Oral health status and Unmet Restorative Treatment Needs (UTN) in disadvantaged migrant and not migrant children in Italy



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Abstract

Aim Despite a global decline in caries experience in children, dental caries remains a common and persistent public health problem, being more prevalent among socioeconomically disadvantaged groups. The aim of this survey is to evaluate DMFT index, caries prevalence and Unmet Restorative Treatment Needs (UNT) index in migrant and not migrant children with low income, in Campania region (Italy), in order to plan and build up strategies for promoting dental health in children and adequate health care for vulnerable groups.

Methods A sample of 553 children (age range: 12–14 years old) were recruited from volunteer patients at a charitable foundation in Naples (Italy) and were categorised into 2 subgroups, according to their status of "migrant" or "not migrant". Parents completed a questionnaire in order to investigate demographic and oral health behaviour. The participants were healthy and from low family income levels. DMFT scores and caries prevalence were calculated; UNT index was also calculated [D/(D + F)]%. The mean DMFT values related to the examined variables were calculated using one-way ANOVA.

Results Mean DMFT and UTN index were 3.92±2.92 and 86.3% for migrants, and 3.29±3.21 and 68.4% for not migrants, respectively. The difference in the mean DMFT between the two groups was statistically significant (p=.027). Caries prevalence was 77.5% and 55.9% in the migrant group and in the not migrant group, respectively. High DMFT values were statistically associated to history of previous dental visit, sugar intake, brushing teeth once a day, and low mothers' educational level for both groups.

Conclusions Economically disadvantaged children showed high levels of dental caries. Furthermore, DMFT values, caries prevalence and unmet restorative treatment needs index among migrant children were higher than that of not migrant. In order to reduce inequalities in dental caries experience, there is a need to design policies aimed at primary prevention through health promotion programmes.

KEYWORD Disadvantaged children; Oral health status; Unmet Restorative Treatment Needs (UNT).

Introduction

In the last decades, immigration in European Union countries is strongly increased, particularly due to migration of young and adult people fleeing their homelands for various reasons (wars, epidemics, etc.) [European Union Commission, 2011]. Integration and cooperation of different races and communities are the real challenges for all western countries also in the current century, especially ensuring to vulnerable people essential services as school, health care and welfare.

Concerning health, children are a vulnerable population because of their lack of autonomy and their inability to communicate needs. Although disparity among children can be found in nearly every marker of health, oral health is particularly disturbing, being dental caries the most common chronic disease of childhood [Vargas and Ronzio, 2006; Mathur et al., 2014; Ferrazzano et al., 2006; Ferrazzano et al., 2016a].

Furthermore, oral health improvements across the world seemed not to involve migrant children, and those from minority ethnic groups [Murray Thomson et al., 2003]. In fact "migrant status" is considered a strong determinant of oral health [Sundby and Petersen, 2003].

In the United States, despite a remarkable reduction in the prevalence of dental caries [Brown et al., 2000], this disease is still highly prevalent among children who are socially disadvantaged (racial/ethnic minority, poor, rural, immigrants) [Dye et al., 2004; Ferro et al., 2012].

Also, in Canada, dental caries is disproportionately concentrated among newcomer children [Rowan-Legg, 2013; Reza et al., 2016]. This might be a result of untreated oral diseases in their home country as well as various barriers to appropriate oral health when they arrive in a new country [Brown et al., 2005; Reza et al., 2016], along with a lack of financial resources [Rowan-Legg, 2013]. A similar situation has been observed in Australia among refugees children [Davidson et al., 2006].

Therefore, inequalities are evident in dental caries rates within the socially and economically disadvantaged migrant children [Sheiham, 2006]. These considerations apply to industrialised countries where immigration is a well-established

social phenomenon, started decades or centuries ago. In Italy, however, immigration is fairly recent. It is since the early 1990s that people coming from East Europe, Africa and Asia are moving to Italy [as of 2013, according to the Italian National Institute of Statistics - ISTAT]. For this reason, in Italy limited data is available on the prevalence of caries and on oral health knowledge and practices among migrant children.

