

**PREVALENCE OF MELASMA AMONG PREMENOPAUSAL LATINO
WOMEN IN DALLAS AND FORT WORTH, TX, USA**

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PREVALENCE OF MELASMA AMONG PREMENOPAUSAL LATINO WOMEN IN
DALLAS AND FORT WORTH, TX, USA

By

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DISSERTATION

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By

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ABSTRACT

PREVALENCE OF MELASMA AMONG PREMENOPAUSAL LATINO
WOMEN IN DALLAS AND FORT WORTH, TX, USA
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The University of Texas Southwestern Medical Center at Dallas, 2006

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Background: The prevalence of melasma in Latino women is unknown.

Objective: The purpose of this study was to develop a valid instrument for determining the presence of melasma in Latino women and to administer this instrument by telephone to premenopausal Latino women living in Dallas-Fort Worth, Texas.

Methods: A questionnaire to investigate rates of self-reported melasma was developed and validated. This questionnaire was used to interview 500 premenopausal Latino women by telephone.

Results: The questionnaire was found to have a sensitivity of 93% and a specificity of 82%. The prevalence of melasma in 500 premenopausal Latino women was 8.8%.

Spanish as a primary language was found to be an important risk factor for self-reporting melasma.

Conclusion: Melasma is common among premenopausal Latino women in the Dallas-Ft. Worth area, especially among Spanish-speakers. A validated English and Spanish instrument has been developed which can be used to determine the prevalence of melasma.

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PRIOR PUBLICATIONS AND PRESENTATIONS

Werlinger KD, Moore AY. Eumycotic mycetoma due to *Cladophialophora bantiana* in a patient with systemic lupus erythematosus. J Am Acad Dermatol. 2005;52:S114-7.

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Werlinger KD, Upton GU, Moore AY. Recurrence rates of primary nonmelanoma skin cancers treated by surgical excision compared to electrodesiccation-curettage in a private dermatological practice. Dermatol Surg 2002;28:1138-1142.

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CHAPTER ONE

Introduction

Melasma is an acquired disorder of facial hyperpigmentation which is most commonly observed in brown-skinned women. The appearance of these symmetric light-to gray-brown macules and patches, typically observed in the centrofacial, malar, or mandibular areas, is often associated with change in hormonal status, such as that experienced during pregnancy, menopause, or use of oral contraceptives.¹ Other possible etiologies include genetic influences, UV light exposure, cosmetics, and phototoxic and anti-seizure medications.¹ The disorder is worsened by ultraviolet light exposure, which contributes to the challenge of treating these patients.^{2,3} As with other disorders of pigmentation, patients with melasma may experience significant psychological distress, which improves with treatment.^{4,5}

Although melasma is usually described as a “common” disorder, information about its prevalence is limited. Previous studies have determined prevalence rates of melasma among patients presenting to dermatology and general medical clinics.⁶⁻¹² The prevalence in the general population is unknown. Dallas and Fort Worth (DFW) are two cities in North Texas that are approximately 30 miles apart. The combined population of the DFW metropolitan area is 5.6 million, with a large percentage of Latinos. The purpose of this study was to determine the prevalence of melasma in premenopausal Hispanic women in the DFW area.

CHAPTER TWO

Methods

Validation of the questionnaire

The accuracy of self-reported melasma by telephone interview was determined in an initial study approved by the University of Texas Southwestern Medical Center Institutional Review Board. Thirty Latino women with melasma and 30 without melasma were recruited from visitors to a general outpatient clinic in a predominantly Latino neighborhood in Dallas. The patients were examined for the presence or absence of melasma during a blood pressure and pulse measurement. The patient's skin was not discussed during this visit, and they were informed that a follow-up phone call would be made later. The patients were then contacted by phone two to three weeks later by an independent investigator and asked a series of questions in order to determine their ability to self-diagnose melasma (Table I). Question 8 was crucial in helping to identify patients who had pigmentation on their skin due to a cause other than melasma, and question 9 helped to eliminate patients with very mild melasma that was not detectable by exam.

Administration of the questionnaire

The potential subject pool was generated by random selection of telephone numbers associated with Spanish surnames in the designated zip codes for Dallas and Fort Worth, Texas. Bilingual personnel interviewed subjects using the questions in Table I until 500

interviews had been completed.

In order to collect data from a uniform population, only women who identified their origin as Mexican, Guatemalan, Salvadoran, or Honduran were included in the study. Subjects were 18 years or older, and they were still menstruating in order to collect data from typically affected females. If more than one eligible female were present in the household, the subject with the most recent birthday was interviewed.

