ORIGINAL RESEARCH

Sociodemographic Inequalities and Health Behaviors in the Dental and Periodontal Health

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ABSTRACT

Aim: Dental decay and periodontal diseases are very common allover the world with outcomes ranging from dental loss to systemic diseases. In this study, we aim to determine the impact of sociodemographic disparities and health behaviors on dental and periodontal health (DPH).

Materials and methods: An epidemiological study was conducted amongst 600 dental patients in two private dental clinics in the region of Marrakesh, Morocco from 2012 to 2015. Three hundred seventeen patients between 25 years and 46 years old who were contacted by telephone to carry out a supplementary survey and of these 317 patients, 82 subjects were maintained. A questionnaire was followed to assess sociodemographic disparities, self-reported oral health status, and hygiene behaviors.

Results: The age of the sample varies between 3 years and 78 years with an average of 31.2 ± 14.3 years. Also, the dominant age group is between 26 and 44 years old with a percentage of 47.6%. The distribution of the population by sex shows good equity (53.4% of men and 46.6% of women). For the educational level, 7.3% of the population is illiterate, 17.1% have a primary level, 39.0% have a high school level and 36.6% have a university level. In addition, habitation is urban at 79.3%, and rural at 20.7%. Furthermore, we note that only 28.8% of patients have a good daily toothbrushing frequency which is equal to or greater than 3.

Conclusion: Dental and periodontal health (DPH) are indeed affected by sociodemographic and economic status with higher dental problems among rural and poor people.

Clinical significance: Dental and periodontal diseases are serious problems of public health allover the world.

The lack of oral education and dental cares, particularly in developing countries and rural areas may increase these affections. The result of this study shows the implication of sociodemographic disparities and health behaviors in dental and periodontal outcomes.

This work will complement the limited knowledge of the existing interaction between sociodemographic disparities and health behaviors and dental and periodontal affections. It is also a fundamental starting of public health preventive or therapeutic strategies.

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INTRODUCTION

Affecting about 40–50% of adults in industrialized countries, tooth decay is an infectious disease due to the interaction of biological, behavioral and socioeconomic influences.[1,2]

The development of caries is multifactorial, depending on many interacting variables to promote its development especially bacteria, alimentation, the host's oral environment, and time.[3]

Periodontitis is an inflammatory disease affecting the supporting tissues of the tooth. In the general US population, studies found that minority and lower-income groups have poorer oral health.[4-6]

Moreover, healthy habits and good oral hygiene, including twice-daily toothbrushing, are important to prevent gum disease and maintain good oral health.[7]

In addition, the prevalence of less than twice tooth brushing per day is higher among people in low and middle income than in high income and also the prevalence of less than an annual dental check-up is higher among people s in developing countries.[7]

Few studies have been conducted on oral health based on the files of dental clinics patients, in particular in low and middle-income countries. Therefore, this epidemiologic study describes the DPH of a sample of dental patients, examines relationships between sociodemographic factors and (DPH), and behavioral factors and (DPH). The study involved the exploitation of 600 client files randomly selected from two private dental offices in the Marrakech region in Morocco from 2012 to 2015.

MATERIALS AND METHODS

Ethics Statement

The participants were questioned after having the full explanation of the purpose of our study and receiving their verbal consent. The consent procedure was approved

by the health ministry delegation. Also, our study has been independently reviewed and approved by the health ministry delegation. We note that we have not yet a local ethics committee because of that the health ministry delegation ensures that function. Finally, our research has been conducted in full accordance with the World Medical Association Declaration of Helsinki.

Consulting Methods

The study involved the exploitation of 600 client files randomly selected from two private dental offices in the region of Marrakesh in Morocco from 2012 to 2015.

These files contain information like name, age, sex, health status, address, phone, profession, and dental and periodontal interventions. Thereafter, we selected among them 317 files of patients between 25 years and 46 years old, who were contacted by telephone to carry out a supplementary survey. Of these 317 patients, 82 subjects were maintained. Their distribution by sex was as follows: 41 women and 41 men.