Results from a national survey on the oral health status of 4-year-old children, conducted by Campus et al. [2009], revealed that parents' nationality (not Italian vs. Italian: $p < 0.001$) can be considered a risk factor for dental caries.

On the contrary, in another national survey on oral health status of 12-year-olds conducted by the same authors there were no significant differences in the caries data with respect to ethnicity [Campus et al., 2007].

An Italian study [Ferro et al., 2007] showed that inequalities associated with mothers with an immigrant background were observed in the distribution of caries experience among children. These children represent the first generation settling in and growing up in Italy, and their dental status-related data are comparable to those observed at the same ages in first generation "non-western" children living in other industrialised countries.

Another study [Ferro et al., 2010] analysed the correlation between the occurrence of tooth decay with a social class indicator (occupational level) and the immigrant status in a group of children aged 3 to 5 years old residents in the Veneto region (Italy): It was observed that caries occurrence was higher among children from lower social class families and the prevalence of dental caries in immigrant preschool children was significantly higher than in the indigenous ones, while caries severity in immigrants was almost 4 times higher.

In the absence of exhaustive information on the extent of the phenomenon, the aim of this survey is to evaluate DMFT index, caries prevalence and unmet restorative treatment needs (UTN) index in migrant and not migrant children of low income, in the Campania region (Italy), in order to plan and apply strategies for promoting dental health in children and adequate health care for vulnerable groups.

Materials and methods

Sample Size

A formula for estimating a population proportion with absolute precision was used to calculate the sample size. Considering 63.4% as the caries prevalence in 12–14 year-old children of low family income levels and a 95% confidence interval, the calculated minimum sample size was 358. Initially, 678 12-year-olds were enrolled in the study, which exceeded the required sample size. Inclusion criteria required that children be 12–14 years old, from single live births and in good health (ASA I-II) with or without a history of therapeutic dental care. Only children with their parent's signed consent were enrolled as participants. The final analysis included 553 children.

Study design

A cross-sectional study was carried out from September 2014 to May 2016 among a sample of 553 children aged 12 to 14 years. The study was conducted in accordance with the Declaration of Helsinki [World Medical Association, 2001]. Ethical approval was granted by the "Federico II" University of Naples, Italy (Naples, Italy; code-number: 73/09). Parents of the children were informed about the protocol and the aim of the study and then they were invited to give their written consent to the evaluation of the oral health status of their children.

All the participants were categorised into 2 subgroups, according to their status of "migrant" or "not migrant". Children were categorised as "migrant" if the mother was born in a "not-Western country" (Eastern Europe, Asia, Africa, Turkey, South and Central America); otherwise a "not-migrant" status was assigned.

Parents completed a questionnaire in order to investigate demographic and oral health behaviours of all participants through inquiries about family socio-demographic background, past medical history, dietary habits and oral health practices. All participants needed to provide information and documentation regarding the family's annual income and assets by bringing ISEE certification, which it is an official form that indicates the financial standing in any given year based on family status, earnings, property and expenses.

The examinations were executed at a charitable Foundation in Naples, Italy.

Three calibrated dentists performed a comprehensive dental examination of all 553 children under artificial light (portable 60w lamps) using a plane buccal mirror and a dental explorer.

The presence of caries was recorded. Assessments of dental health was conducted using DMTF index (number of decayed, missing, and filled teeth/tooth surfaces for permanent dentition), without x-ray assessment.

The examiners were calibrated at the Department of Neuroscience, Reproductive and Oral Sciences, Section of Paediatric Dentistry, University of Naples, Federico II, Naples, Italy. The three examiners observed a sub-sample of fifty subjects independently as a tool for standardising the examination procedures: agreement was assessed by means of k statistic ($k = 0.935$ (CI 95% 0.777-0.975) for DMFT score.