Statistics

Cross tables and Mantel-Haenszel analyses were performed with the Frequency procedure of SAS software for Windows (SAS Institute, Cary, NC, Version 9.1). *P* values are two-tailed with significance defined at the 0.05 level.

CHAPTER THREE

Results

Validation of the questionnaire

Twenty-eight of the 30 patients with melasma and 28 of the 30 patients without melasma were contacted by telephone 2-3 weeks after the initial examination. Two patients in each group could not be reached after multiple attempts. Twenty-six out of 28 patients with melasma stated they did indeed have melasma at the conclusion of the telephone interview, yielding a sensitivity of 93%, while 23/28 patients without melasma stated they did not have melasma, yielding a specificity of 82%. Ninety-five percent of the subjects in the validation study were Spanish-speaking only. Seventy-five percent reported that they did not wear makeup during the initial examination.

Administration of the questionnaire

A total of 4,607 telephone numbers were called; the response rate was 42.1%, taking into account both eligible and non-eligible numbers. Of the 500 qualified subjects interviewed by telephone, 423 (84.6%) preferred to be interviewed in Spanish. The overwhelming majority identified their origin as Mexican (n = 474, 94.8%). Twenty-one (4.2%) subjects were Salvadoran, 3 were Guatemalan (0.6%), and 2 were Honduran (0.4%). The mean age was 31 years (SD = 7.98).

Although 16.4% of the subjects initially stated that they had melasma, further

questioning, especially questions 6, 8 and 9, reduced the prevalence rate to 8.8% (Table II). This prevalence rate includes only women who stated that

- (1) they had melasma at the time of the telephone interview (question 6),
- (2) they were certain they had melasma versus another skin disorder (question 8),
and
- (3) their melasma was visible to others (question 9).

Four percent of subjects reported that they actually had visible melasma in the past, but did not have it at the time of the interview (question 6).

The distribution of reported melasma by demographic characteristics is summarized in Table III. The prevalence of melasma was found to be higher in subjects over 30 than those 29 and younger ($P < .01$). Respondents were more likely to report having melasma if they lived in Dallas ($P < .0001$) and chose to conduct the interview in Spanish ($P < .0001$). Country of origin did not affect the likelihood of melasma self-diagnosis ($P = .49$).

Distribution of demographic characteristics by city of residence is found in Table IV. Subjects in Dallas and Ft. Worth were not found to differ in terms of age or country of origin. However, Dallas residents were significantly more likely to choose Spanish as the preferred language for the telephone interview ($P < .0001$).

In Table V, the relative effects of language and city of residence on prevalence of melasma are compared. In Spanish-speakers, Dallas subjects had 2.49 times greater risk of reporting melasma than Ft. Worth subjects ($P < .0001$); in English-speaking subjects, Dallas residents had 4.00 times greater risk of melasma than Fort Worth subjects ($P =$

0.31). Comparing the two groups geographically, in Dallas residents, Spanish-speakers had 3.93 times greater risk of melasma than English-speakers ($P = .0015$), while in Ft. Worth subjects, Spanish-speakers had 6.82 times greater risk ($P = .017$). The Mantel-Haenszel summary relative risks indicate that Spanish-speaking preference confers much greater risk of reporting melasma (RR_{MH} , 4.56; 95% CI, 1.76 to 11.79) than city of residence (RR_{MH} , 2.35; 95% CI, 1.54 to 3.59).

CHAPTER FOUR

Discussion

There is a paucity of epidemiological data on melasma. In previous studies reporting the prevalence of skin diseases, melasma is often grouped with vitiligo and post-inflammatory hypo- and hyperpigmentation under “pigmentary disorders.” Several studies from various countries have included data on the prevalence of melasma (Table VI); however, all but one¹¹ have been conducted in patients presenting to dermatology clinics.

The reported prevalence ranges in clinical populations varies widely, from 1.8% to 33%, which most likely does not reflect the prevalence in the general population at the study sites. These dermatology clinic-based statistics may underestimate the true prevalence of melasma, since many patients with melasma may prefer self-treatment or seek treatment from estheticians and beauty salons. Likewise, these reports may overestimate the prevalence of melasma, due to the fact that many investigators were specialists in pigmentary disorders, causing affected patients to seek them out.

In the only community-based prevalence study, investigators reported the prevalence of skin disease among 3,812 subjects in the state of Guerrero, Mexico.¹¹ The prevalence of melasma was reported as 6% in rural areas and 4% in urban areas. The authors stated that the results were preliminary, and they did not provide the methodology of the data collection and analysis or skin types of the patients examined.

