer than women of the same age from any other ethnic group (SEER, 2006). By contrast, Hispanic women aged

65+ have lower incidence rates of breast cancer than older white and black women but higher rates than American Indian and Pacific Islander origin women. Finally, older Hispanic women have lower screening rates than other ethnic groups in the US (Wu, Black, Freeman, & Markides, 2001). Factors related to the lower rates of screening services utilization among older Hispanic women include poverty, lack of insurance, low education, limited access to health care, acculturation levels and barriers related to language, culture, and negative provider attitudes (Wu et al., 2001; Suarez, Ramirez, Villarreal, Marti, McAlister, Talavera, Trapido & Perez-Stable, 2000; Coughlin & Uhler, 2002; Randolph, Freeman, & Freeman, 2002; Peek, 2003; Rodriguez, Ward, & Perez-Stable, 2005; Palmer, Fernandez, Tortolero-Luna, Gonzales, & Dolan Mullen, 2005; Valdez, Banerjee, Ackerson, Fernandez, Otero-Sabogal & Somkin, 2001; Zambrana, Breen, Fox, & Gutierrez-Mohamed, 1999; Kagay, Quale, & Smith-Bindman, 2006; Reyes-Ortiz, Freeman, Peláez, Markides, & Goodwin, 2006; Reyes-Ortiz, Camacho, Amador, Velez, Ottenbacher & Markides, 2007); however, most studies are focused on adult Hispanic women and there are not studies related to cancer screening utilization in the very old Hispanic women (75+). In 2000, people of Mexican origin were the largest Hispanic group United States, representing 59% (21 million) of the country's total Hispanic population (United States Census Bureau, 2004).

The objective of the authors was to explore the association between socioeconomic factors, and acculturation levels with Pap smear and mammography use among older Mexican American women aged 75 years and older. The hypotheses are, first, that women with low socioeconomic status (SES) tend to have lower screening rates compared to women with high SES, and second, that older women who are US born tend to have higher cancer screening use rates than foreign born.

Method

Data set and sample

The Hispanic Established Population for the Epidemiologic Study of the Elderly is a community based study that originally included 3,050 (1,758 women) Mexican Americans aged 65+ at the 1993-94 baseline survey. The sample was designed to be representative of approximately 500,000 older Mexican Americans living in five southwestern states including California, Arizona, New Mexico, Colorado, and Texas (Markides, Rudkin, Angel, & Espino, 1997). The study protocol was approved by the University of Texas Medical Branch Institutional Review Board, and written consent forms were obtained from each participant. The surviving cohort at Wave 5 in 2004-2005 includes 741 women (from a total of 1,167 persons) aged 75+. Also, at Wave 5 a new representative cohort of 531 women (from a total of 902 persons) aged 75+ from the same region was added to the original cohort. A total sample for this analysis includes 1,272 women aged 75+.

Measures

Our conceptual model is a modification of the Behavioral Model of Health Services Utilization (Andersen, 1995), and proposes that cancer screening utilizations (as health outcomes) are determined by predisposing characteristics of individuals and their environments (age, marital status, education, country of birth, and language preference- as measure of acculturation); factors that enable or impede utilization (income, financial strain, health insurance, functional status, cognitive status, and affective status); and perceived and/or evaluated need for health services (comorbidity, and history of cancer).

Outcomes

The outcomes were mammography use and Pap smear use (yes/no) during the two years prior to the interview.

Independent Variables

Socioeconomic variables included education (0-5 years vs. >5), total annual household income (<\$10,000 vs. ≥\$10,000), health insurance (none, public (Medicare or Medicaid) or private (HMO), and financial strain (difficulty in meeting monthly bills, yes/no). Acculturation refers to the process by which immigrants adopt the attitudes, values, customs, beliefs, and behaviors of their new culture. Among Hispanic immigrants to the US, these changes may include increases in smoking, obesity, and alcohol intake and decreases in dietary quality and physical activity (Lara, Gamboa, Kahramanian, Morales & Bautista, 2005). As a proxy measure of acculturation we included place of birth (foreign or the US), and language at interview (Spanish or English). We created these three categories for acculturation measure: foreign born (the less acculturated); US born & Spanish; and US born & English. Other demographic variables included age and marital status. A variable was created to distinguish the old versus the new cohort.

