

Oral Health Status in Chongqing Orphans at 3-5 and 12-15 Years Old: A Sampling Survey

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Abstract

Objective: To investigate the oral health status of orphans in Chongqing. Based on the data, it may be used to develop oral health interventions.

Methods: A total of 722 orphans were recruited from urban and suburban areas in Chongqing. The oral health status of them was assessed through oral clinical examination. According to the standard of the "Third National Oral Health Survey". The multi-stage, stratified, equal amount, unequal ratio random sampling methods were adopted.

Results: In 3 - 5 aged group, the prevalence rate of dental caries, mean dmft and filled tooth ratio were 73.98%, 3.91 and 0.21%, respectively. The prevalence of dental caries and dmft in suburban areas were higher than in urban areas ($P < 0.05$). There was no significant difference between the urban and the suburban areas in the filling ratio and with the same results between the boys and girls ($P > 0.05$). In 12 - 15 aged group, the prevalence rate of dental caries, mean DMFT and filling ratio were 42.02%, 0.89, and 4.72%, respectively. The detection rate of gingival bleeding and dental calculus were 85.71%, 76.09%, respectively. The mean DMFT in suburban areas was higher than in urban areas ($P < 0.05$). There were no significant difference between the urban and the suburban areas in the prevalence rate of dental caries, filled tooth ratio, the detection rate of gingival bleeding and dental calculus ($P > 0.05$). Neither gender nor region difference of gingival bleeding nor gender difference of dental calculus was no statistical significance ($P > 0.05$).

Conclusion: Not only 3 - 5 aged groups but also 12 - 15 aged groups were worse about the oral health status in Chongqing. The prevalence rate of dental caries was high. The tooth filled ratio was very low. Health administrative departments should strengthen the prevention and treatment against oral diseases of orphan population.

Keywords: Chongqing; Orphans; Oral Epidemiology; Caries

Introduction

The orphans are the ones who have lost both their parents and are socially and economically deprived. They have been sympathized with, ignored, vitrified or even hidden away in the community. Due to the special living conditions, lack of adequate staff attention, lack of oral health knowledge and bad oral habits, low emphasis on oral health, their oral health status is worried [1].

The aim of this study was to evaluate the oral health status of orphan children and to improve the social concerns of this vulnerable group of orphans, to provide the baseline information and scientific basis for the of oral health measures for orphan. The survey was con-

ducted among 246 children aged 3 - 5 years and 476 adolescents 12 to 15 years old from July to September 2014 in the urban and rural areas of Chongqing, China.

Chongqing, located at latitude 28°10' to 32°13' N and longitude 105°11' to 110°11' E. It covers a large geographical area of 82,000 square km and has over 38 districts or counties, which include 6 urban districts in Chongqing city, 12 poor counties according to national standards and 8 poor counties according to provincial standards [2]. By the end of 2015, the total population was 30.1655 million, with an urban population of 18.3841 million and a rural population of 11.7814 million [3]. Chongqing is the largest municipality that is directly administered by the central government of China and plays a key role in the development strategy for western China. In this survey, the Jiangbei District was on behalf of cities and Fulling District as village representatives.

Materials and Methods

Sample size and selection of children

The survey included 3 to 5 years old, 12 to 15-year-old resident orphans in rural and urban areas orphanage, where 3 to 5 years old group represents the primary dentition, the 12 to 15 age group on behalf of permanent dentition, the chronological age calculations to survey date.

According to The Third National Oral Health Epidemiological Survey Plan requirements [4], this study used a multi-stage, stratified, equal amount, unequal ratio random sampling methods to select the subjects. Four Children's Welfare Institute were chosen randomly from each stratification. The Jiangbei District Children's Welfare Institute was on behalf of cities and Fulling District children's welfare as village representatives. Children who had major systemic diseases or who were on long-term medication were excluded from the study. Based on the third national oral-health survey conducted in 2005, the prevalence of primary tooth caries of 5-year-old groups and permanent caries of 12-year-old groups in China was 66.0% and 28.9%, respectively. With a standard error set at 1.5%, the sample size required in this survey would be 92 and 438 respectively. The response rate was expected to be 90%, and as such, this study aimed to recruit 589 children. 280 orphans aged 3 - 5 years were selected each randomly, and 600 orphans aged 12 - 15. A total of 722 subjects joined the survey actually.

Clinical Examination

The standards of the examination were based on the 3rd Chinese National Oral Epidemiological Survey and WHO Oral Health Surveys [4]. Dental caries was accessed using criteria recommended by the WHO [5].

All the oral examination were conducted by 3 oral professional undergraduate college seniors, recorded by 3 seniors All the undergraduate students from ChongQing Medical University had through the survey epidemiologists specialized training by specialists. Before the survey, the standard conformance testing is completely reliable (Kappa values > 0.8). Investigation procedures and use of the device in accordance with WHO oral health surveys basic methods and the third national oral health epidemiological survey program.