Because the subjects in the current study were selected from the general population of self-identified Latino households, the data presented here more accurately reflects the prevalence of melasma in premenopausal Latino women. 8.8% of the 500 subjects reported having melasma, and an additional 4% stated they had melasma in the past, which supports the general belief by dermatologists that melasma is a common disorder in Latino women.¹ As the proportion of Latinos in the United States continues to grow, greater familiarity with skin diseases common in this population will be required.¹³ The numbers of patients with melasma in other Spanish-speaking countries, particularly those in close proximity to the equator, may be even greater.

An interesting and unexpected finding was that the risk of self-diagnosed melasma was found to be higher in Dallas, where subjects were also more likely to prefer speaking in Spanish. This led to an examination of population differences between the two cities. According to 2004 census data, Dallas has more Hispanics than Ft. Worth (42% vs. 33.5%), more foreign-born residents (26.6% vs. 16.7%), and more residents who speak a language other than English in the home (43.7% vs. 30.2%). Moreover, Dallas has a greater population of recent immigrants who entered the US after 2000 (28.6% vs. 18.4%).¹⁴

The observation that Dallas Latino residents, who are more likely to be recent, Spanish-speaking immigrants, are more likely to report having melasma than Ft. Worth Latino residents, indicates that external factors may play a role in the development and course of this disease. These external factors could be physiological or cultural. For example, subjects may have had greater sun exposure in Mexico than in the United States, leading to more visible melasma in recent immigrants. Another possibility is that

sunscreen use may be more common in the United States than in Mexico, resulting in less melasma after a longer length of residence in the U.S.

Although infection is not considered to be a cause of melasma, the results here are similar to recent findings regarding *Helicobacter pylori* in Hispanics living in the U.S. Hispanic immigrants were found to have a higher prevalence of *H. pylori* than first-generation US-born Hispanics, who, in turn, demonstrated a higher prevalence of *H. pylori* than second-generation Hispanics.¹⁵ The investigators concluded that environmental factors in the United States and birth-countries probably contributed to declining *H. pylori* prevalence among successive generations of Hispanics. The finding that recent immigration to the U.S. may be associated with increased risk of melasma deserves further investigation.

The results from this study may be generalized to other premenopausal populations of Latinos; however, genetic and climate variation may cause considerable differences in the prevalence of melasma in different locations throughout the world. The climate of Dallas-Fort Worth is humid subtropical with hot summers (mean temperature 35.6°C) and mild winters (mean temperature 0.6°C).¹⁶ Plentiful sunshine and mild weather lead to significant ultraviolet exposure and subsequent melasma among the Latino population.

A limitation of this type of study is the inaccuracy inherent in self-reported data. These effects have been minimized with the validation of the questionnaire, which was demonstrated to be both sensitive and specific. Another potential problem was the difficulty in assessing the presence of melasma through cosmetic makeup in the validation study. However, the majority (75%) of the patients in the validation study did

not wear makeup during the examination, which helps to minimize inaccuracies in diagnosis. Finally, this study was limited to premenopausal women and found an increased risk of melasma with increasing age. Thus, its generalizability to postmenopausal populations is limited, as older women may be at increased risk.

Further studies in different populations are warranted in order to determine the true epidemiology of this common disorder. In addition to prevalence data, quality-of-life studies are needed in Latinos and other ethnic groups in order to determine the true burden of melasma and its affect on the life of affected patients. The instrument described in this study can be used in future investigations of melasma prevalence rates in English and Spanish speaking populations.

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Table I: Telephone questionnaire

English

1. First, would you like to continue this interview in English or Spanish?
2. Would you consider yourself White, African-American, Hispanic or Latino, Asian, or some other racial-ethnic origin?
3. More specifically, would you consider yourself Mexican, Guatemalan, Salvadoran, Honduran, or some other Hispanic origin group?
4. What is your age?
5. Have you been through menopause?
6. Do you have melasma right now, also known as mask of pregnancy?
7. Have you ever had melasma?
8. Are you sure that you don't have freckles, age spots, or spots left over from acne?
9. If someone were to see you from a few feet away without makeup, would they say you had melasma?

Spanish

1. ¿Primero, le gustaría continuar la entrevista en inglés o español?
2. ¿Usted es Caucásica, Negra, Hispana, Latina, Asiática, o de otro grupo racial?
3. ¿Específicamente, usted es mexicana, guatemalteca, salvadoreña, hondureña u otro grupo de origen hispana?
4. ¿Cuál es su edad?
5. ¿Ha pasado por la menopausia?
6. ¿Usted tiene melasma ahora, también conocido como máscara de embarazo?

7. ¿Usted alguna vez ha tenido melasma?
8. ¿Usted esta segura que no tiene pecas, manchas de la edad o manchas a consecuencia del acne?
9. ¿Si alguien podría verla a ciertos pies de distancia sin maquillaje, podría l persona decir que usted tiene melasma?