Medical conditions were assessed asking participants if they had ever been told by a doctor that they had diabetes, heart attack, stroke, and hypertension. A summary score was created, from 0 to 4; and dichotomized as 0-1 vs. ≥2. Cancer was used as separated variable (yes/no). Functional status was assessed by ten Instrumental Activities of Daily Living (IADL) items (range 0-10), included use the telephone, drive the car or travel alone, go shopping for groceries or clothes, prepare own meals, do light housework, take own medicine, handle own money, do heavy work around the house, walk up and down stairs, and walk half a mile. IADL was dichotomized as 0-3 vs. ≥4 (Fillenbaum, 1985). Depressive symptoms were measured by the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977), (range 0-60), and dichotomized as “depressed” (≥16) vs. “non-depressed” (<16). Cognitive function was assessed with the Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975), (range 0-30), and dichotomized as ≥18 vs. >18.

Data Analysis

We used the Chi-square/ Fisher test to assess bivariate associations between the outcomes (mammography or Pap smear use) and other variables. A graphics was used to describe the distribution of percentages of the outcomes by age and health insurance status. Multivariate logistic regression analyses were used to test the association between the outcomes with the independent variables. All analyses were performed using the SAS System for Windows, version 9.1.3 (SAS Institute, Inc., Cary, NC), significance level was set at $p < 0.05$, two-tailed.

Results

Table 1 shows the study population. A quarter ($n=316$; 25%) was aged 85+. Half of the population ($n=651$; 51%) had up to 5 years of education, 27% ($n=347$) were married, 46% ($n=590$) had income <\$10,000/ year, 56% ($n=711$) reported financial strain, 4% ($n=52$) were uninsured and 43% ($n=550$) were foreign born. A third ($n=402$; 32%) of women had 2 or more medical conditions, 7% ($n=84$) had cancer, 50% ($n=637$) had 4 or more IADL limitations, 22% ($n=271$) had high depressive symptoms, and 29% ($n=365$) had a MMSE of 18 or less.

Figure shows the percentage of screening methods by age and insurance categories. There is an association of insurance status with both Pap smear ($p=0.0025$) and mammography use ($p=0.0019$) at age 75-79, where being uninsured had the lowest percentages of screening and being on private insurance had the highest. In the other groups, there was only effect on mammography use ($p=0.0200$) at age 80-84, and no effect at age 85+. When comparing the uninsured group to the insured group (public or private), uninsured participants tend to be

younger (<85 yr vs. 85+, $p=0.0419$), foreign born (vs. US born Spanish or English speaking, $p=0.0019$), part of the new cohort (containing more recent immigrants, $p=0.0054$), and in the lower income category ($p=0.0002$).

Table 2 shows the prevalence of Pap smear and mammography use according to sociodemographic and health variables. Women with higher Pap smear prevalence were younger, married, highly educated, with higher income, without financial strain, on private insurance, with lower number of functional limitations, with high MMSE score, and from the new cohort. Women with higher mammography prevalence were younger, married, highly educated, with higher income, without financial strain, on private insurance, with lower number of functional limitations, with cancer or with a higher number of medical conditions, and with high MMSE score. Thus, main factors associated with both Pap smear and mammography use in bivariate analyses were predisposing factors such as age and education, enabling factors such as income, financial strain, health insurance, functional status, and cognitive status, and health needs perception factors such as history of cancer.

Table 3 shows the multivariate logistic regression analyses for predictors of Pap smear and mammography use among older Mexican American women. Lower Pap smear use was associated with older age (85+ vs. 75-79), lower education (<5 yr. vs. ≥ 5), financial strain, and having public health insurance compared to private. Lower mammography use was associated with older age (80-84 or 85+ vs. 75-79), lower education, lower income (<10,000/ yr vs. $\geq 10,000$), having public health insurance compared to private, having 4 or more instrumental activities of daily living limitations, or having a low MMSE score. In contrast, higher mammography use was associated with having history of cancer, and higher depressive symptoms. Immigration status and language use were not associated with either Pap smear or mammography use. Thus, main factors associated with mammography use in multivariate analyses were predisposing factors such as age and education, enabling factors such as income, health insurance, functional status, depressive symptoms and cognitive status, and health needs perception factors such as history of cancer. By contrast, factors associated with Pap smear use in multivariate analyses were only predisposing factors such as age and education, and enabling factors such as financial strain and health insurance.