Data entry and analysis

Data were entried by the responsible person. Data processing and analysis were performed with IBM Statistical Product and Service Solutions (SPSS) Statistics 13.0. The descriptive statistics were made on a different index using percentage. The prevalence between groups was assessed with a chi-square test or Fisher's exact test. Caries prevalence and mean dmft scores were described by mean \pm standard deviation, Comparisons were made using an independent t-test. P values take sides. The statistical significance level for all tests was set at 5%.

Results

A total of 580 orphans from Welfare Institutes were joined the survey.

Chongqing 3-5 year-old group of orphans deciduous teeth caries was 73.98 percent in total. The mean DMFT score was 3.91, the caries filling rate was 0.21%. Both the prevalence of dental caries and mean DMFT in rural were higher than in urban areas ($P < 0.05$). There were no significant difference neither between the urban and the suburban areas nor gender in the rate of caries filling tooth ($P > 0.05$). Table 1 shows the calculated caries prevalence of different genders and place of residence for the orphans. The significant difference was between orphans from rural areas and those from urban areas. Caries and DMF constituent ratio with urban and rural areas and different genders is shown in Table 2. Filling rate of urban and rural and gender is shown in table 3.

	Gender	Examine Number	Caries Number	Caries Prevalence Rate	χ^2	P
	Male	50	34	68.00%	0.10	0.7568
Urban	Female	84	54	64.29%		
	Subtotal	134	88	65.67%		
	Male	44	36	81.82%	0.12	0.1196
Rural	Female	68	58	85.29%		
	Subtotal	112	94	83.93%		
	Male	94	70	74.47%	0.01	0.9233
Total	Female	152	112	73.68%		
	Total	246	182	73.98%		

Table 1: The caries prevalence of different genders and place of residence for the orphans.

urban-rural proportion: $\chi^2 = 5.28, P = 0.0215$

	Gender	N	d				m				f				dmf				
			dt	Mean	S.D	Ratio	mt	Mean	S.D	Ratio	ft	Mean	S.D	Ratio	N	Mean	S.D	t	P
	Male	50	168	3.36	0.92	100.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00	168	3.36	0.92	0.37	0.7131
Urban	Female	84	286	3.41	0.98	98.62	2	0.02	0.15	0.69	2	0.02	0.15	0.69	290	3.45	0.99		
	Subtotal	134	454	3.39	0.95	99.56	2	0.01	0.12	0.44	2	0.01	0.12	0.00	458	3.42	0.96		
	Male	44	190	4.32	0.99	97.94	4	0.09	0.29	2.06	0	0.00	0.00	0.00	194	4.41	1.01	0.50	0.6187
Rural	Female	68	304	4.47	1.02	98.06	6	0.09	0.29	1.94	0	0.00	0.00	0.00	310	4.55	1.03		
	Subtotal	112	494	4.42	1.00	98.02	10	0.09	0.29	1.98	0	0.00	0.00	0.00	504	4.50	1.02		
	Male	94	358	3.81	1.06	98.90	4	0.04	0.20	1.10	0	0.00	0.00	0.00	362	3.85	1.09	0.43	0.6661
Total	Female	152	590	3.88	1.12	98.34	8	0.05	0.22	1.33	2	0.01	0.11	0.33	600	3.94	1.14		
	Subtotal	246	948	3.85	1.09	98.54	12	0.05	0.22	1.25	2	0.01	0.09	0.21	962	3.91	1.12		

Table 2: Caries and DMF constituent ratio with urban and rural areas and different genders urban-rural proportion: $t = 6.04, P < 0.0001$

Compared with 5-year-old children caries epidemiological sampling survey report of Chongqing in 2008: $t = 3.37, P = 0.0010$

	N	dt	ft	Filling ratio (%)	χ^2	P
Urban	134	456	2	0.44		0.4750
Rural	112	504	0	0.00		
Male	94	362	0	0.00		1.0000
Female	152	600	2	0.33		
Total	246	962	2	0.21		

Table 3: Filling rate of urban and rural and gender.
 Compared with 5-year-old children caries epidemiological sampling survey report of Chongqing in 2008 [6]: Fisher's Exact Test, $P = 0.6885$.

The permanent caries of age group of 12 to 15 orphans In ChongQing was 42.02%, DMFT was 0.89. Caries filling rate was 4.72%. The rate of bleeding gingiva was 85.71%, the detection rate of dental calculus was 76.09%, DMFT in rural areas were higher than the city, the difference was statistically significant ($P < 0.05$). There was no significant difference between orphans from rural areas and those from urban areas in the prevalence rate of caries, filling rate, the detection rate of bleeding gingiva and dental calculus. Table 4 shows the calculated caries prevalence of different genders and place of residence for the orphans of aged 12 to 15. Caries and DMF constituent ratio with urban and rural areas and different genders is shown in Table 5. Periodontal status according to gender and different areas in Table 6. Filling rate of urban and rural and gender is shown in table 7.

