THE UNIVERSITY OF
SYDNEY

Dental Survey of Children in Ferozepur, India

Vishal Chhabra, BDS
(*Baba Farid University of Health Sciences*)

A thesis submitted in partial fulfillment of the requirements for the degree of

MASTER OF DENTAL SCIENCE
Community Oral Health and Epidemiology

Faculty of Dentistry
The University of Sydney Australia

2007

Dedication

I dedicate my thesis to my father Sh. Jagjeet Chhabra and to my mother Smt. Sudesh Chhabra for their constant support and helping me financially along with my friend Jaspreet Kaur who motivated me in studying further and helping me emotionally in completing my degree.

Acknowledgements

I would like to express my sincere thanks to the following people for their contribution and help towards the research and preparation of the thesis:

- Associate Professor Wendell Evans, Head of Discipline, Community Oral Health and Epidemiology, University of Sydney for his guidance and assistance in completing the thesis.

- Dr. Jaspreet Kaur, my friend, who acted as a research assistant.

- Ms Ramona Grimm, Administrative Officer, Community Oral Health and Epidemiology for her administrative support.

- Vasu Dev Chhabra, my brother, who helped in organizing the survey.

- All of the school principals and the children who participated in the survey.

- Dr. Choon Wong for conducting the analysis of water samples in Sydney.

****

Foreword

This thesis is divided into two parts:

Part One: A review of the literature on dental caries experience among 6- and 12-year-olds in different states of India.

Part Two: Part two of this thesis is a paper that will be submitted for publication in the *Indian Dental Journal* concerned with an epidemiological study of 6- and12-year-olds Punjabi school children, India.

Table of Contents

List of Abbreviations

DMFT/dmft	Decayed, missing, and filled teeth
DMFS/dmfs	Decayed, missing, and filled surfaces
F	Fluoride
Mg/L	Milligram per litre
OR	Odds Ratio
ppm	Parts per million
ml	millilitre

****

List of Tables

****

Appendices

Appendix A: Letter of approval from the Human Research Ethics Committee, The University of Sydney, including, the Participant Information Sheet (English and Punjabi), the Parent/Guardian Consent Form (English and Punjabi), and the Need for Dental Care Form (English and Punjabi).

Appendix B: Letter to the District Education Officer seeking permission for conducting the survey.

Appendix C: Clinical Examination Form.

Appendix D: Questionnaire (English and Punjabi).

Appendix E: Letters regarding survey and consent from respective schools.

Appendix F: Map of Ferozpur (Punjab).

Appendix G: Press cutting regarding survey.

Appendix H: The [Indian] National Oral Health Policy resolutions.

Appendix I: The [Indian] National Oral Health Care Programme (NOHCP) Goals.

Part One

Review of Literature

Review of literature on dental caries experience among Indian children

INTRODUCTION

India has a population of over 1028.7 million people and has high prevalence of oral diseases (Registrar General & Census Commissioner, 2003).

Dental caries is a public health problem in India. In some regions, the caries prevalence is as high as 60-80% in Indian children (Damle, 2002). It was reported by The World Health Organisation Oral Health Surveillance in 1992 (WHO, 1992), that nationally the DMFT index for 12-year-olds was 0.89. In addition, about 30% of children suffer from malocclusion (WHO, 2001) affecting proper functioning of the dento-facial apparatus. A lack of awareness about dental diseases has resulted in gross neglect of oral health (Parkash & Mathur, 2003).

According to Shah (Undated), the optimum concentration of fluorine in drinking water for caries risk reduction in India is 0.75–1 mg/L. A high fluoride content in ground water is endemic in some states, including Andhra Pradesh, Gujarat, and Rajasthan.

A survey was conducted in Punjab by the State Health Department during 1989-90 and it indicated that nearly 84% of the population was suffering from caries or periodontal disease (Department of Health & Family

Welfare, 2006). It was reported that this alarming level of dental diseases was mainly due to lack of awareness among the people about the prophylactic, interceptive, and curative treatment available in the existing infrastructure of the Dental Health Care Services in the state. It was also reported that the dentist to population ratio was 1: 30,000 in the urban areas and 1:119,000 in rural areas.

The following review of dental caries experience among children in different Indian states refers mostly to cross-sectional studies. Prior to the partition of India, Pakistan belonged to the Punjab province. Ferozepur is directly on the Indian side of the border with Pakistan and has similar demographic and geographic variations like that of Pakistan. Therefore, for the purpose of making relevant contrasts related to oral health features, Pakistan was included.

REVIEW OF STUDIES

The dental caries status of Indian children

Primary dentition caries experience: The data in Table 1.1 shows that the 3-6-year-olds in Tamil Nadu had the lowest mean dmft of nearly zero (Gopinath *et al.,* 1999). The 5-6-year-olds in Karnataka had the highest mean dmft and dmfs scores of 3.5 and 10.2, respectively (Shetty & Tandon, 1988). A similar mean dmft score of 2.7 was reported for 5-8-year-olds in Orissa and children aged 9 years in Kerala (Dash *et al.,* 2002; Retnakumri, 1999). Two studies gave results for males and females separately, and show that males had higher dmft scores compared with females (Gopinath *et al.,* 1999; Saravanan *et al.,* 2003). Children living in urban areas had higher dmft scores compared with the children living in rural areas. For example, the dmft score

of 2.5 for 5-6- year-olds living in an urban area of Sikkim was much higher than for children of the same age group living in rural area; their dmft score was 0.7 (Mandal *et al.,* 2001).

Mixed dentition caries experience: The data in Table 1.2 shows that in two of the studies (Gopinath *et al.,* 1999; Khan, 1992) males and females had same caries prevalence. In five of the eight studies shown in Table 1.2, males had higher caries prevalence rates as compared with females, however, the significance of the differences between both the genders was not reported. One of the studies (Singh *et al.,* 1999) showed that females had a non-significantly higher caries prevalence as compared with males. A study (Gopinath *et al.,* 1999) showed that among the studies including 6-year-olds, the 3-6-year-olds in Tamil Nadu had the lowest caries prevalence (36.2 in males and 36.0 in females), and 9-12-year-olds from the same state had the highest caries prevalence (80.4 in males and 68.8 in females).

Permanent dentition caries experience: Table 1.3 shows that the 6-9-year-olds in Tamil Nadu had the lowest mean DMFT score of 0.4 (Gopinath *et al.,* 1999). The 12-year-olds in different states of India had DMFT scores in the range of 0.4 -1.1, but those in Pakistan had higher DMFT scores in the range of 1.2 -1.8 (Khan, 1992; Maher, 1992). The 7-17-year-olds in Punjab had the highest mean DMFT and DMFS scores of 3.8 and 5.8, respectively (Gauba *et al.,* 1986). Children living in urban areas had higher DMFT scores compared with rural children. For example, those aged 15-16-year-olds living in the urban area of Sikkim had a mean DMFT score of 0.5, while children of the same age group living in rural areas had a mean DMFT score of 0.3 (Mandal *et al.,* 2001).

Dental treatment needs

Table 1.4 shows that the need for restorative treatment on one or more surfaces was the most prominent of the dental treatment needs shown across the studies and accounted for 60-80% of the various treatment need types (Dash *et al.,* 2002; Gauba *et al.,* 1986). The treatment needs of children in Pondicherry were about half that of children in Orissa (Sarvanan *et al.,* 2003; Dash *et al.,* 2002). Tooth extractions were needed by 3-15% of the children (Sarvanan *et al.,* 2003; Dash *et al.,* 2002). Only one study showed that the need for preventive/sealant treatment accounted for 11% of the various dental treatment needs (Sarvanan *et al.,* 2003). Mandal *et al.,* (2001) reported that the children living in both urban and rural areas had similar dental treatment needs.

Dental caries and oral hygiene methods

The data in Table 1.5 refer to methods of oral hygiene practised by children in India. The reports indicate that more than two-thirds of the children claimed that they practised tooth brushing with toothpaste and that less than one-third of the children practised tooth brushing with tooth powder. The children in Tamil Nadu did not use any traditional or other mode of oral hygiene practise (Gopinath *et al.,* 1999). Less than 1% of children in Pondicherry reported using a traditional method of oral hygiene practise (Saravanan *et al.,* 2003).