Discussion

In this study we explored the relationship between socioeconomic factors and acculturation with cancer screening utilization among Mexican American women aged 75+. According to our conceptual model, predisposing characteristics of Mexican American older women such as age and education have influences on both Pap smear and mammography use; enabling factors such as insurance and socioeconomic status (income or financial strain) have influences on both Pap smear and mammography use; however, other enabling factors such as functional status, depressive symptoms and cognitive status have an influence on mammography use but not on Pap smear use.

General guidelines for Pap smear use state that women who have an intact cervix and who are in good health should continue cervical cancer screening until age 70; however, cancer screening after age 70 is recommended for women in good health who have not been previously screened, women for whom information about previous screening is unavailable, and for whom past screening is unlikely (Smith, Cokkinides, Brooks, Saslow & Brawley, 2010). We have an overall prevalence of 37% ($n=454$) for Pap smear in women aged 75+ in the past 2 years. In a predominantly white population (79%, $n=1,693$; 8%, $n=171$ were Hispanic women), women aged 70+ had a prevalence of 77% ($n=1,659$) for a Pap smear in the past 3 years (Walter, Lindquist, & Covinsky, 2004). In a population of Mexican

American women aged 50-74; there was a prevalence of Pap smear for 64% (n=289) in the past two years (Randolph et al., 2002).

For mammography use, no specific upper age has been established. The decision to continue mammography screening should be individualized based on the potential benefits and risks of screening in the context of health status and estimated longevity (Smith et al., 2010; Walter & Covinsky, 2001; Kapp, Lemaster, Zweig & Mehr, 2008). In our study we have an overall prevalence of 49% (n=599) for a mammography; while the Medicare Current Beneficiary Survey has a prevalence of 27% (n=628) for a mammography in the last 2 years among women 75+ (Blustein & Weiss, 1998); however, their data were collected when just Medicare instituted biennial coverage for screening mammography for older women. In another study, 78% (n=3,115) of women aged 70+ had a mammography in the past 2 years (Walter et al., 2004). By age groups, women in our study tend to have lower breast cancer screening rates than in other studies. Our prevalence for a mammography was 48% (n=176) for age 80-84 and 33% (n=100) for age 85+, while the prevalence was of 58% (n=302) and 40% (n=145) in the National Health Interview Survey during 2000 (Schonberg, McCarthy, Davis, Phillips, & Hamel, 2004), and 54% (n=410) and 42% (n=319) in the Asset and Health Dynamics among the oldest old (AHEAD) study during 2000 (Ostbye, Greenberg, Taylor, & Lee, 2003) respectively for those age ranges.

Having private insurance was an important predictor for both Pap smear and mammography use in this study and agrees with other studies (Blustein, 1995; Ostbye et al., 2003; Rodriguez et al., 2005; Reyes-Ortiz et al., 2006; Reyes-Ortiz, Velez, Camacho, Ottenbacher, & Markides, 2008). In another study, lack of insurance coverage was associated with low utilization rates for Pap smear and a mammogram among young Latinas in California (Rodriguez et al., 2005). Older women from the AHEAD study (white and black population), where nearly all participants were insured by Medicare, those who had additional private insurance were more likely to have a Pap smear or a mammogram in the last two years (Ostbye et al., 2003). Similarly, women aged 65+ having Medicare coverage but lacking supplemental health insurance were less likely to undergo mammography (Blustein, 1995).

In our study, there was not an effect of nativity status or language use at the interview – as measure of acculturation - on Pap smear or mammography use; in agreement with another study (Borrayo & Guarnaccia, 2000), but in disagreement with other studies (Goel et al., 2003; Rodriguez et al., 2005; Tsui, Saraiya, Thompson, Dey, & Richardson, 2007). At younger ages, foreign-born Hispanic women had the highest rates of never being screened with mammography and Pap smears when compared with US-born Hispanic women and non-Hispanic white women (Rodriguez et al., 2005). In a predominantly younger sample (79% n=25,599 aged <60 years), foreign-born Hispanic women were less likely to report cervical cancer screening than US-born Hispanic women (Goel et al., 2003).

Our findings that lower education level and financial strain or low income was associated with lower Pap smear or mammography use agree with other studies (Rodriguez et al., 2005; Ostbye et al., 2003; Schonberg et al., 2004; Reyes-Ortiz et al., 2007). Our findings where history of cancer, IADL limitations or lower cognition was associated with lower odds for a mammography also agree with other studies (Caplan & Haynes, 1996; Marwill, Freund, & Barry, 1996; Blustein & Weiss, 1998; Legg, Fauber, & Ozcan, 2003; Ostbye et al., 2003; Schonberg et al., 2004).