	Gender	Examine Number	Caries Number	Caries Prevalence Rate	χ^2	P
	Male	108	40	37.04%		
Urban	Female	380	64	35.56%		
	Subtotal	288	102	36.11%	0.02	0.8992
	Male	76	36	47.37%		
Rural	Female	112	60	53.57%		
	Subtotal	188	96	51.06%	0.17	0.6763
	Male	184	76	41.30%		
Total	Female	292	124	42.47%		
	Total	476	200	42.02%	0.02	0.9005

Table 4: The caries prevalence of different genders and place of residence for the orphans of aged 12 to 15.
 urban-rural proportion: $\chi^2 = 2.61, P = 0.1062$
 Compared with 12-year-old children caries epidemiological sampling survey report of Chongqing in 2009 [7]: $\chi^2 = 17.51, P < 0.0001$

	Gender	N	d				m				f				dmf				
			dt	Mean	S.D	Ratio	mt	Mean	S.D	Ratio	ft	Mean	S.D	Ratio	N	Mean	S.D	t	P
	Male	108	76	0.70	0.98	90.48	0	0.00	0.00	0.00	8	0.07	0.27	0.09	84	0.77	1.01	0.22	0.8304
Urban	Female	180	120	0.67	1.23	93.75	0	0.00	0.00	0.00	8	0.04	0.21	6.25	128	0.71	1.22		
	Subtotal	288	196	0.68	1.14	92.45	0	0.00	0.00	0.00	16	0.06	0.23	7.55	212	0.73	1.14		
	Male	76	88	1.16	1.34	95.65	0	0.00	0.00	0.00	4	0.05	0.23	4.35	92	1.21	1.34	0.37	0.7123
Rural	Female	112	120	1.07	1.22	100.0	0	0.00	0.00	0.00	0	0.00	0.00	0.00	120	1.07	1.22		
	Subtotal	188	208	1.11	1.26	98.11	0	0.00	0.00	0.00	4	0.02	0.15	1.89	212	1.13	1.26		
	Male	184	164	0.89	1.15	93.18	0	0.00	0.00	0.00	12	0.07	0.25	6.82	76	0.95	1.16	0.44	0.6581
Total	Female	292	240	0.82	1.23	96.77	0	0.00	0.00	0.00	8	0.03	0.16	3.23	248	0.85	1.22		
	Subtotal	476	404	0.85	1.20	95.28	0	0.00	0.00	0.00	20	0.04	0.20	4.72	424	0.89	1.19		

Table 5: Caries and DMF constituent ratio with urban and rural areas and different genders urban-rural proportion: $t = 6.04, P < 0.0001$
 Compared with 12-year-old children caries epidemiological sampling survey report of Chongqing in 2009: $t = 3.64, P = 0.0003$

	Gender	Examined Number	the detection rate of bleeding gingiva		χ^2	P	the detection rate of dental calculus.		χ^2	P
			N	%			N	%		
	Male	108	92	85.19	0.01	0.9326	80	74.07	0.02	0.8882
Urban	Female	180	152	84.44			136	75.56		
	Subtotal	288	244	84.72			216	75.00		
	Male	76	68	89.47		1.0000	60	78.95		1.0000
Rural	Female	112	96	85.71			88	78.57		
	Subtotal	188	164	87.23			148	78.72		
	Male	184	160	86.95	0.09	0.7585	140	76.09	0.01	0.9376
Total	Female	292	244	84.93			224	76.71		
	Subtotal	476	404	85.71			364	76.47		

Table 6: Periodontal status according to gender and different areas of aged 12 to 15 orphans urban-rural proportion: the detection rate of bleeding gingiva $\chi^2 = 0.15, P = 0.1465$; the detection rate of dental calculus $\chi^2 = 0.22, P = 0.6397$

Compared with 12-year-old children caries epidemiological sampling survey report of Chongqing in 2009: the detection rate of bleeding gingiva $\chi^2 = 2.52, P = 0.1126$

the detection rate of dental calculus $\chi^2 = 8.54, P = 0.0035$

	N	dt	ft	Filling ratio (%)		P
Urban	288	196	16	8.16		0.3629
Rural	188	208	4	1.92		
Male	184	164	12	7.31		0.6470
Female	292	240	8	3.33		
Total	476	404	20	4.95		

Table 7: Filling rate of urban and rural and gender aged 12 to 15. Compared with 12-year-old children caries epidemiological sampling survey report of Chongqing in 2009: Fisher’s Exact Test, P = 1.0000.