The data in Table 1.6 shows that except in Kerala (Retanakumri, 1999; Kuriakose, 1999), more than 90% of the children claimed that they brushed once daily while less than 10% of children brushed twice daily. In Kerala, two thirds of the children claimed that they brushed their teeth once daily and one-third of the children brushed twice. Almost all children brushed once or twice daily. Shetty & Tandon (1988) reported that 0.2% of children they studied in Karnatka never brushed their teeth.

Caries experience and fluoride concentration in drinking water

Primary dentition: Table 1.7 shows that in one study, the fluoride levels were less than 0.1 mg/L at which point a therapeutic effect would not be expected. In this study, which was conducted in urban area of West Bengal where the fluoride level was 0.007 the dmft score of 1.9 was observed, where as in rural area of the same state which had a fluoride level of 0.011 a dmft score of 1.5 was noted. These dmft scores did not correlate with the fluoride concentration (Mandal *et al.,* 2001). In the other studies reported in Table 1.7, the fluoride concentrations ranged from 0.00 – 0.38 mg/L but, in fact, the dmft score of 3.5 in Karnataka where the fluoride level was 0.00 and dmft score of 2.7 in Chandigarh where the fluoride level was 0.38 did not correlate with the fluoride concentration (Shetty &Tandon, 1988; Chawla *et al.,* 2000).

Permanent dentition: The studies reported in Table 1.8 demonstrate that caries experience in the permanent dentition was inversely related to the fluoride concentration in drinking water. This relationship was significant in only one study in which the DMFT scores, where for example, the DMFT scores for 12-year-olds decreased from 1.0 (0.7 mg/L) to 0.3 (>3.0 mg/L) (Acharya, 2003). The significance status of the caries-fluoride relationship was not reported in rest of the studies (Chawla *et al.,* 2000; Shetty & Tandon, 1988; Mandal *et al.,* 2001). There were no differences in the DMFT scores of children living in rural or urban areas (Mandal et *al.,* 2001).

Table 1.1: Primary dentition caries experience of children in various Indian states

Reference	State	Class	Age	Sex	n	dmft	sd	dmfs	sd
Gopinath *et al.* (1999)	Tamil Nadu		3-6	M	50	0.10			
			3-6	F	47	0.00			
Saravanan *et al.* (2003)	Pondicherry		5	M	527	1.90	2.64		
			5	F	482	1.40	2.18		
Shetty & Tandon (1988)	Karnataka		5-6		450	3.50	3.72	10.20	12.76
Chawla *et al.* (2000)	Chandigarh		5-6		131	2.60	1.45	6.00	9.77
Mandal *et al.* (2001)	West Bengal	Urban	5-6		124	1.80	2.33	3.80	5.13
		Rural	5-6		120	1.50	2.11	3.00	4.94
	Orissa	Urban	5-6		116	2.30	2.67	5.20	6.73
		Rural	5-6		117	1.60	2.14	3.00	4.73
	Sikkim	Urban	5-6		110	2.50	2.79	5.80	7.21
		Rural	5-6		109	0.70	1.63	1.70	4.41
Dash *et al.* (2002)	Orissa		5-8		574	2.70		5.00	
Retanakumari (1999)	Kerala		9		100	2.70			

Table 1.2: Mixed dentition caries prevalance[a] by gender in various Indian states including Lahore and Karachi, Pakistan

Reference	State	Age	Gender	N	Caries prevalence	p value
Gopinath *et al.* (1999)	Tamil Nadu	3-6	Males	50	36.2	
			Females	47	36.0	
			Both	97		NR[b]
Shetty & Tandon (1988)	Karnataka	5-6	Males	225	74.0	
			Females	225	68.0	
			Both	450		NS
Gopinath *et al.* (1999)	Tamil Nadu	6-9	Males	109	63.4	
			Females	123	58.7	
			Both	232		NR
Retanakumari (1999)	Kerala	6-12	Males	371	68.0	
			Females	379	66.0	
			Both	750		NR
Gopinath *et al.* (1999)	Tamil Nadu	9-12	Males	41	80.4	
			Females	45	68.8	
			Both	86		NR
Khan (1992)	Lahore Karachi	12-15	Males	1401	50.0	
			Females	1765	50.0	
			Both	3166		NR

[a] dmft or DMFT > 0

[b] Not reported

Continued over

Table 1.2 (continued): Mixed dentition caries prevalance[a] by gender in various Indian states including Lahore and Karachi, Pakistan

Reference	State	Age	Gender	N	Caries prevalence	p value
Singh *et al.* (1999)	Haryana	12-16	Males	688	37.9	
			Females	331	42.6	
			Both	1019		NS
Shetty & Tandon (1988)	Karnataka	15-16	Males	222	69.0	
			Females	228	65.0	
			Both	450		NS

[a] dmft or DMFT > 0

[b] Not reported

Table 1.3: Permanent dentition caries experience of children in various Indian states including Lahore and Karachi, Pakistan

Reference	State	Class	Age	Sex	N	DMFT	SD	DMFS	SD
Gopinath *et al.* (1999)	Tamil Nadu		6-9	M	109	0.30			
				F	123	0.40			
			9-12	M	41	1.20			
				F	45	1.10			
Subrata (1996)	West Bengal		6-14		9600				
Gauba *et al.* (1986)	Punjab		7-17		1516	3.80	2.72	5.80	4.24
Dash *et al.* (2002)	Orissa		11-15		683	2.00		3.00	
Maher (1992)	Karachi Lahore		12		218	1.80	2.35	2.46	
Saravanan *et al* .(2003)	Pondicherry		12	M	510	0.40			
			12	F	503	0.50			
Khan (1992)	Lahore		12-15		3166	1.20			
Chawla *et al.* (2000)	Chandigarh		12-15		378	1.10	1.35	1.50	2.21
Acharaya (2003)	Karnataka		12		609	0.68			
			15		519	0.84			
Singh *et al.* (1999)	Haryana		12-16		1019	1.00			

Continued over

Table 1.3 (continued): Permanent dentition caries experience of children in various Indian states including Lahore and Karachi, Pakistan

Reference	State	Class	Age	Sex	N	DMFT	SD	DMFS	SD
Mandal *et al.* (2001)	West Bengal	Urban	15-16		119	0.40	0.77	0.70	1.68
		Rural			118	0.30	0.75	0.60	1.89
	Orissa	Urban	15-16		120	0.30	0.66	0.70	1.90
		Rural			121	0.30	0.74	0.90	2.36
	Sikkim	Urban	15-16		106	0.50	0.94	1.60	3.18
		Rural			106	0.30	0.88	1.10	3.71

Table 1.4: Dental treatment needs of Indian children by age and state (percentages)

Ref.[a]	Age	State		N	Tooth surface restorative needs: One	Tooth surface restorative needs: One or more	Tooth surface restorative needs: Two or more	Other restorative needs: Crown	Other restorative needs: Pulp care	Other needs: Exo	Other needs: Sealant/ preventive	Other needs: Unspecified	Other needs: None	Total
1	5-12	Pondicherry		2022	23.1		11	0.4	6.8	3.8	11	1.7	58.1	Note
2	5-15	Orissa		808		80.8				14.7		4.5		100
3	7-17	Punjab		1516		60.3								—
4	5-6	West Bengal	Urban	231	2.87		4.94	0.19		0.34		0.41		
			Rural	178	2.58		3.56	0.31		0.27		0.23		
		Orissa	Urban	274	3.15		5.98	0.98		0.70		0.41		
			Rural	185	3.08		3.36	0.20		0.42		0.00		
		Sikkim	Urban	277	2.85		6.29	1.06		0.08		0.99		
			Rural	76	0.89		1.56	0.08		0.17		0.50		
4	15-16	West Bengal	Urban	37	0.69		0.15	0.06		0.00		0.22		
			Rural	35	0.61		0.21	0.00		0.06		0.00		
		Orissa	Urban	33	0.44		0.30	0.00		0.12		0.12		
			Rural	39	0.41		0.32	0.03		0.18		0.00		
		Sikkim	Urban	56	0.60		0.45	0.00		0.40		0.44		
			Rural	34	0.23		0.24	0.00		0.34		0.34		

Note — Totals do not add to 100%
[ ] % of teeth

a
1 Saravanan *et al.*, 2003
2 Dash *et al.*, 2002
3 Gauba *et al.*, 1986
4 Mandal *et al.*, 2001

Table 1.5: Percentage distributions of oral hygiene methods that were reported to have been practised by children in various Indian states

				Oral hygiene method		
Reference	**State**	**Age**	**N**	**Tooth brushing with toothpaste**	**Tooth brushing with tooth powder**	**Traditional[a]/ other methods**
Shetty & Tandon (1988)	Karnataka	5-6	450	90.0		10.0
		15-16	450	81.7	0.2	18.0
Retanakumari (1999)	Kerala	6-12	750	82.0	3.0	15.0
Gopinath *et al.* (1999)	Tamil Nadu	3-6	97	87.6	12.4	
		6-9	232	79.7	20.3	
		9-12	86	74.4	25.6	
Saravanan *et al.* (2003)	Pondicherry	5-12	2022	67.3	31.8	0.9

[a] Includes use of mango leaves, salt, finger, charcoal, brick powder, and ash.