Very old age remained an important factor for lower cancer screening use in our study and agrees with other studies including older women (Mandelblat et al., 1999; Randolph et al., 2002; Reyes-Ortiz et al., 2006, 2008). According to Blustein and Weiss (1998), older

women are less likely to be screened because of women's preferences (low interest in potentially life-prolonging medical procedures), access factors (fewer resources or social support), or physician's behaviors (less offer of procedures to the oldest old). According to Ostbye et al. (2003), the age-related pattern of decline for screening might be explained by other physicians' factors such as considering weak recommendations and little evidence of effect of screening in older women, or diminishing importance of finding asymptomatic disease in participants with established illness. In addition, randomized controlled trials do not provide evidence for or against screening mammography in women who are 75+ because older women are not included in the trials (Walter, Lewis, & Barton, 2005).

This study has some limitations. Data on mammography use and Pap smear use were self-reported, and we could not distinguish between screening and diagnostic procedures. Our cross-sectional analyses could not establish causal order between certain variables and screening use. Also, income information was incomplete and we kept an additional category for missing values. However, we used other socioeconomic measures such as education and financial strain that are usually well correlated to income or other socioeconomic measures. On the other hand, our study may help to understand that even in the very old population socioeconomic barriers may affect screening utilization. Having public insurance is not enough to get a screening method, and indicating that access to health care is a complex issue in the very old population. In addition, the recent economic recession may make worst the influence of health insurance status or other SES factors on screening utilization in these Mexican American women and perhaps in other underserved populations (Lavarreda, Brown, Cabezas & Roby, 2009).

In conclusion, socioeconomic deprivation (low income or education, and financial strain), health insurance coverage, functional status or cognitive and affective problems determine screening utilization in very old Mexican American women but not acculturation. Further studies need to explore the influence of insurance status coverage and other socioeconomic factors on cancer screening utilization among older women in Latin American countries or other world areas.

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Table 1

Study population, Mexican American women aged 75 and older, United States, 2004-2005 (N=1,272)

Variables	n (%)
Age (years)	
75-79	578 (45.4)
80-84	378 (29.7)
85+	316 (24.8)
Marital status	
Married	347 (27.3)
Unmarried	922 (72.7)
Education	
0-5	651 (51.2)
>5	621 (48.8)
Income	
< \$10,000/ year	590 (46.4)
≥ \$10,000/ year	495 (38.9)
Unknown	187 (14.7)
Financial strain	
Yes	711 (55.9)
No	561 (44.1)
Health insurance	
None	52 (4.1)
Public (Medicare or Medicaid)	938 (73.7)
Private (HMO)	282 (22.2)
Nativity and language use	
Foreign born	550 (43.3)
US born Spanish speaking	504 (39.6)
US born English speaking	217 (17.1)
Medical conditions	
0-1	870 (68.4)
≥ 2	402 (31.6)
Cancer	
Yes	84 (6.6)
No	1188 (93.4)
IADL limitations	
0-3	635 (49.9)
≥ 4	637 (50.1)
CESD	
< 16	939 (77.6)
≥ 16	271 (22.4)
MMSE	
> 18	907 (71.3)

Variables	n (%)
≤ 18	365 (28.7)
Cohort	
New	531 (41.8)
Old	741 (58.2)

IADL= Instrumental Activities of Daily Living

CESD= Center for Epidemiologic Studies Depression Scale

MMSE= Mini-Mental State Examination

Table 2

Prevalence of Pap smear and mammography in the previous 2 years among Mexican American women aged 75 and older, United States, 2004-2005

