The changing of oral health status in Mongolian children after changing socio-economic system

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1. Introduction

The Republic of Mongolia became a communist country since the Communist Revolution in 1924. The Communist Party (People's Revolution Party) lost its political power in 1996 and handed it over to the Social Democratic Party and the National Democratic Party, which advocated democratic and capitalistic policies[1]. This new government applied the capitalistic market economy system to the Mongolia.

In their dental care system since 1996, traditional socialistic dental care has been gradually diminished and replaced by private sector care.

After introduced market economy system, lots of sugar containing-product and candies were imported from outside. Consequently, children have been highly exposed to sugary foods, and the frequency and quantity of sugar intake have been increased. Although these are not enough affected in children of lower social class, caries prevalence would be expected to increase in children of urban area. Under the market economic system, improvement of accessibility for dental care would be also expected and it would be affected in prevalence of dental caries. At this point, we assumed that changing of Mongolian socio-economic system would affect oral health of

Mongolian children.

But there was neither systemic epidemiological oral health survey nor recent reports of caries status in Mongolia[2]. Also no information existed in the WHO data bank.

The purpose of this study was to investigate the dental caries experience of Mongolian school children in Ulanbaator city after changing socio-economic system. For this, oral examination survey for Mongolian children was performed both in the year of 1997 and 2002.

2. Materials and Methods

About 25% of the Mongolian population, around 620,000 inhabitants live in capital city of Ulanbaator. There are 105 schools in the city. The total number of students is about 160,000.

We researched the oral health status of them twice(1997 and 2002). In the first survey in the year of 1997, we selected 2 schools in Ulanbaator city. Total number of subjects was 738. The second research was conducted in the year of 2002. We selected 3 schools in Ulanbaator city. Total number of subjects was 683.

In the first survey of 1997, clinical examination was conducted by two Mongolian and two Korean

dentists in a standard manner using dental lights and mirrors. Caries examination of permanent teeth was conducted using WHO caries diagnostic criteria. Radiography was not used. Oral hygiene status was assessed by simplified Oral Hygiene Index of Green and Vermillion (OHI). Before clinical examination was conducted, training and calibration sessions were undertaken. These sessions were in vitro (extracted tooth models with about 200 teeth) and in vivo (replicate examinations of 20 children). Dental caries calibration resulted in Kappa values of inter-examiner agreement of 0.80.

In the second survey of 2002, clinical examinations were conducted by 2 Mongolian and 3 Korean examiners who had taken pre-calibration training. Kappa values of inter examiner agreement was 0.81. The first and second surveys were conducted with same methods.

Data were cleaned and analyzed by personal computer using SAS Version 8.1 (SAS Institute Inc. Cary, USA). Frequency distributions were generated, Student's t-tests were used for testing statistical significant differences between 1997 and 2002.

3. Results

Table 2 is showing caries prevalence by age in 1997 and 2002. As supposed, prevalence of caries experience tended to increase with age. Almost 70% of the 12 years old children had dental caries experience in 1997. And the prevalence of caries was decreased to about 56% in 2002.

Table 3 and 4 present a comparison of DMFT

Table 1. Subjects group by age (N)

Age	1997	2002
Total	738	683
8	97	125
9	129	87
10	131	105
11	108	105
12	135	130
13	138	131

Table 2. Caries prevalence in 1997 and 2002 in Mongolian urban elementary students(%)

Age	1997	2002
8	30.93	37.60
9	49.61	35.63
10	47.33	40.00
11	59.26	58.10
12	69.63	56.15
13	74.64	64.12

Table 3. DMFT index in 1997 and 2002 in Mongolian urban elementary students(Mean±SD)

Age	1997	2002	P-value
8	0.56±1.00	0.68±1.04	NS
9	1.00±1.32	0.72±1.19	NS
10	0.91±1.25	0.78±1.14	NS
11	1.43±1.79	1.43±1.63	NS
12	1.86±1.63	1.50±2.08	NS
13	1.89±1.79	1.87±2.31	NS

NS: Statistically non-significant

Table 4. DMFS index in 1997 and 2002 in Mongolian urban elementary students(Mean±SD)