From the obtained data, DMFT scores were calculated; mean values, standard deviation and frequency distribution were computed. Unmet Restorative Treatment Needs Index percentages were calculated [D/(D + F)]% . The prevalence of caries was also calculated. The mean DMFT values in relation to examined variables were calculated using one-way ANOVA. All statistical procedures were performed using the Statistical Package for the Social Sciences (SPSS 10.0 for Windows; Chicago, IL, USA). For all statistical tests, a confidence interval of 95% and significance level of 5% ($p < 0.05$) were adopted.

Results

Inter-examiner calibration

The kappa statistic comparing DMFT measured by each examiner to DMFT measured by an examiner used as a gold standard, yielded scores of 0.87, 0.79, and 0.83, respectively. For DMFT index, the kappa was 0.84 when comparing examiners 1 and 2, 0.78 when comparing examiners 2 and 3, and 0.81 when comparing examiners 1 and 3.

Clinical examinations

The analysed sample consisted of 183 (102 females and 81 males) migrant children (mean age 12.85 ± 1.63) and 370 (206 females and 164 males) not-migrant children (mean age 12.61 ± 1.53). Caries prevalence was 77.5% and 55.9% in migrant group and in not-migrant group, respectively. In migrant children, the DMFT mean value was 3.92±2.92 with maximum and minimum values of 12 and 0, respectively. In not migrant subjects the DMFT mean value was 3.29±3.21 with maximum and minimum values of 13 and 0, respectively.

		N	Mean	Std. deviation	95% confidence interval for mean		p
					Lower bound	Upper bound	
DMFT	Migrant group	183	3.92	2.92	3.49	4.34	.027
	Not-migrant group	370	3.29	3.21	2.96	3.62	
	Total	553	3.50	3.13	3.24	3.76	
Decayed teeth	Migrant group	183	2.49	1.98	2.20	2.78	.000
	Not-migrant group	370	1.16	1.35	1.03	1.30	
	Total	553	1.60	1.71	1.46	1.75	
Missing teeth	Migrant group	183	.88	1.24	.70	1.06	.166
	Not-migrant group	370	.71	1.43	.56	.85	
	Total	553	.76	1.37	.65	.88	
Filled teeth	Migrant group	183	.56	1.10	.40	.72	.000
	Not-migrant group	370	1.38	1.98	1.18	1.59	
	Total	553	1.11	1.78	.96	1.26	

TABLE 1 DMFT index and distribution of its components in migrant and not-migrant groups.

The difference in the mean DMFT between the two groups was statistically significant (p=.027). Table 1 showed the DMFT index and the distribution of its components. There was a statistically significant difference between migrant and not migrant subjects for decayed teeth (2.49±1.98 cf 1.16±1.35; p<0001) and filled teeth (0.56 ±1.10 cf 1.38±1.98; p<0001), but there is not a statistically significant difference for missing teeth (0.88±1.24 cf 0.71±1.43; p =.166). The unmet restorative treatment needs (UTN) index was 86.3% for migrants and 68.4% for not-migrants children, respectively.

Questionnaire data

39.9% of migrant children and 57.3% of not migrant children had received a dental examination prior to this study. In both groups, mean DMFT of the children already visited by the dentist before this study (4.73±3.01 and 4.68±3.20 for migrants and not migrants children, respectively) was higher than that of the children not previously visited (3.38±2.75 and 1.42±2.09 for migrants and not migrants children, respectively). The DMFT values were statistically significantly in relation to this variable for both groups (p <0.01 and p<0.001 for migrant and not migrant groups, respectively) (Table 2).