	Pap smear n (%) N=1,221	p-value	Mammography n (%) N=1,229	p-value
Overall prevalence	454 (37.2)		599 (48.7)	
Age (years)				
75-79	242 (43.4)	<.0001	323 (57.6)	<.0001
80-84	134 (36.8)		176 (48.0)	
85+	78 (26.0)		100 (33.2)	
Marital status				
Married	147 (44.3)	0.0019	183 (54.5)	0.0151
Unmarried	307 (34.6)		416 (46.7)	
Education (years)				
0-5	194 (31.1)	<.0001	262 (41.7)	<.0001
>5	260 (43.5)		337 (56.1)	
Income				
< \$10,000/ year	189 (33.1)	0.0154	248 (43.4)	<.0001
≥ \$10,000/ year	201 (41.7)		274 (56.4)	
Unknown	64 (38.1)		77 (45.0)	
Financial strain				
Yes	229 (33.1)	0.0007	320 (46.1)	0.0357
No	225 (42.5)		279 (52.1)	
Health insurance				
None	19 (38.8)	<.0001	22 (44.9)	<.0001
Public (e.g., Medicare or Medicaid)	304 (33.6)		410 (45.0)	
Private (e.g., HMO)	131 (48.9)		167 (62.1)	
Nativity and language use				
Foreign born	179 (34.2)	0.1172	244 (46.1)	0.2419
US born Spanish speaking	187 (38.6)		245 (50.2)	
US born English speaking	88 (41.7)		110 (52.1)	
Medical conditions				
0-1	305 (36.6)	0.5474	388 (46.5)	0.0204
≥ 2	149 (38.4)		211 (53.5)	
Cancer				
Yes	37 (46.8)	0.0664	53 (67.1)	0.0007
No	417 (36.5)		546 (47.5)	
IADL limitations				
0-3	269 (43.4)	<.0001	361 (58.0)	<.0001
≥ 4	185 (30.8)		238 (39.2)	

	Pap smear n (%) N=1,221	p-value	Mammography n (%) N=1,229	p-value
CESD				
< 16	359 (39.0)	0.1332	456 (49.4)	0.8226
≥ 16	86 (33.9)		129 (50.2)	
MMSE				
> 18	364 (40.8)	<.0001	487 (54.5)	<.0001
≤ 18	90 (27.3)		112 (33.4)	
Cohort				
New	212 (41.2)	0.0123	267 (51.7)	0.0723
Old	242 (34.2)		332 (46.6)	

IADL= Instrumental Activities of Daily Living

CESD= Center for Epidemiologic Studies Depression Scale

MMSE= Mini-Mental State Examination

Table 3

Multivariate logistic regression analyses, predictors of Pap smear and mammography use in the previous 2 years among Mexican American women aged 75 and older, United States, 2004-2005

Variables	Pap smear Odds ratios (95 % CI)	Mammography Odds ratios (95 % CI)
Age (years)		
75-79	1.00	1.00
80-84	0.79 (0.59-1.05)	0.70 (0.53-0.92)
85+	0.55 (0.39-0.78)	0.46 (0.33-0.64)
Marital status		
Married	1.24 (0.92-1.66)	1.02 (0.76-1.37)
Unmarried	1.00	1.00
Education		
0-5	0.76 (0.57-0.99)	0.76 (0.58-0.99)
>5	1.00	1.00
Income		
≥ \$10,000/ year	1.00	1.00
< \$10,000/ year	0.93 (0.70-1.25)	0.75 (0.56-0.99)
Unknown	1.06 (0.71-1.59)	0.80 (0.54-1.20)
Financial strain		
Yes	0.69 (0.53-0.90)	0.81 (0.62-1.05)
No	1.00	1.00
Health insurance		
None	0.74 (0.38-1.44)	0.61 (0.31-1.20)
Public (Medicare or Medicaid)	0.71 (0.52-0.97)	0.67 (0.49-0.93)
Private (HMO)	1.00	1.00
Nativity and language use		
Foreign born	1.00	1.00
US born Spanish speaking	1.08 (0.82-1.43)	0.99 (0.75-1.30)
US born English speaking	0.93 (0.64-1.35)	0.83 (0.57-1.21)
Medical conditions		
0-1	1.00	1.00
≥ 2	1.03 (0.79-1.34)	1.26 (0.96-1.64)
Cancer		
Yes	1.52 (0.94-2.47)	2.27 (1.36-3.80)
No	1.00	1.00
IADL limitations		
0-3	1.00	1.00
≥ 4	0.86 (0.65-1.14)	0.65 (0.49-0.86)
CESD		
< 16	1.00	1.00
≥ 16	1.04 (0.76-1.42)	1.42 (1.04-1.94)
MMSE		

	Pap smear	Mammography
> 18	1.00	1.00
≤ 18	0.84 (0.61-1.17)	0.62 (0.45-0.86)
Cohort		
New	1.24 (0.96-1.59)	1.15 (0.90-1.48)
Old	1.00	1.00

CI= confidence intervals

IADL= Instrumental Activities of Daily Living

CESD= Center for Epidemiologic Studies Depression Scale

MMSE= Mini-Mental State Examination