Age	1997 Mean SD	2002 Mean SD	P-value
8	0.72±1.37	0.95±1.67	NS
9	1.79±3.20	1.24±2.42	NS
10	1.72±2.90	1.35±2.46	NS
11	2.87±5.10	2.72±4.00	NS
12	3.47±4.18	2.76±4.63	NS
13	4.40±5.22	3.52±4.54	NS

NS: Statistically non-significant

Table 5. OHI index in 1997 and 2002 in Mongolian urban elementary students(Mean±SD)

Age	1997	2002	P-value
8	0.42±0.70	0.43±0.45	**
9	0.87±1.30	0.67±0.49	*
10	0.84±1.26	0.76±0.40	**
11	1.32±1.97	0.80±0.42	**
12	1.58±1.63	0.79±0.48	NS
13	1.96±2.06	0.81±0.50	**

NS: Statistically non-significant
* : P < 0.05 by Student's t-test
** : P < 0.01 by Student's t-test

and DMFS index in 1997 and 2002 in Mongolian urban elementary students. Mean DMFT and DMFS index tended to increase with age. DMFT index of 12-years-old children was 1.86 in 1997,

and it was decreased to 1.50 in 2002. But this was not statistically significant(Student's t-test, p>0.05).

Table 5 shows OHI index of both years. OHI index in 2002 had been greatly decreased than

Table 6. DS index(rate) in 1997 and 2002 in Mongolian urban elementary students(Mean ± SD(%))

Age	1997	2002	P-value
8	0.64±1.28(88.57)	0.74±1.34(87.44)	NS
9	1.27±2.66(70.99)	0.72±1.88(62.48)	NS
10	1.19±2.21(69.33)	1.13±2.39(84.52)	NS
11	2.25±4.19(78.39)	1.75±2.98(71.57)	NS
12	2.80±3.85(80.77)	1.80±3.71(66.35)	**
13	3.13±4.50(71.17)	2.44±3.86(71.30)	NS

NS: Statistically non-significant
** : P < 0.01 by Student's t-test

Table 7. MS index(rate) in 1997 and 2002 in Mongolian urban elementary students(Mean ± SD(%))

Age	1997	2002	P-value
8	0.05±0.51(7.14)	0.00±0.00(0.00)	NS
9	0.33±1.32(18.61)	0.17±0.92(6.34)	NS
10	0.34±1.54(20.00)	0.05±0.49(2.38)	NS
11	0.42±1.82(14.52)	0.19±0.96(2.66)	NS
12	0.44±1.67(12.82)	0.21±1.08(3.78)	NS
13	0.96±2.07(21.91)	0.61±1.76(11.32)	NS

NS: Statistically non-significant

Table 8. FS index(rate) in 1997 and 2002 in Mongolian urban elementary students(Mean ± SD(%))

Age	1997	2002	P-value
8	0.03±0.17(4.29)	0.20±1.04(12.56)	NS
9	0.19±0.56(10.39)	0.34±1.16(31.18)	**
10	0.18±0.68(10.67)	0.17±0.74(13.10)	NS
11	0.20±0.67(7.10)	0.78±2.22(25.77)	**
12	0.22±0.83(6.41)	0.76±1.86(29.88)	**
13	0.30±0.78(6.92)	0.47±1.17(17.38)	*

NS; Statistically non-significant
* ; P < 0.05 by Student's t-test
** ; P < 0.01 by Student's t-test

1997. This indicates that oral hygiene status had been generally improved.

Table 6, 7, and 8 show a comparison of DMFS component in 1997 and 2002. It is very interesting that the filling component was remarkably increased than 1997.

4. Discussion

The Mongolia remained Communist country during 72 years from 1924 to 1996. New government applied the capital market system to the Mongolian economy in 1996. Under the Capitalistic system, it is expected that sugary food intake would be increased and the accessibility of dental care system would be improved. So we

assumed that socio-economic change will affect the oral health status in Mongolian children. Therefore we conducted the oral survey of Mongolian children in 1997 and 2002.

Caries prevalence of the 12 years old children was 69.93% in 1997 and 56.15% in 2002. These are less than the 77.14% of Korean children in 2000[3]. The mean DMFT of the 12 years old Mongolian children was 1.86 in 1997 and 1.50 in 2002, which is much lower than 3.3 of korean 12-years-old children in 2000[3]. We assumed that caries experience of Mongolian children might increase due to market opening. But caries prevalence was slightly decreased. We could think several reasons of this decreasing tendency.