Sugary food intake influenced the values of DMFT proportionally (Table 2). In fact, in the migrant group, DMFT was 1.47±1.91 in children who never ate sugary, 3.28±2.57 in those who ate sugary only once a day, 4.19±2.73 in those who consumed sugary twice a day, and it was 4.69±3.14 for children who ate sugary food three or more times a day (Table 2). Similarly, in the not migrant group, DMFT value was 2.15±2.61 in children who never ate sugary, 2.43±2.68 in those who consumed sugary once a day, and 3.55±3.37 in subjects who ate sugary twice a day, and 3.80±3.34 in children who consumed sugary food three or more times a day (Table 2). The DMFT values were statistically significantly in relation to this habit for both groups (p<0.001 and p<0.01 for migrant and not migrant groups, respectively) (Table 2). As for tooth brushing, 47.5% of migrant children and 44.1% of not migrant children brushed their teeth after eating only once a day. DMFT values were statistically different in relation to this habit (p<0.05 for migrant group and p<0.01 for not migrant group) (Table 2).

DMFT index was significantly influenced by mothers' educational level (no school or primary school, middle school, secondary school, university degree), decreasing with a higher level of education (p<0.01 for migrant group and p<0.01 for not migrant group) (Table 2).

Discussion

Over the past decades, the prevalence of caries in industrialised countries has markedly decreased both in adults and in children, mainly due to the use of preventive systems [Albani et al., 2005; Campus et al., 2007; Ferrazzano et al., 2017; Ferrazzano et al., 2016b]. Despite a global decline in dental caries experience in children, it remains a common, widespread, and persistent public health problem, being more prevalent among socioeconomically disadvantaged groups [Piovesan et al., 2011; Rossete Melo et al., 2013]. Dental caries showed an increased polarisation, so that a higher prevalence is now found in a small proportion of children, primarily of low socio-economic status in many countries worldwide [Levin et al., 2009].

An impressive body of scientific evidence demonstrated that socio-economic status (SES) has a well-established relationship with dental caries over time [Piovesan et al., 2011], showing that low SES groups exhibited worse oral health compared with high SES groups [Cho et al., 2014]. Caries prevalence decreases with increasing income, and this gradient is consistently observed in the primary and permanent dentitions [Capurro et al., 2015]. The reasons of such disparities in oral health are linked to the difficulties in accessing healthcare for economic reasons both for everyday treatment such as dental care and for prevention [Matranga et al., 2014].

Based on these considerations, the present study analysed the oral health status in two groups of children (migrants and not migrants), both from low family income levels.

The results obtained showed that, despite the difference in the mean DMFT between the two groups was statistically significant (p =.027), with a worse oral health status for migrant children, both the reported DMFT values were higher compared with previous national data [Ferrazzano et al., 2016a], confirming the relationship between low SES and

caries experience [Piovesan et al., 2011].

Analysing the DMFT index in its components, migrant children presented more decayed (D) teeth and less filled (F) teeth with respect to their counterparts, indicating a higher need for dental care and a lack of control over the disease. Instead, the difference for missing (M) teeth was not statistically significant, suggesting that, when reached, dental therapy is rather radical, involving tooth extraction.

Furthermore, caries prevalence and unmet restorative treatment needs index among migrant children were consistently higher than that of not migrant.

Our findings are in agreement with aepidemiologic studies reporting high prevalence of caries in migrant children with respect to native children [Reza et al., 2016; Sundby and Petersen, 2003].

The reported differences between migrant and not migrant children can be related to language difficulties, lack of communication, inequalities in access to information and to health services [Edelstein and Chinn, 2009].

It is interesting to note that, in both groups, subjects already visited by dentists before this study had higher DMFT values than children never visited. This could be explained considering