Table 1.6: Percentage distributions of tooth brushing frequency practised by children in various Indian states who claimed that they brushed their teeth

				Daily brushing frequency		
Reference	**State**	**Age**	**N**	**Once**	**Twice**	**Never**
Saravanan *et al.* (2003)	Pondicherry	5-12	2022	96.4	3.6	
Shetty & Tandon (1988)	Karnataka	5-6	450	97.1	2.8	
		15-16	450	94.2	5.5	0.2
Retanakumari (1999)	Kerala	6-12	750	69.9	30.1	
Gopinath *et al.* (1999)	Tamil Nadu	3-6	97	94.8	5.2	
		6-9	232	93.1	6.9	
		9-12	86	93.0	7.0	
Kuriakose (1999)	Kerala	Pre-school	545	64.5	35.5	

Table 1.7: Primary dentition caries experience of children from various Indian states by fluoride concentration (mg/L) in drinking water

Reference	State		Year	F(mg/L)	Age	N	Prevalence	Mean dmft	p value
Shetty & Tandon (1988)	Karnataka			0.00	5-6	130	70.0	3.5	NR[a]
				0.05		60	87.0	5.0	
				0.10		75	77.0	3.8	
				0.20		59	68.0	3.1	
				0.25		78	59.0	3.0	
				0.30		48	67.0	2.9	
Chawla *et al.* (2000)	Chandigarh		1977	0.28	5-6			2.6	NR
			1993	0.38	5-6	131		2.7	
Mandal *et al.* (2001)	West Bengal	Urban		0.007	5-6	124		1.9	NR
		Rural		0.011		120		1.5	
	Orissa	Urban		0.004		116		2.4	
		Rural		0.006		117		1.6	
	Sikkim	Urban		0.004		110		2.5	
		Rural		0.004		109		0.7	

[a] Not reported

Table 1.8: Permanent dentition caries experience of children from various Indian states by fluoride concentration (mg/L) in drinking water

Reference	State	Year	F(mg/L)	Age	N	Prevalance	Mean DMFT	p value
Chawla *et al.* (2000)	Chandigarh	1977	0.28	12			3.9	NR[a]
		1993	0.38	12	223		1.3	
Acharya (2003)	Karnataka		0.70	12	96	41.6	1.0	<0.01
			0.7-1.2		198	38.4	0.8	
			1.3-2.0		115	20.0	0.6	
			2.0-3.0		147	22.4	0.5	
			>3.0		53	18.8	0.3	
Chawla *et al.* (2000)	Chandigarh	1977	0.28	15			4.7	NR
		1993	0.38	15	155		1.1	
Acharya (2003)	Karnataka		0.70	15	92	35.9	1.4	<0.01
			0.7-1.2		172	32.6	0.8	
			1.3-2.0		89	29.2	0.7	
			2.0-3.0		129	28.7	0.6	
			>3.0		37	27.0	0.5	
Shetty & Tandon (1988)	Karnataka		0.00	15-16	244	67.0	2.8	NR
			0.05		36	64.0	2.3	
			0.10		82	77.0	2.6	
			0.20		20	55.0	2.1	
			0.25		57	61.0	2.3	

[a] Not reported

Continued over

Table 1.8 (continued): Permanent dentition caries experience of children from various Indian states by fluoride concentration (mg/L) in drinking water

Reference	State		F(mg/L)	Age	N	Prevalence	Mean DMFT	p-value
Mandal *et al.* (2001)	West Bengal	Urban	0.007	15-16	119		0.4	NR
		Rural	0.011		118		0.3	
	Orissa	Urban	0.004		120		0.3	
		Rural	0.006		121		0.3	
	Sikkim	Urban	0.004		106		0.5	
		Rural	0.004		106		0.3	

SUMMARY AND CONCLUSIONS

The development of a policy for oral care in India commenced in 1984 at a workshop in Bombay organized by the Indian Dental Association. A draft policy was completed in 1986 (Ministry of Health and Family Welfare, 1995). This policy was considered by the Dental Council of India at two national workshops held in Delhi and Mysore in 1991 and 1994, respectively. The outcome was that a National Oral Health Policy for India was formulated (Bali *et al.,* 1994). A core committee appointed by the Ministry of Health and Family Welfare (MOH&FW) was established to move this policy forward in 1995. A National Oral Health Policy containing 10 resolutions was then drafted. This was accepted by the Government of India and was included as part of the National Health Policy in the same year (Lal *et al.,* 2004). In implementing this policy, the MOH&FW instituted a National Oral Health Care Programme (NOHCP) which had nine goals. This was launched as a pilot project, initially in five states, including Delhi, Punjab, Maharashtra, Kerala, and the North Eastern States (Parkash & Shah, undated).

The dental caries experience among 6- and 12-year-olds was low in comparison to the level corresponding to Goal 3 of the National Oral Health Care Programme (NOHCP) 'To bring down the DMFT (decayed, missing, filled teeth) in school children aged 6-12 years from approximately 4 at present to less than 2' (Parkash & Shah, undated). In all the studies, except one (Gauba *et al.,* 1986), DMFT scores were two or less.

The restoration of tooth surfaces was the most common dental treatment need identified among children in various parts of India since the majority of the DMF teeth presented as untreated decay. Whereas Goal 3 of the NOHCP has been met, Goal 1 'Oral Health for all by the year 2010 '

has yet to be reached; the current health services are clearly not sufficient to manage the untreated decay. In addition to the lack of preventive and other dental care services, a lack of awareness about oral health among population may be responsible for the problem of untreated decay. Clearly, there is a need to implement NHCOP Goal 2 'To bring down the incidence of oral and dental diseases to less than 40% from the existing prevalence of 90%'. The National Oral Health Policy resolutions should become an integral part of the National Health Policy (Lal *et al.,* 2004).

Overall, the studies showed that children living in urban areas had higher caries experience compared with the children in rural areas. There is a need for the NOHCP to be launched 'to provide oral health care in urban areas' as stated in Resolution 2 (see Appendix) of the National Oral Health Policy (Lal *et al.,* 2004).

There was an inverse relationship of the dental caries experience among 6-and 12-year-olds with water fluoride concentration (mg/L) in drinking water. This result should be used in health promotion to encourage water fluoridation in regions where the community water supplies have naturally low fluoride levels. This conclusion is supported by the results of a meta-analysis on the role of water fluoridation in caries risk reduction (Cochrane, 2003).

Reference:

1. Acharya S, Anuradha KP (2003). Correlation between water fluoride levels and dental caries in Davangere district, India. *Indian Journal of Dental Research* 14:146-51.

2. Chawla HS, Gauba K, Goyal A (2000). Trend of dental caries in children of Chandigarh over the last sixteen years. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 18:41-5.

3. Damle SG (2002). *Epidemiology of Dental Caries in India*. New Delhi: Arya Publishing House, pages 75-96.

4. Dash JK, Sahoo PK, Bhuyan SK, Sahoo SK (2002). Prevalence of dental caries and treatment needs among children of Cuttack (Orissa). *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 20:139-43.