First, OHI index of 2002 was remarkably decreased than 1997. Many previous studies have shown that poor oral health behaviors are associated with caries incidence[5-8]. Therefore, this improvement of oral hygiene may be one reason that dental caries prevalence were a little decreasing tendency in Mongolian children.

The second reason might be the mongolian traditional food style. Mongolian food contains less sugar than Western food, since the Mongolian diet consists primarily of sheep meat, milk, tea and traditional mill cake, and as such is naturally low in sugar. In spite of market opening, These dietary habits do not seem to have changed greatly.

Among Mongolian children, in 1997 DS rate was more than 70-90% and FS rate was low. This remarkably high DS rate indicates a great need for dental care. But FS rate in 2002 was higher increasing tendency than 1997. The main reason of this increase can be the improvement of economic

status. The better the capital market system is adapting to the Mongolian society, the more accessible dental care will be offered to the public.

In conclusion, caries prevalence and DMFT(S) index of Mongolian schoolchildren in Ulanbaator city were relatively low and there was no typical change of DMFT(S) index between 1997 and 2002. But the FS rate of 2002 was increased higher than 1997.

For evaluating exact effect that market opening influence the oral health status in the mongolia, we need to have more investigations.

5. Conclusion

The purpose of this study was to investigate changing caries prevalence, DMFT, and DMFS index of Mongolian school children in Ulanbaator city after changing socio-economic system. We conducted oral survey twice in 1997 and 2002. The number of subjects were 738 and 683 relatively. Examiners assessed the entire permanent dentition for caries and oral hygiene status by the OHI index. The obtained results were as follows;

1. DMFT and DMFS index of Mongolian children did not significantly different between 1997 and 2002. DMFT index of 12-year-old children in 1997 was 1.86. In 2002, it was decreased to 1.50. However, this was not statistically significant.

2. OHI index in 2002 was greatly decreased than 1997(p < 0.01). This indicates that oral hygiene status was generally improved.

3. As comparing of DMFS components in 1997 and 2002, the filling components in 2002 was much

higher than 1997(p < 0.01). After introducing of market economic system in Mongolia, it was considered that dental treatment of accessibility in Mongolian school children was improved.

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몽골 사회경제적 체계 변화가
몽골아동의 구강건강상태 변화에 미친 영향

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색인 : 몽골, 아동, 우식경험영구치, 우식경험영구치면, 유병률, 치아우식증

목적: 본 연구의 목적은 사회경제적 시스템이 변화함에 따라 울란바타르시에 있는 몽골 아동의 치아우식 유병률, 우식경험영구치지수, 우식경험영구치면 지수의 변화를 파악하기 위함이었다.

대상 및 방법: 1997년과 2002년에 울란바타르시에 있는 학교를 대상으로 각각 8-13세 아동 738명과 683명의 구강실태조사를 실시하였다. 1997년에 4명, 2002년에는 5명의 조사자가 구강검사를 시행했으며, 조명과 치경을 사용하여 영구치 치아우식증과 구강위생상태를 평가하였다. 조사자간 일치도를 높이기 위하여 카파지수가 0.8이 될 때까지 일치도 훈련을 반복 시행하였다.

결과: 몽골 울란바타르시 12세 아동의 치아우식경험자율은 1997년에 약 70%, 2002년에 약 56%로 다소 감소하였다. 1997년 12세 아동의 우식경험영구치지수가 1.86이었고, 2002년에는 1.50이었으나 이는 유의한 차이는 아니었다. 구강위생지수는 2002년에 현저하게 감소되었고, 충전율이 1997년에 비해 2002년에 상당히 높게 나타났다.

결론: 1997년도에 비해 2002년도에 치아우식경험도가 다소 감소되었으며 특히 처치치아의 비중이 높아졌다. 이는 구강위생상태의 개선과 치과치료접근의 용이성 때문으로 추측되며 전통적으로 설탕섭취가 적은 몽골의 식습관도 또 다른 원인으로 사료된다.