Table II. Prevalence of melasma overall and by certainty and visibility of the condition

		Total		Melasma (% of 500)		
		N	%	Never	Past, not now	Presently
All		500	100.0	71.2	12.4	16.4
Certain of melasma?						
	No	371	74.2	71.2	1.4	1.6
	Yes	129	25.8	0.0	11.0	14.8
Melasma visible?						
	No	431	86.2	71.2	7.6	7.4
	Yes	69	13.8	0.0	4.8	9.0
Certain?	Visible?					
No	No	366	73.2	71.2	0.6	1.4
	Yes	5	1.0	0.0	0.8	0.2
Yes	No	65	13.0	0.0	7.0	6.0
	Yes	64	12.8	0.0	4.0	8.8

Table III. Distribution of reported melasma by demographic characteristics

	Total		Melasma (row %)			<i>P</i>
	N	%	Never	Past, not now	Presently	
All	500	100.0	74.2	11.0	14.8	
Age Group						
10-19 yrs	26	5.2	100.0	0.0	0.0	
20-29 yrs	191	38.2	76.4	10.5	13.1	
≥30 yrs	283	56.6	70.3	12.4	17.3	0.0030
City of residence						
Ft. Worth	173	34.6	87.9	9.2	2.9	
Dallas	327	65.4	67.0	11.9	21.1	<0.0001
Preferred interview language						
English	85	15.4	94.8	0.0	5.2	
Spanish	423	84.6	70.5	13.0	16.5	<0.0001
Country of origin						
Mexico	474	94.8	74.0	10.8	15.2	
South Central America*	26	5.2	76.9	15.4	7.7	0.49

*El Salvador (21), Guatamala (3) and Honduras (2)

Table IV. Distribution of demographic characteristics by city of residence

	Total		City of Residence (column %)		<i>P</i>
	N	%	Dallas	Ft. Worth	
All	500	100.0	100.0	100.0	
Age Group					
10-19 yrs	26	5.2	5.2	5.2	
20-29 yrs	191	38.2	37.6	39.3	
≥30 yrs	283	56.6	57.2	55.5	0.76
Preferred interview language					
English	77	15.4	10.1	25.4	
Spanish	423	84.6	89.9	74.6	<0.0001
Country of origin					
Mexico	474	94.8	95.1	94.2	
South Central America*	26	5.2	4.9	5.8	0.67

*El Salvador (21), Guatamala (3) and Honduras (2)

Table V. Relative effects of language and city of residence on prevalence of melasma

Language Preferred for Interview		Dallas			Ft. Worth		RR _{MH}	
		Total	Melasma		Melasma		RR	95% CI
			No	Yes	No	Yes	95% CI	<i>P</i> _{MH}
Spanish	N	423	189	105	109	20	2.49	
	row %		64.3	35.7	84.5	15.5	1.64 - 3.77	<0.0001
English	N	77	30	3	43	1	4.00	<0.0001
	row %		90.9	9.1	97.7	2.3	0.44 - 36.75	
RR			3.93		6.82			
95% CI			1.32 - 11.68		0.94 - 49.36			
<i>P</i>			0.0015		0.017			
RR _{MH}					4.56			
95% CI					1.76 - 11.79			
<i>P</i> _{MH}					<0.0001			

RR is the prevalence relative risk; RR_{MH} and *P*_{MH} are the Mantel-Haenszel summary prevalence relative risk and its *P* value.

Table VI: Prevalence of melasma

Study & year of publication	Location	Source of subjects	Total number of subjects (Race or ethnic group)	Number of subjects with melasma (%)
Present study, 2004	Dallas-Ft. Worth, TX, USA	General population	500 (Latino)	44 (8.8%)
Castanon & Hay, 1992	Guerrero, Mexico	General population	3812 (Latino)	NP (6% rural, 4% urban)
Sanchez, 2003	New York, NY, USA	Private dermatology clinic	1000 (Latino)	82 (8.2%)
Sanchez, 2003	New York, NY, USA	Hospital dermatology clinic	2000 (Latino)	41 (4.1%)
Tomb & Nassar, 2000	Lebanon	Dermatology clinic	6822 (NP)	234 (3.4%)
Hiletework, 1998	Addis Ababa, Ethiopia	Dermatology clinic	7760 (NP)	142 (1.8%)
Parthasaradhi & Gufai, 1998	Hail, Saudi Arabia	Dermatology clinic	3298 (NP)	75 (2.3%)
Sivayathorn, 1995	Bangkok, Thailand	Dermatology clinic	679 (Asian)	224 (33.0%)
Failmezger, 1992	Cuzco, Peru	Dermatology clinic	1277 (Latino)	129 (10.1%)

NP = not provided

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