5. Department of Health & Family Welfare (2006). Punjab, India.

6. Gauba K, Tewari A, Chawla HS (1986). Frequency distribution of children according to dental caries status in rural areas of northern India. *Journal of the Indian Dental Association* 58:505-512.

7. Gopinath VK, Barathi VK, Kannan A (1999). Assessment and treatment of dental caries in semi-urban school children of Tamil Nadu (India). *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 17:9-12.

8. Khan AA (1992). Prevalence of dental caries in school children of Lahore, Pakistan. *Community Dentistry & Oral Epidemiology* 20:155.

9. Kuriakose S, Joseph E (1999). Caries prevalence and its relation to socio-economic status and oral hygiene practices in 600 pre-school children of Kerala India. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 17:97-100.

10. Lal S, Paul D, Pankaj, Vikas, Vashisht BM (2004). National Oral Health Care Programme (NOHCP) Implementation Strategies. *Indian Journal of Community Medicine* 29(1).

11. Maher R, Khan A, Rahimtoola S, Bratthal D (1992). Prevalance of mutans streptocooci and dental caries in Pakistani children. *Journal of Pakistan Medical Association* 42(9):213-5.

12. Mandal KP, Tewari AB, Chawla HS, Gauba KD (2001). Prevalence and severity of dental caries and treatment needs among population in the eastern states of India. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 19:85-91.

13. Marhino VCC, Higgins JPT, Logan S, Sheiham A (2003). Fluoride toothpastes for preventing dental caries in children and adolescents (Review). *Cochrane Database of Systematic Reviews.*

14. Ministry of Health and Family Welfare (2001). *National Oral Health Care Programme.* Directorate General of Health Services. New Delhi: Government of India.

15. Parkash H, Mathur VP (2002). *Indian Pediatrics NOHCP (EDITORIAL).* 39: 1001-1005.

16. Parkash H, Shah N (Editors) (Undated). *National oral health care programme implementation strategies.* New Delhi: Ministry of Health and Family Welfare, Government of India.

17. Registrar General & Census Commissioner, India (2003). *Census Data 2001, National Summary Data Page (NSDP).* New Delhi: Ministry of Home Affairs, Government of India.

18. Retnakumari N (1999). Prevalence of dental caries and risk assessment among primary school children of 6-12 years in the Varkala municipal area of Kerala. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 17:35-42.

19. Saravanan S, Anuradha KP, Bhaskar DJ (2003). Prevalence of dental caries and treatment needs among school going children of Pondicherry, India. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 21:1-12.

20. Shetty NS, Tandon S (1988). Prevalence of dental caries as related to risk factors in schoolchildren of south Kanara. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 6:30-7.

21. Singh S, Kaur G, Kapila VK (1985). Dental disorders in primary school children of Faridkot city. *Journal of the Indian Dental Association* 57:305-308.

22. Singh AA, Singh B, Kharbanda OP, Shukla DK, Goswami K, Gupta S (1999). A study of dental caries in school children from rural Haryana. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 17: 24-8.

23. Subrata S, Subrata S (1996). Prevalence and severity of dental caries and oral hygiene status in rural and urban areas of Calcutta. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 14:17-20.

****

Part Two

Dental Survey of Children in Ferozepur, Punjab, India

Dental Survey of Children in Ferozepur, Punjab, India

Vishal Chhabra and Wendell Evans
Community Oral Health and Epidemiology
Faculty of Dentistry
The University of Sydney, Australia

Key words: Dental caries, dental fluorosis, caries risk
Prepared for publication in the *Indian Dental Journal*.

ABSTRACT

Objectives: A study was conducted in Ferozepur, Punjab. The objectives of this study were to determine (1) the oral health status (caries and fluorosis experience) and treatment needs of children in Ferozepur, (2) the fluoride concentration in drinking water sources in Ferozepur, and (3) possible caries risk factors.

Materials and methods: Children aged 6 and 12 years from four socio-demographic areas were targeted in this study. Schools were stratified on the basis of socio-demographic status: rural, urban-upper middle class, -lower middle class, and -lower class. A total of 1600 children aged 6 and 12 years, that is, 400 in each of the socio-demographic classes constituted the sample size of study. Dental caries and fluorosis experience was determined according to WHO guidelines. A questionnaire was completed by the 12-year-olds to obtain information on oral health behaviour and exposure to caries risk factors.

Results: The mean dmft scores for 6-year-olds was 1.01. 60% were caries-free. The equivalent DMFT scores for 12-year-olds were 0.50 and 72%, respectively. Fluorosis prevalence (very mild or more) was 51.5%. The results of the multiple variable logistic regression analysis indicated that most degrees of fluorosis were associated with significantly less caries experience compared with no fluorosis (ORs of 0.56 or less). Socio-demographic status was also a significant independent predictor of caries experience of caries. Compared with rural children, urban-upper middle class children were more than 50% likely to experience one or more DMFT (OR=1.56).

Conclusions: Caries experience in the primary and permanent dentitions of children is lower than the goals set by National Oral Health Care Programme (NOHCP). High levels of fluorosis are probably due to high levels of fluoride naturally occurring in drinking water (0.60-1.25 mg/L) in urban and rural area respectively, and this indicates that further control of dental caries in Ferozepur must be achieved by means other than water fluoridation. Urban children are more likely to experience caries compared with rural children because of easy access to a rich sugar diet.

INTRODUCTION

India is a country with rich cultural heritage and a population of 1027 Million 2001 (Census), distributed in 28 States, 7 Union Territories, 5564 tehsils/talukas, 640,000 villages and 5161 towns and cities (Bose, 2001). The Indian population is predominantly rural as over 72% of people continue to live in rural areas (Department of Family Welfare, 2003).

Dental caries is one of the most prevalent diseases in children worldwide (Marthaler, 1990). The prevalence of dental caries has declined in developed countries and the reverse pattern is following in developing countries (Rugg-Gunn, 1993).

The dentist to population ratio in India is 1:30,000 which is unevenly distributed. More than 90% of dentists are based in urban settings and only 10% serve the populous rural communities (Ministry of Health and Family Welfare, 1995). Besides this, there is also an acute shortage of equipment, material and other essential facilities to run the minimal curative services for the vast population (Lal *et al.,* 2004).

Dental health services are provided by tertiary level hospitals, district hospitals, private practitioners and non governmental organizations (Lal *et al.,* 2004).

Study objectives

In response to Goal 3 of the NOHCP 'To bring down the DMFT (decayed, missing, filled teeth) in school children aged 6-12 years from approximately 4 at present to less than 2', a study was conducted and the objectives of the study were to determine (1) the oral health status (caries and fluorosis experience) and treatment needs of children in Ferozepur, Punjab, one of the five states to be included in the NOHCP pilot project (Parkash & Shah,

undated), (2) the fluoride concentration in drinking water sources in Ferozepur, and (3) possible caries risk factors.

MATERIAL AND METHODS

Study Population

This study was conducted in Ferozepur district, Punjab in 2007. Ferozepur encompasses four towns and many villages and has a population of around 700,000. The ground water in Ferozepur has a high fluoride concentration, ranging from 0.60 to 1.25 mg/L. Children from Grades 1 and 7 from four socio-demographic classes (urban upper middle, urban lower middle, urban lower class and rural) classes were targeted in this study. Schools were stratified on the basis of socio-demographic class, where urban upper middle, urban lower middle and urban lower class equated with school fees of Indian Rupees 700-1000, 400-700, and 200-400 per month respectively. Rural children attended schools situated more than 5 km from the city boundary where school fees are minimal or not charged.

Sampling

A total of 1600 children from Grades 1 and 7 constituted the sample size, including 400 subjects in each of the four socio-demographic classes. A total of nine schools were selected (two from urban upper middle, two from urban lower middle, two from urban poor, and three from the rural area). They were selected randomly from the list of all schools that included all the government and private schools. At each school, all Grade 1 children were selected. These children were mostly aged 6 year but included some aged 5 and 7 years. Similarly, all the children from Grade 7 were selected. They were mainly aged 12 years along with some 11- and 13-year-olds.