These 82 patients were interviewed using a questionnaire that includes sociodemographic information (age, sex, profession, habitation, educational level, health insurance, and socioeconomic status), height, weight, health behaviors(daily brushing frequency, type of toothbrush, brushing method, and flossing), and self-reported dental and periodontal status.

To assess the oral status of patients, we used frequencies of presence/absence of gingivitis, periodontitis, gingival bleeding, halitosis, gingival recession, tooth mobility, tooth decay, oral abscess, and tooth loss. Also, patients were categorized according to their dental status: degraded state when the number of treated teeth is greater than or equal to three and normal when the number of affected teeth is less than 3.

Age was coded into four classes (<18, 18–25, 26–45, and over 45), also the level of education has been coded into four classes (illiterate, primary, middle or high school). Professions have been classified into two categories: favored and disfavored.

Additionally, the following variables were used to assess dental hygiene:
- Daily brushing frequency with two modalities ($\geq$ 3 times/day and <3 times/day).
- Type of a toothbrush with two modalities (soft and medium or hard)
- Brushing method with two modalities (right method and another method).
- Flossing modalities (yes and no).

Finally, the body mass index (BMI) was calculated which allowed us to classify subjects into two classes (underweight or normal and overweight or obese).

Exclusion Criteria

Smoking patients and patients with general diseases were excluded from the study.

Statistical analysis

Data was entered and analyzed by statistical package for social sciences (SPSS) ver. 13.0 (Chicago, IL, USA). Independent sample t-tests were used and were considered statistically significant at *p* values below 0.05.

RESULTS

Table 1 gives a description of the population studied by sociodemographic and economic characteristics.

The age of the sample varies between 3 years and 78 years with an average of 31.2 ± 14.3 years. Also, the dominant age group is between 26 years and 44 years old with a percentage of 47.6%. The distribution of the population by sex shows good equity (53.4% of men and 46.6% of women). For the educational level, 7.3% of the population is illiterate, 17.1% have a primary level, 39.0% have a high school level, and 36.6% have a university level.

The habitation is urban at 79.3%, and rural at 20.7%.

Regarding the social system, about 46.3% have no insurance, 3.7% have RAMED*, 14.6% have CNOPS**, and 35.6% have other types of coverage.

Regarding the socioeconomic level, 71.4% of the sample was favored and 28.6% disfavored.

The body mass index calculated on the population aged between 25 and 46 shows that 1.4% of this sample

Table 1: Sociodemographic and economic characteristics of the population

Variables	Modalities	Effective	Percentage (%)
Age	<18	68	13.8
	18–25	111	22.6
	26–44	241	49.6
	≥45	72	14.6
Sex	Male	304	53.4
	Female	265	46.6
Habitation	Urban	65	79.3
	Rural	17	20.7
Level of education	Illiterate	6	7.3
	Primary	14	17.1
	High school	32	39.0
	University	30	36.6
Health insurance	RAMED	3	3.7
	CNOPS	12	14.6
	Others	29	35.4
	Without	38	46.3
Socioeconomic status	Optimal	14	28.6
	Poor	35	71.4

RAMED: A public insurance dedicated to people with poor incomes
CNOPS: A public insurance dedicated to the employees of the state
Others: private insurances

are severely underweight, 51.4% present underweight moderate, 34.8% are at a normal weight, and 12.4% are at overweight or obese.

Table 2 contains some data relating to dental hygiene.

Only 28.8% of patients have a good daily toothbrushing frequency which is equal to or greater than 3.

The study also found that 59.2% of the population uses the correct method of brushing. Furthermore, 57.0% of the population uses medium or hard toothbrushes.

Finally, only 14.1% use dental flossing.

Table 3 gives the relationship between dental hygiene factors and oral problems.

The results show that patients who brush with medium or hard brushes have more dental problems (dental mobility) than those who brush with soft toothbrushes. Also, patients who brush their teeth with the right method have less gingivitis than patients using other methods.