		N	Mean	Std.	Lower bound	Upper bound	p
DMFT values in relation to previous dental visit							
DMFT Migrant group	no previous dental visit	110	3.38	2.75	2.86	3.90	.002
	previous dental visit	73	4.73	3.01	4.02	5.43	
	Total	183	3.92	2.92	3.49	4.34	
DMFT Not-migrant group	no previous dental visit	158	1.42	2.09	1.10	1.75	.000
	previous dental visit	212	4.68	3.20	4.25	5.12	
	Total	370	3.29	3.21	2.96	3.62	
DMFT values in relation to sugary intake							
DMFT Migrant group	never	17	1.47	1.91	.49	2.45	.000
	one	39	3,28	2.57	2.45	4.12	
	two	63	4,19	2.73	3.50	4.88	
	three or more	64	4.69	3.14	3.90	5.47	
	Total	183	3.92	2.92	3.49	4.34	
DMFT Not-migrant group	never	33	2.15	2.61	1.23	3.08	.003
	one	76	2.43	2.68	1.82	3.05	
	two	120	3.55	3.37	2.94	4.16	
	three or more	141	3.80	3.34	3.25	4.36	
	Total	370	3.29	3.21	2.96	3.62	
DMFT values in relation to toothbrushing habits after eating							
DMFT Migrant group	one	87	4.56	3.32	3.86	5.27	.014
	two	84	3.26	2.40	2.74	3.78	
	three or more	12	3.83	2.29	2.38	5.29	
	total	183	3.92	2.92	3.49	4.34	
DMFT Not-migrant group	one	158	3.75	3.59	3.18	4.31	.003
	two	177	3.19	2.87	2.77	3.62	
	three or more	35	1.74	2.47	.89	2.59	
	total	370	3.29	3.21	2.96	3.62	
DMFT values in relation to mothers' educational level							
DMFT Migrant group	no or primary school	132	3.69	2.74	3.22	4.16	.006
	middle school education	21	5.48	3.14	4.05	6.91	
	secondary school education	23	4.52	3.41	3.05	6.00	
	university degree	7	1.57	1.512	.17	2.97	
	total	183	3.92	2.922	3.49	4.34	
DMFT Not-migrant group	no or primary school	0	_	_	¬_	¬_	.007
	middle school education	175	3.63	3.35	3.13	4.13	
	secondary school education	142	3.33	3.13	2.81	3.85	
	university degree	53	2.06	2.68	1.32	2.80	
	total	370	3.29	3.21	2.96	3.62	

TABLE 2 DMFT values in relation to dental visit habits, sugar intake, toothbrushing after eating, mothers' education level in migrant and not-migrant groups.

that parents brought their children for dental visits only when they had dental care needs, rather than for scheduled regular dental check-ups. In addition, the results from the present study confirmed a significant association between frequency of sugar intake and higher DMFT index for both groups. The habit of frequent consumption of sweet meals can be explained with the lack of nutritional knowledge and the lack of culturally appropriate information on healthy food by caregivers [Jamieson et al., 2006]. Furthermore, the habit of brushing the teeth only once a day after eating was significantly associated with higher DMFT index both for migrant and for not migrant children. In both the economic disadvantaged groups, it is evident the lack of knowledge on correct oral hygiene behaviours, which is essential to prevent dental caries [Bashirian et al., 2018; Ferrazzano et al., 2008].

The results from this study indicate that, in both groups, children with mothers of lower educational level experienced higher DMFT values than children with mothers of higher educational level. The reasons for this association can be explained, considering that mothers with more years of study can have more access to information and better understanding of the importance of dental health in daily life [Hashizume et al., 2011; Relvas et al., 2014].

The results from this study provided a more comprensive and detailed understanding on oral health status of migrant and not migrant children of low income family level.

The present knowledge can be useful to take effective action against dental caries in high risk groups.

Conclusions

This study highlights that economically disadvantaged children show high level of dental caries. Furthermore, DMFT values, caries prevalence and unmet restorative treatment needs index among migrant children were higher than that of not migrant.

In order to reduce inequalities in dental caries experience, there is a need to intervene early and prevent the onset of dental caries.

These interventions, to be effective, should be evidence-based, easily accessible, community-based and involve government and local communities.

There is a need to design policies, which aim at primary prevention through health promotion programmes involving both children and parents, such as public health campaigns promoting brushing with fluoride toothpaste; community/ school programmes, giving information on risk factors for dental caries.

Moreover, the data from this study corroborate available information about disparity in oral health in both migrant and not migrant children of low family income levels and would be of great importance for evaluating, monitoring and planning further oral health activities.

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