Assessment of caries risk factors

A seven item questionnaire was completed during school hours by the 12 year olds. Information was collected on the potential risk factors for caries experience including use of tooth brushes, tooth brushing frequency, type of toothpastes, and consumption of sugar containing food items, beetle nut chewing, dental visits and reasons for dental visits.

The questionnaire was completed by each child without discussion among themselves. However, prior to its completion they were given an opportunity ask questions to clarify any related matters.

Caries assessment

Caries assessment was conducted according to W.H.O guidelines (1997). Dental caries was diagnosed by tactile examination with the use of plain mouth mirror and a probe. The decayed component of DMFT was divided in two parts D1mm and D 4mm (depending on the diameter of cavity). Initial caries (incipient/ early caries lesions) was not recorded.

The dental examination was performed in the natural daylight by a single examiner (VC) who had been calibrated in Australia during a similar survey of school children before the survey. The instruments were disinfected by chemical procedures during the day.

Fluorosis assessment

Fluorosis was graded by using Dean's index of fluorosis. The fluorosis examination was also performed in good natural day light by the same examiner (VC). Photographs were also taken.

Fluoride concentration assessment

Ground water samples from both the urban and rural areas were collected from the hand pumps (main source of drinking water). They were analyzed in a laboratory in Sydney, Australia for the determination of fluoride concentration (mg/L) in drinking water. The concentration of fluoride in the samples taken from the urban and rural areas were 0.60 and 1.25 mg/L, respectively.

Statistical analyses

The data were later entered into an electronic database for subsequent data analysis using Epi Info ^{TM} (Version 3.2.2) software. The total number of decayed, missing or filled permanent teeth (DMFT index) was calculated by this criterion.

Following the data checking, the mean DMFT scores were calculated. Firstly, bivariate associations between DMFT scores and the caries risk factors were explored which included use of tooth brush, frequency of tooth brushing, type of toothpastes, and consumption of sugar containing food items, beetle nut chewing, dental visits and reasons for dental visits. Secondly, the risk factors that were significantly associated in the bivariate analysis with the differences in DMFT groups were explored further in a logistic regression analysis to model potential predictors for caries experience in Grade 7 children.

RESULTS

The principals of the nine selected schools all agreed to include their schools in survey and on behalf of the parents, gave their consent for the oral examination of the children.

Primary dentition caries experience

A total of 200 Grade 1 children were examined in each of the socio-demographic groups. Overall, 60% of the Grade 1 children were caries free and although the level of caries freedom was greater in females, this gender difference was not significant (Table 2.1). There were more decayed teeth than missing teeth whereas the number of filled teeth were negligible. Among the decayed teeth, there were more 4mm sized cavities than 1mm.

The overall mean dmft score was 1.01. Children, both male and female, from the urban lower middle class had higher dmft scores, 1.45 and 1.17, respectively, compared with children in the other socio-demographic groups. The difference across the socio-demographic groups was significant ($p = 0.010$). Caries experience was lowest among the rural children.

Permanent dentition caries experience

Similarly, 200 Grade 7 children were examined in each of the socio-demographic groups (Table 2.2). The overall caries experience in this was 0.50 DMFT and 72 per cent were caries free. The DMFT score was highest (0.71) among children from the urban upper middle class and lowest (0.38) among those from the rural area. The differences across the groups was significant ($p=0.030$). Distributions of the caries experience statistics were similar across both male and female socio-demographic groups.

Caries experience and risk factors

Caries experience by oral health related behaviours and socio-demographic factors of the Grade 7 children are shown (Table 2.3). As noted in relation to the data in Table 2.2, socio-demographic status was significantly (p=0.030) associated with caries experience. No other variable was significantly associated, however, the association between fluorosis and DMFT approached significance (p=0.06).

Fluorosis prevalence was 51.5%. This proportion includes those with very mild or more severe fluorosis. Only 13.8% were classified as having normal tooth enamel and 33.9% were borderline and classified as questionable. Respective proportions having very mild, mild, moderate, and severe degrees of fluorosis were: 19.8, 17.4, 10.0 and 4.4%. Children without fluorosis had a mean DMFT score of 0.70 whereas children who had severe fluorosis had nearly half that score.

As a result of the dichotomisation of caries experience in the logistic regression analysis, the unadjusted odds ratios revealed that most degrees of fluorosis were associated with significantly less caries experience compared with no fluorosis (Table 2.4). This outcome was maintained (ORs of 0.56 or less) in the multiple regression analysis to control for potential confounding. Similarly, socio-demographic status remained as a significant independent predictor of caries experience of caries (OR=1.56) in children residing in Ferozepur while gender remained as a non-significant predictor.

Table 2.1: Primary dentition caries experience of Grade 1 children by socio-demographic status

Socio-demographic status	N	% CF	d1mm[a]	d4mm[b]	d	m	f	dmft	SD	p value
Males										
Rural	121	74	0.19	0.23	0.44	0.25	0.00	0.70	1.90	0.000
Urban poor	125	54	0.30	0.36	0.74	0.21	0.03	0.98	1.67	
Urban lower middle class	132	55	0.36	0.83	1.31	0.14	0.00	1.45	2.12	
Urban upper middle class	126	59	0.50	0.40	0.96	0.06	0.00	1.03	1.74	
Females										
Rural	79	58	0.15	0.44	0.62	0.26	0.00	0.89	1.31	0.890
Urban poor	75	63	0.20	0.32	0.60	0.32	0.00	0.92	1.88	
Urban lower middle class	69	58	0.17	0.55	0.91	0.19	0.07	1.17	2.19	
Urban upper middle class	73	58	0.20	0.56	0.79	0.08	0.01	0.89	1.45	
Both										
Rural	200	68	0.18	0.32	0.51	0.26	0.00	0.77	1.70	0.010
Urban poor	200	58	0.26	0.35	0.68	0.25	0.02	0.95	1.74	
Urban lower middle class	201	56	0.29	0.73	1.17	0.15	0.02	1.35	2.14	
Urban upper middle class	199	58	0.40	0.46	0.90	0.07	0.01	0.98	1.63	
Males	504	60	0.34	0.46	0.87	0.17	0.00	1.05	1.89	0.967
Females	296	59	0.18	0.47	0.73	0.21	0.02	0.96	1.72	
Total	800	60	0.28	0.46	0.82	0.19	0.01	1.01	1.82	

a Cavity diameter at least 1mm
b Cavity diameter of 4mm or more

Table 2.2: Permanent dentition caries experience of Grade 7 children by socio-demographic status

Socio-demographic status	N	%CF	D_{1mm} [a]	D_{4mm} [b]	D	M	F	DMFT	SD	p value
Males										
Rural	106	75	0.11	0.22	0.35	0.05	0.01	0.42	0.83	0.370
Urban poor	110	71	0.16	0.28	0.50	0.05	0.00	0.56	1.01	
Urban lower middle class	106	72	0.10	0.20	0.36	0.02	0.00	0.39	0.75	
Urban upper middle class	101	67	0.28	0.36	0.64	0.04	0.03	0.73	1.19	
Females										
Rural	94	80	0.07	0.18	0.26	0.06	0.00	0.31	0.75	0.010
Urban poor	90	82	0.10	0.16	0.28	0.04	0.00	0.32	0.83	
Urban lower middle class	94	67	0.06	0.33	0.46	0.10	0.04	0.60	1.10	
Urban upper middle class	99	67	0.25	0.33	0.66	0.03	0.01	0.69	1.17	
Both										
Rural	200	77	0.09	0.20	0.30	0.06	0.01	0.38	0.79	0.030
Urban poor	200	76	0.13	0.23	0.40	0.05	0.00	0.46	0.94	
Urban lower middle class	200	70	0.08	0.26	0.40	0.07	0.02	0.49	0.94	
Urban upper middle class	200	67	0.26	0.35	0.64	0.04	0.02	0.71	1.18	
Males	423	71	0.16	0.26	0.46	0.04	0.01	0.52	0.97	
Females	377	74	0.12	0.25	0.41	0.06	0.01	0.49	0.99	
Total	800	72	0.14	0.25	0.44	0.05	0.01	0.50	0.98	0.398

a Cavity diameter at least 1mm
b Cavity diameter of 4mm or more

Table 2.3: Caries experience by oral health related behaviours and socio-demographic factors of Grade 7 children