Graphs 1 shows the relationship between socioeconomic factors and oral problems.

No significant differences were observed depending on the sex.

The education level shows differences in dental caries with a benefit in favor of higher levels. For the professions, the differences are important mainly for gingival bleeding, which is more pronounced in the disfavored population.

DISCUSSION

The oral health study aimed to describe (DPH) and highlight the different risk factors. Based on the results, the 26–44 age group is the most group who visited the dentist.

93.9% of this age category estimated to have oral problems which often dental losses, caries, and gum bleeding. In another study involving adolescents from the Marrakesh area aged 12–18, Kaoutar et al. (2013) found a prevalence rate of caries involvement estimated at 44.1%.[8]

In addition, the study shows no significant difference in DPH according to sex which is contradictory to the study conducted by Eke et al. who found that men develop more periodontal diseases than women (56.4% *vs.* 38.4%). This high risk of developing periodontal diseases is explained by another survey which found that women are more using professional dental care and have higher oral hygiene than men.[9,10]

Inversely, women develop more dental caries than men (92.66% *vs.* 90.57%). This high caries prevalence among women is due to the earlier eruption of teeth in girls, the longer exposure to the cariogenic oral environment, better access to food supplies and snacks during pregnancy.[11]

Moreover, the results show that subjects with a level of education that does not exceed high school have a high percentage of caries compared to subjects with a higher level of education. This may be due to the awareness of educated people to the importance of oral health. It is in common with the study conducted by Vano et al. who found a positive association between the educational level and dental and periodontal status.[12]

Depending on the socioeconomic level, the disfavored class has a poorer oral health status than the favored class. This result seems logical as subjects with a high socioeconomic level have the means to take care of their general health and in particular oral health. Thus, it is similar to the study of Piovesan et al. who found that socioeconomic inequalities at individual and community levels are major determinants for the occurrence of the oral diseases, and Chung et al. who found that people with disadvantaged circumstances had a significant proportion of dental disease.[13,14]

In addition, the results show a higher average of dental caries in rural people than urban people. Rural living is related to poverty, illiteracy, poor dental status and no health insurance coverage. These factors have an impact on oral health care, service delivery, and research.[15-17]

Furthermore, the study shows no significative differences in oral health between different (BMI) classes, contrarily to previous studies which found that increased BMI has been associated with increased gingival bleeding.[18]
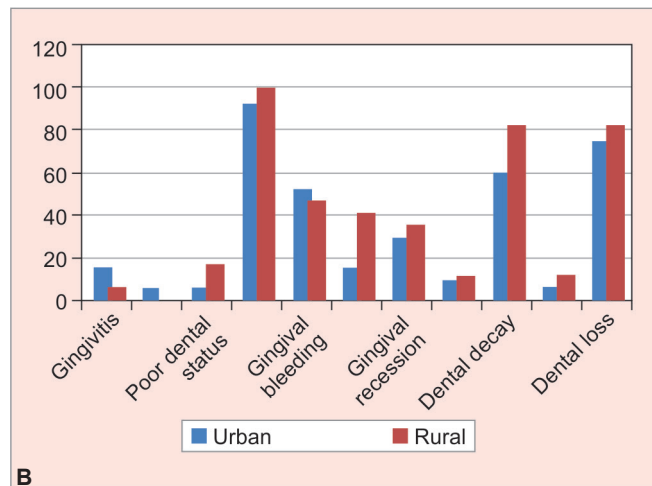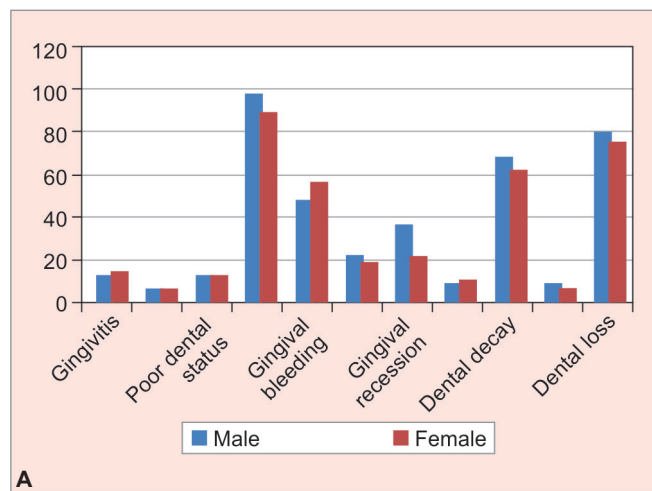
Table 2: Characteristics of health behaviors in the population