Discussion

Orphan is a special group, they tend to live in the bottom of society. Their social status particularity determined their living conditions, education, health care and other aspects were uniqueness. All along, the security system for orphans is not sound. Because of inadequate dental manpower, financial constraints, and lack of perceived need for dental care among the people, it is difficult to meet their growing needs for oral health [6]. There are also many difficulties in orphans’ medical rehabilitation and education. Thus, orphanage children are such disadvantaged groups having limited accessibility to oral healthcare. Their social security issues should be concerned by the State and society. According to the Ministry of Civil Affairs, 2009 Social Services Development Statistics Bulletin, 2010 Social Services Development Statistics Bulletin, and 2011 Social Services Development Statistics Bulletin, the number of orphans were 71.2 million, 65.5 million, 50.9 million [7]. The total number of orphans was 10080, including 1699 supported in welfare agencies, accounting for 16.8% of the total number of orphans in the Chongqing area.

Oral health survey for orphans reported less in China so far. An oral health survey about orphans aged 6 - 12 in Chengdu section carried out by Jiangxian Jun., *et al.* showed that [8]: deciduous caries prevalence was 46.4%, dmft was 1.70 ± 2.50 , permanent teeth caries rate was 23.9% DMFT was 0.47 ± 1.05 . Asma M. Al-Jobai., *et al.* Found that in central Saudi Arabia the orphans had more dental caries and worse oral hygiene compared with children living with their parents [9]. The researchers in Yemen, Nigeria and India also found that the orphans had worse oral health status and careless attitude towards oral health [10-12]. The results are similar to this study, indicating that the oral health status of orphaned children is bleak, effective oral health promotion strategies need to be implemented to improve the oral health and oral health practices of children living in orphanages.

The sample survey using Third National Oral Health Epidemiological Survey approach and standards and the findings were Chongqing 3 - 5 age group caries prevalence rate, dmft and caries filling rates were: 73.98%, 3.91, 0.21% [13]. Compared with normal 5-year-old child dental caries epidemiological investigation report in 2008 Chongqing, both urban and rural orphans, the caries filling rate is very low. In 12 to 15 aged group caries prevalence rate, DMFT and caries filling rate was 42.02%, 0.89, 4.72% [14]. Orphans caries filling rate was much lower compared with normal 12-year-old children’s oral health survey analysis result in 2009 Chongqing [15]. This suggests that social orphans as a special group, due to their poor medical condition, low level of protection, lacking of oral health practitioners child welfare agencies, orphans oral problems cannot get timely and effective treatment [16].

The survey also showed: in Chongqing, both of 3 to 5 years old and 12 to 15 years old orphans DMFT and caries prevalence rate with urban and rural areas have significant differences, both in rural areas higher than urban. This may be related to the economic development model of Chongqing. Chongqing cities as a large part of the countryside, rural economic development has lagged far behind in the

city. Health administrative departments put into the city orphanage relatively more capital investment, staff and management staff with more professional training, and oral health knowledge dissemination have more colorful methods [17]. In addition, city orphanage got more public attention, often have oral health care education and caring examine by professional hospital.

The periodontal examination results of 12 to 15 years old orphans shows: the detection rate of gingiva bleeding and dental calculus were 85.71% and 76.09%. This suggests that periodontal condition of Chongqing orphans was poor. The reasons that may be they do not have good oral hygiene habits, lack of oral health knowledge, and their oral health awareness is weak. This finding is in agreement with a number of earlier studies in various normal child investigations [16]. In most welfare agencies, oral health care is not included among general medical care [18-24].

Finally, proposed suggestions were based on the results above. Collaboration between general healthcare and oral healthcare has to be included in healthcare education programs. Dental colleges can organise camps for educating orphans and their caretakers. Various manufacturing companies can offer products free. Further, it should be appeal to the whole community to support, concern and pay attention to orphans and disabled children's dental prevention.

Limitations of the study

It is important to emphasize that the surveyed populations in this study were only orphans from four welfare agencies, which could not reflect the oral health status of the whole Chongqing orphans. And the surveyed children selected using the multi-stage cluster sampling method may not be as representative as those selected through random sampling. Therefore, future oral epidemiology investigations should be done in Chongqing.

Conclusion

In short, through this sample survey on Chongqing orphan oral health status, it was found out that the oral health status of both 3 - 5 aged groups and 12 - 15 aged groups were worse in Chongqing. The prevalence rate of dental caries was high. The tooth filled ratio was very low. To prevent the occurrence and development of caries and periodontal disease effectively, health administrative departments should strengthen the prevention and treatment against oral diseases of orphan population. In addition, it could be encouraged to promote targeted prevention measures to improve the knowledge attitude-behaviour of the orphans towards oral health and increase investment in oral health care for orphans. Overall, the strengthening of oral health promotion and disease prevention and treatment are urgently needed for orphans in ChongQing.

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