	N	%	%CF[a]	Mean DMFT	SD	p value
How do you clean your teeth?	800					
Use of tooth brush	737	92.1	73	0.50	0.99	0.940
Other method or don't clean	63	7.8	71	0.49	0.95	
How often do you clean your teeth?	800					
More than once daily	257	32.1	71	0.59	1.08	0.290
Once daily	466	58.2	75	0.47	0.95	
Less than once daily or never	77	9.6	71	0.40	0.78	
Which of the type of toothpaste you use?	800					
Fluoridated	730	91.2	74	0.50	0.99	0.240
Non-fluoridated	42	5.2	71	0.50	0.80	
Don't use toothpaste	28	3.5	64	0.67	0.94	
Which sugar containing food items do you usually take between meals?	800					
Sweets	122	15.2	75	0.48	1.02	0.200
Chocolates	60	7.5	60	0.78	1.09	
Soft drink	72	9.0	71	0.48	0.94	
Hot drinks	298	37.2	73	0.48	0.92	
Biscuits	238	29.7	76	0.49	1.02	
Other	10	1.2	80	0.30	0.44	
How often do you chew betelnut/pan?	800					
Daily or more than once daily	102	12.7	77	0.46	0.96	0.570
Once or twice a week	196	24.5	70	0.55	0.99	
Never	502	62.7	74	0.50	0.98	

a Caries Free

Continued over

Table 2.3 (continued): Caries experience by oral health related behaviours and socio-demographic factors of Grade 7 children

	N	%	%CF[a]	Mean DMFT	SD	p value
Have you been to a dentist?	800					
Yes	358	44.7	71	0.56	1.01	0.120
No	442	55.2	75	0.46	0.95	
Why did you visit a dentist?	358					
Caries	339	94.7	71	0.57	1.02	0.870
Orthodontic reasons	19	5.3	68	0.58	0.96	
Fluorosis score	800					
No fluorosis	110	13.8	61	0.70	1.04	0.060
Questionable	271	33.9	76	0.41	0.85	
Very mild	158	19.8	72	0.53	0.99	
Mild	139	17.3	76	0.49	1.00	
Moderate	80	10.0	76	0.56	1.19	
Severe	35	4.3	80	0.34	0.80	
Missing values	7	0.1				
Socio-demographic status	800					
Rural	200	25.0	78	0.37	0.80	0.030
Urban poor	200	25.0	76	0.45	0.94	
Urban lower middle	200	25.0	72	0.49	0.94	
Urban upper middle	200	25.0	68	0.71	1.18	
Gender	800					
Males	423	52.9	72	0.52	0.97	0.390
Females	377	47.1	74	0.48	0.99	

a Caries Free

Table 2.4: Logistic regression analysis of potential predictors for caries experience in Grade 7 children

Variables	N	Unadjusted OR	95% CI		p value	Adjusted OR	95% CI		p value
Socio-demographic status									
Urban upper middle	200	1.64	1.05	2.56	0.025	1.56	1.00	2.45	0.049
Urban lower middle	200	1.46	0.94	2.29	0.090	1.40	0.89	2.20	0.141
Urban poor	200	1.05	0.66	1.67	0.810	0.96	0.60	1.54	0.873
Rural	200	1.00				1.00			
Fluorosis									
Questionable	271	0.38	0.15	0.97	0.040	0.52	0.32	0.84	0.008
Very mild	158	0.65	0.39	1.10	0.110	0.67	0.40	1.10	0.137
Mild	139	0.54	0.31	0.93	0.020	0.56	0.32	0.96	0.037
Moderate	80	0.48	0.25	0.92	0.020	0.52	0.27	0.99	0.049
Severe	35	0.38	0.15	0.97	0.040	0.39	0.15	0.98	0.040
No	110	1.00				1.00			
Gender									
Male	423	1.13	0.83	1.55	0.415	1.15	0.84	1.58	0.370
Female	377	1.00				1.00			

Caries experience dichotomised as DMFT = zero or 1 plus

DISCUSSION

The overall caries prevalence in 6 and 12 year old was low in comparison to the Goal 3 of the NOHCP 'To bring down the DMFT (decayed, missing, filled teeth) in school children aged 6-12 years from approximately 4 at present to less than 2'.

Risk of caries was significantly associated with socio-demographic status and fluorosis. The important question is whether the association is casual or not. As this is cross-sectional study, the caries experience outcome was measured directly on the day of survey, while exposures to the variables of interest were inferred on the basis of the current habits of the children. The weakness of this research design is the assumption that measures of exposure, based on current habits, may be biased estimates of previous habits. Hence, the inference we have drawn on the basis of the exposure estimate can only be interpreted as suggestive of a casual link, rather than proof of one. To prove causation, the ideal research design would be that of controlled cohort study in which the children would be followed for a period, throughout which their exposures to socio demographic factors and other oral health related behaviors along with confounding factors would be assessed at regular intervals. In this way, the exposures could be better quantified.

The inverse association between exposure to fluoride and caries prevalence has been well established in number of studies (Shetty & Tandon, 1998; Chawla *et al.,* 2000; Acharya & Anuradha, 2003) and was confirmed in this study.

The higher caries experience of children living in urban areas, as shown in this study, has been observed in many other studies conducted in developing countries (Kuriakose & Joseph, 1996; Subrata & Subrata,

1996; Mandal *et al.,* 2001) and they suggested that this was due to combination of (1) use of filter water in urban areas, (2) easy accessibility of fast food, candy and other sweets to urban children, (3) no or less pocket money given to rural children, or (4) a fibrous diet taken by rural children including use of sugarcane. However, although the caries experience of children was found to be higher in urban areas than in rural areas in this study, it was not confirmed that this was due to dietary or oral hygiene factors.

It is recommended, in line with the National Oral Health Policy resolution that a National Institute for Dental Research should be established to determine national oral health needs of the population (Lal *et al.,* 2004).

Conclusion

Caries experience in the primary and permanent dentitions of children is lower than the goals set by National Oral Health Care Programme (NOHCP). High levels of fluorosis are probably due to high levels of fluoride naturally occurring in drinking water (0.60-1.25 mg/L) in urban and rural area respectively, and this indicates that further control of dental caries in Ferozepur must be achieved by means other than water fluoridation.The low caries experience of the children was most likely due to the high concentration of fluoride naturally occurring in drinking water. Urban children are more likely to have caries as compared with rural children because of the easy availability of refined rich sugar diet and use of filter water for drinking. Fluorides have once again proved to provide a caries preventive effect.

Acknowledgements

We are grateful to the school principals, parents, and children for their co-operation during the survey, and we thank the water engineer for data on the fluoride concentration in the water supplies in the survey regions.

Reference:

1. Acharya S, Anuradha KP (2003). Correlation between water fluoride levels and dental caries in Davangere district, India. *Indian Journal of Dental Research* 14:146-51.

2. Bali RK, Mathur VB, Tewari A, Jayna P (1994). *National Oral Health Policy*, New Delhi: Dental Council of India.

3. Bose A (2001). Health for the millions, Population Scan, First results of census of India.

4. Chawla HS, Gauba K, Goyal A (2000). Trend of dental caries in children of Chandigarh over the last sixteen years. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 18:41-5.

5. Department of Family Welfare (2003). *Bulletin on Rural Health Statistics in India.* New Delhi: Ministry of Health and Family Welfare, Government of India.

6. Kuriakose S, Joseph E (1999). Caries prevalence and its relation to socio-economic status and oral hygiene practices in 600 pre-school children of Kerala India. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 17:97-100.

7. Lal S, Paul D, Pankaj, Vikas, Vashisht BM (2004). National Oral Health Care Programme (NOHCP) Implementation Strategies. *Indian Journal of Community Medicine* 29: 3-10.

8. Mandal KP, Tewari AB, Chawla HS, Gauba KD (2001). Prevalence and severity of dental caries and treatment needs among population in the eastern states of India. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 19:85-91.

9. Marthaler TM (1990). Changes in the prevalence of dental caries: how much can be attributed to changes in diet? Diet, nutrition and dental caries. *Caries Research* 24(suppl 1):3-15.