Variables	μ ± σ	Modalities	Effective	%
Daily brushing frequency	1,96 ± 0,82	> = 3 times/day	21	28.8
		< 3 times/day	52	71.2
Type of toothbrush		Soft	30	42.3
		Medium	36	50.7
		Hard	5	7.0
Brushing method		The right method	42	59.2
		Othermethod	29	40.8
Flossing		Yes	11	14.1
		No	67	85.9

Table 3: The relationship between hygiene and oral problems

Factors	Modalities	Gingivitis (%) N = 600		Periodontitis % N = 600		Poor dental status N = 600		Dental problems N = 84		Gingival bleeding N = 84		Halitosis N = 84		Gingival recession N = 84		Dental mobility N = 84		Dental caries N = 84		Dental abcess N = 84		Dental loss N = 84	
Daily brushing frequency	≥3 fois/j	19.0	ns	4.8	ns	9.5	ns	85.7	ns	52.4	ns	9.5	ns	38.1	ns	4.8	ns	61.9	ns	71.5	ns	0.0	ns
	< 3 fois/j	13.5		1.9		3.8		96.2		51.1		25.0		25.1		13.5		61.5		75.0		11.8	
Type of toothbrush	Souple	13.3	ns	3.3	ns	3.3	ns	90.0	ns	46.6	ns	16.7	ns	30.0	ns	0.0	**	53.3	ns	63.3	ns	3.3	ns
	Médium/dure	14.6		2.4		7.3		97.6		48.8		24.4		39.3		19.5		70.7		82.9		12.5	
Brushing method	Du rouge au blanc	7.1	*	2.4	ns	7.1	ns	90.5	ns	42.9	ns	14.3	ns	21.4	ns	7.1	ns	59.5	ns	76.2	ns	9.8	ns
	Autre brossage	27.6		3.4		3.4		96.6		65.5		27.6		41.4		17.2		65.5		72.4		6.6	
Flossing	Oui	27.3	ns	9.1	ns	0.0	ns	90.9	ns	36.4	ns	18.2	ns	27.3	ns	9.1	ns	45.5	ns	63.6	ns	0.0	ns
	Non	11.9		3.0		7.7		94.0		55.2		22.4		29.9		10.7		67.2		77.6		9.1	

N.B: Khi$_2$ Test of Pearson:
ns = no significative, *:significative at 5%, **: significative at 1%

Graphs 1A and B: The relationship between socioeconomic factors and oral problems: (A) Sex and oral problems; (B) Habitation and oral problems

This may be because (BMI) has a positive relationship with proinflammatory markers and an inverse relationship with antioxidants.[19,20] Moreover, the associations between low socioeconomic status and being overweight have been demonstrated.[21]

CONCLUSION

The study showed that dental problems are quite frequent among the population of the region of Marrakeh.

Dental and periodontal health (DPH) is intimately linked at the sociodemographic and economic level; dental problems are higher among rural people, lower education levels and lower economic classes. Also, health behaviors such a correct toothbrush may prevent gingivitis. Indeed, it is essential to conduct preventive and therapeutic programs as well as promoting dental health awareness, especially among poor, rural, and less-equated people.