10. Ministry of Health and Family Welfare (1995). *National Oral Health Policy. Fourth conference of Central Council of Health and Family Welfare - Proceedings and Resolutions.* New Delhi: Government of India.

11. Parkash H, Shah N (Editors) (Undated). *National oral health care programme implementation strategies.* New Delhi: Ministry of Health and Family Welfare, Government of India.

12. Rugg-Gunn AJ (1993). *Nutrition and dental health.* Oxford: Oxford University Press.

13. Shetty NS, Tandon S (1988). Prevalence of dental caries as related to risk factors in schoolchildren of south Kanara. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 6:30-7.

14. Subrata S, Subrata S (1996). Prevalence and severity of dental caries and oral hygiene status in rural and urban areas of Calcutta. *Journal of the Indian Society of Pedodontics & Preventive Dentistry* 14:17-20.

****

Appendix A.

Letter of approval from the Human Research Ethics Committee, The University of Sydney, including, the Participant Information Sheet (English and Punjabi), the Parent/Guardian Consent Form (English and Punjabi), and the Need for Dental Care Form (English and Punjabi).

The University of Sydney

NSW 2006 Australia

Human Research Ethics Committee
www.usyd.edu.au/ethics/human
Senior Ethics Officer:
Gail Briody
Telephone: (02) 9351 4811
Facsimile: (02) 9351 6706
Email: gbriody@usyd.edu.au
Rooms L4.14 & L4.13 Main Quadrangle A14

Human Secretariat
Telephone: (02) 9036 9309
(02) 9036 9308
Facsimile: (02) 9036 9310
Email: bdeleon@usyd.edu.au

19 December 2006

Associate Professor W Evans
Community Oral Health and Epidemiology
Faculty of Dentistry
Westmead Centre for Oral Health
Westmead Hospital
C24

Dear Professor Evans

I am pleased to inform you that the Human Research Ethics Committee (HREC) at its meeting on 12 December 2006 approved your protocol entitled **"Dental Survey of 6 year olds and 12 year olds in India"**

Details of the approval are as follows:

Ref No.:	***12-2006/9740***
Approval Period:	***December 2006 – December 2007***
Authorised Personnel:	***Associate Professor W Evans***
	Dr M G Varkey
	Dr B Christian
	Dr A S Badwal
	Dr P Grover
	Dr P Mehta
	Dr V Chabbra

The HREC is a fully constituted Ethics Committee in accordance with the *National Statement on Ethical Conduct in Research Involving Humans-June 1999* under *Section 2.6.*

The approval of this project is **conditional** upon your continuing compliance with the *National Statement on Ethical Conduct in Research Involving Humans.* We draw to your attention the requirement that a report on this research must be submitted every 12 months from the date of the approval or on completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed.

Special Condition of Approval

- Notify the name of schools in India when they become available.

Chief Investigator / Supervisor's responsibilities to ensure that:

(1) All serious and unexpected adverse events are to be reported to the HREC as soon as possible.

(2) All unforeseen events that might affect continued ethical acceptability of the project are to be reported to the HREC as soon as possible.

(3) The HREC must be notified as soon as possible of any changes to the protocol. All changes must be approved by the HREC before continuation of the research project. These include:-

- If any of the investigators change or leave the University.
- Any changes to the Participant Information Statement and/or Consent Form.

(4) All research participants are to be provided with a Participant Information Statement and Consent Form, unless otherwise agreed by the Committee. The Participant Information Statement and Consent Form are to be on University of Sydney letterhead and include the full title of the research project and telephone contacts for the researchers, unless otherwise agreed by the Committee and the following statement must appear on the bottom of the Participant Information Statement. *Any person with concerns or complaints about the conduct of a research study can contact the Senior Ethics Officer, University of Sydney, on (02) 9351 4811 (Telephone); (02) 9351 6706 (Facsimile) or gbriody@usyd.edu.au (Email).*

(5) The HREC approval is valid for four (4) years from the Approval Period stated in this letter. Investigators are requested to submit a progress report annually.

(6) A report and a copy of any published material should be provided at the completion of the Project.

Yours sincerely

John Watson

Associate Professor J D Watson
Chairman
Human Research Ethics Committee

PARTICIPANT INFORMATION STATEMENT

1. **What is this study about?**
   Oral health is an essential part of general health. This study will show the amount of tooth decay in children aged 6 and 12 years.

2. **Who is carrying out the study?**
   This study is being conducted by an Indian dentist, who is training to be a dental specialist. Associate Professor Wendell Evans at the University of Sydney – Australia supervises his training.

3. **What does the study involve?**
   This study is part of a big study carried out in four states of India. The study involves a dental examination of your child conducted according to World Health Organization standards. Dr Vishal Chhabra will also ask questions about your child's oral habits.

4. **How much time will the study take?**
   It will take only few minutes to complete everything.

5. **Can I withdraw from the study?**
   Yes, you can withdraw anytime without penalty.

6. **What if I require further information?**
   Please contact Dr Vishal Chhabra by telephone 9216052700 for any further information.

Any person with concerns or complaints about the conduct of the research study can contact Manager for Ethics Administration, University of Sydney on (612) 9351 4811.

The University of Sydney

PARENT/GUARDIAN CONSENT FORM

Title of research project: "Dental survey of 6 year olds and 12 year olds in India"
Name of Investigator: Dr Vishal Chhabra
Chief Investigator: Associate Professor Wendell Evans

I permit ....., who is aged ..... years, to participate in the survey.

In giving consent I acknowledge that:

1. I have received the Patient Information Statement and that I have read and understood the information given.
2. Dr Vishal Chhabra has given me the opportunity to discuss this information and to ask questions about the project, and they have been answered to my satisfaction.
3. I understand that I can withdraw my child from the study at any time without penalty now or in the future.
4. I understand that if I have any further questions relating to my child's participation in this survey I may contact Dr Chhabra who will be happy to answer them.

Signature of Parent/Guardian

..... Date .....

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

NEED FOR DENTAL CARE

Dear Parent,

I have examined your child..... today and wish to inform you that he/she needs to attend the dental clinic at..... for dental treatment.

Sincerely,

Dr Vishal Chhabra
Dentist

ਸਿਡਨੀ ਯੂਨੀਵਰਸਿਟੀ

ਫੈਕਲਟੀ ਆਫ ਡੈਨਟਿਸਟਰੀ
ਕਾਲਜ ਆਫ ਹੈਲਥ ਸਾਇੰਸ

ਹਿੱਸਾ ਲੈਣ ਲਈ ਯੋਗਤਾ ਦੀ ਸੂਚਨਾ

1) **ਇਹ ਵਿਦਿਅਕ ਖੋਜ ਕਿਸ ਬਾਰੇ ਹੈ ?**

ਦੰਦਾ ਦੀ ਸੰਭਾਲ ਆਮ ਸਿਹਤ ਦਾ ਜਰੂਰੀ ਹਿੱਸਾ ਹੈ । ਇਹ ਵਿਦਿਅਕ ਖੋਜ 6 ਸਾਲ ਤੇ 12 ਸਾਲ ਦੇ ਬੱਚਿਆ ਦੇ ਦੰਦਾਂ ਵਿਚ ਕਿੜਿਆ ਦੀ ਮਾਤਰਾ ਬਾਰੇ ਦਸੇਗੀ ।

2) **ਇਹ ਵਿਦਿਅਕ ਖੋਜ ਕੋਣ ਕਰ ਰਿਹਾ ਹੈ ?**

ਇਹ ਵਿਦਿਅਕ ਖੋਜ ਡਾ. ਵਿਸ਼ਾਲ ਛਾਬੜਾ ਕਰ ਰਿਹਾ ਹੈ । ਜੋਕਿ ਇਕ ਭਾਰਤੀ ਦੰਦਾਂ ਦਾ ਡਾਕਟਰ ਹੈ ਅਤੇ ਸਿਡਨੀ, ਆਸਟ੍ਰੇਲਿਆ ਦੀ ਯੂਨੀਵਰਸਿਟੀ ਵਿੱਚ ਦੰਦਾਂ ਦੀ ਵਿਸ਼ੇਸ਼ ਪੜਾਈ ਕਰ ਰਿਹਾ ਹੈ ।