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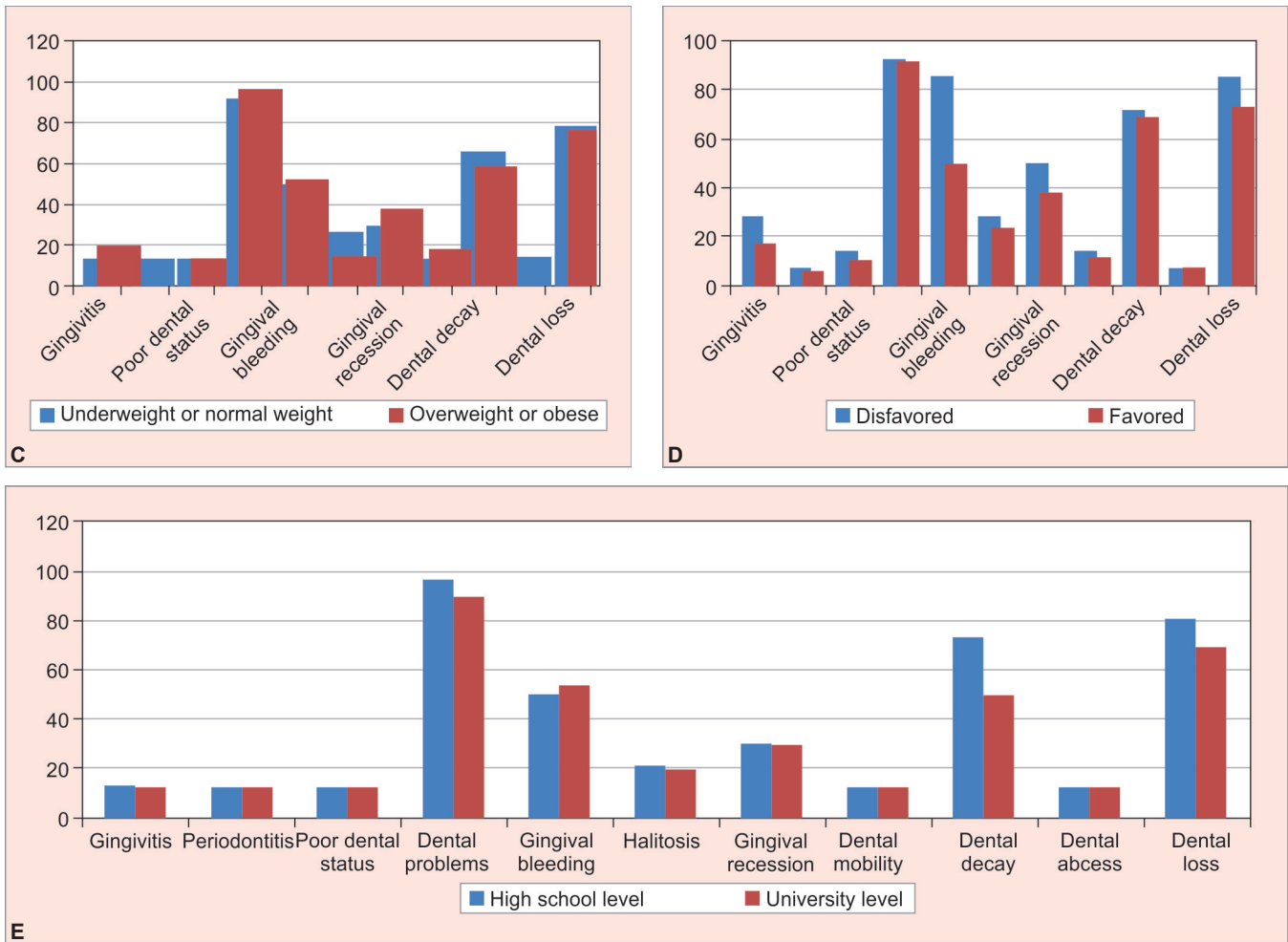
Graphs 1C to E: The relationship between socioeconomic factors and oral problems: (C) Profession and oral problems; (D) IMC and oral problems (E) Level of education and oral problems

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