3) **ਇਸ ਵਿਦਿਅਕ ਖੋਜ ਵਿਚ ਕੀ ਕੀ ਸ਼ਾਮਲ ਹੈ ?**

ਇਹ ਵਿਦਿਅਕ ਖੋਜ ਇਕ ਵੱਡੀ ਖੋਜ ਦਾ ਹਿੱਸਾ ਹੈ । ਜੋਕਿ ਵਿਸਵ ਸਿਹਤ ਸੰਸਥਾਨ ਦੇ ਨਿਯਮਾਂ ਨਾਲ ਭਾਰਤ ਦੇ ਚਾਰ ਪ੍ਰਦੇਸ਼ਾ ਵਿੱਚ ਹੋ ਰਹੀ ਹੈ । ਇਸ ਵਿੱਚ ਦੰਦਾਂ ਨੂੰ ਚੈਕ ਅਤੇ ਬੱਚਿਆ ਦੇ ਖਾਨਪੀਨ ਬਾਰੇ ਪ੍ਰਸ਼ਨ ਸਾਮਲ ਹਨ ।

4) **ਇਹ ਵਿਦਿਅਕ ਖੋਜ ਕਿੰਨਾਂ ਸਮਾਂ ਲੈਦੀ ਹੈ ?**

ਇਹ ਵਿਦਿਅਕ ਖੋਜ ਕੁਝ ਮਿੰਟ ਵਿਚ ਹੀ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ ।

5) **ਕੀ ਮੈਂ ਇਸ ਵਿਦਿਅਕ ਖੋਜ ਨੂੰ ਛੱਡ ਸਕਦਾ ਹਾਂ ?**

ਹਾਂ, ਤੁਸੀ ਇਸ ਵਿਦਿਅਕ ਖੋਜ ਨੂੰ ਕਿਸੇ ਵੀ ਸਮੇ ਬਿਨਾ ਕਿਸੇ ਜੁਰਮਾਨੇ ਤੋਂ ਛੱਡ ਸਕਦੇ ਹੋ ।

6) **ਜੇਕਰ ਮੈਂ ਇਸ ਵਿਦਿਅਕ ਖੋਜ ਬਾਰੇ ਕੁਝ ਹੋਰ ਪਤਾ ਕਰਨਾ ਹੋਵੇ ਤਾਂ ਮੈਂ ਕਿ ਕਰਾਂ ?**

ਡਾਕਟਰ ਵਿਸ਼ਾਲ ਛਾਬੜਾ ਟੇਲੀਫੁਨ ਨੰ: 92160-52700 ਤੇ ਸਮਪਰਕ ਕਰੋ ।

ਜੇਕਰ ਕਿਸੇ ਨੂੰ ਇਸ ਖੋਜ ਬਾਰੇ ਕੋਈ ਸ਼ਿਕਾਇਤ ਹੋਵੇ ਤਾਂ ਉਹ ਮੈਨੇਜਰ ਫਾਰ ਐਥਿਕਸ ਐਡਮਿਨੀਸਟਰੇਸ਼ਨ ਯੂਨੀਵਰਸਿਟੀ ਆਫ ਸਿਡਨੀ, ਫੋਨ ਨੰ:(612) 93514811

ਸਿਡਨੀ ਯੂਨੀਵਰਸਿਟੀ

ਫੈਕਲਟੀ ਆਫ ਡੈਨਟਿਸਟਰੀ

ਕਾਲਜ ਆਫ਼ ਹੈਲਥ ।।।ੴ।।

6 ਅਤੇ 12 ਸਾਲ ਦੀ ਦੰਦਾਂ ਦੀ ਬੀਮਾਰੀਆਂ ਬਾਰੇ ਖੋਜ ਭਾਰਤ ਵਿੱਚ

ਮਾ-ਪਿਓ ਜਾਂ ਆਸ਼ਰਿਤ ਦੀ ਮੰਜੂਰੀ ਦਾ ਫਾਰਮ

ਮੈ ਇਹ, ਮੰਜੂਰੀ ਦਿੰਦਾਂ ਹਾਂ ਕਿ ਮੇਰਾ ਪੁੱ/ਪੁਤਰ..... . . . . ., ਉਮਰ. ।।।ਲ ਦੀ ਦੰਦਾਂ ਦੀ ਬੀਮਾਰੀਆਂ ਬਾਰੇ ਖੋਜ ਵਿੱਚ ਹਿੱਸਾ ਲੈ ਸਕਦਾ ਹੈ ।

ਮੈ ਇਹ ਮੰਜੂਰੀ ਦੇਣ ਲਈ ਇਹ ਹੇਠ ਲਿਖਿਆ ਸਹਿਮਤੀ ਪ੍ਰਗਟ ਕਰਦਾ ਹਾ

1) ਮੈਂ ਹਿੱਸਾ ਲੇਣ ਲਈ ਯੋਗਤਾ ਦੀ ਸੁਚਨਾ 6 ਤੇ 12 ਸਾਲ ਦੀ ਦੰਦਾਂ ਦੀਆਂ ਬੀਮਾਰੀਆ ਬਾਰੇ ਖੋਜ ਦੀ ਸੂਚਨਾ ਪ੍ਰਾਪਤ ਕਰ ਲਈ ਹੈ । ਇਸ ਨੂੰ ਚੰਗੀ ਤਰ੍ਹਾ ਪੜ੍ਹ ਅਤੇ ਸਮਝ ਲਿਆ ਹੈ ।
2) ਡਾਕਟਰ ਵਿਸ਼ਾਲ ਛਾਬੜਾ ਨੇ ਮੈਨੂੰ ਇਹ ਮੋਕਾ ਦਿਤਾ ਹੈ ਕਿ ਮੈ ਇਸ ਪ੍ਰੋਜੈਕਟ ਬਾਰੇ ਉਨਾਂ ਨਾਲ ਸਲਾਹ ਕਰ ਸਕਾ ਅਤੇ ਉਨਾਂ ਨੂੰ ਇਹ ਬਾਰੇ ।।ਆਲ ।।। ਸਕਾਂ ਤੇ ਉਨਾਂ ਨੇ ਇਨਾਂ ਸੁਆਲਾ ਦੇ ਜਵਾਬ ਮੇਰੀ ਤਸੱਲੀਯੋਗ ਦੇ ਦਿਤੇ ਹਨ
3) ਮੇ ਇਹ ਸਮਝ ਲਿਆ ਹੈ ਕਿ ਮੈ ਆਪਣੇ ਬੱਚੇ ਨੂੰ ਇਸ ਵਿਦਿਅਕ ਖੋਜ ਤ ਕਿਸੇ ਵੀ ਸਮੇਂ ਵਗੈਰ ਕਿਸੇ ਜੁਰਮਾਨੇ ਤੋਂ ਛੁਡਵਾ ਸਕਦਾ/ਸਕਦੀਂ ਹਾਂ ।
4) ਮੈਂ ਸਮਝ ਲਿਆ ਹੈ ਜੇਕਰ ਮੇਰੇ ਅੰਦਰ ਕੋਈ ਵੀ ਇਸ ਵਿਦਿਅਕ ਖੋਜ ਜਾਂ ਸਰਵੇ ਬਾਰੇ ਸੁਆਲ ਪੈਦਾ ਹੁੰਦਾ ਹੈ ਤਾ ਮੈਂ ਡਾਕਟਰ ਵਿਸ਼ਾਲ ਛਾਬੜਾ ਨੂੰ ਸਮਪਰਕ ਕਰ ਸ਼ਕਦਾ/ਸਕਦੀ ਹਾਂ । ਜੰਕਿ ਇਨਾਂ ਸੁਆਲਾ ਦਾ ਖੁਸ਼ੀ ਨਾਲ ਸਆਗਤ ਕਰਨਗੇ ।

ਹਸਤਾਖਰ ਮਾਤਾ ਪਿਤਾ ਅਤੇ ਆਸ਼ਾਰਿਤ.....

ਮਿਤੀ .....

ਸਿਡਨੀ ਯੂਨੀਵਰਸਿਟੀ

ਫੈਕਲਟੀ ਆਫ ਡੈਨਟਿਸਟਰੀ
ਕਾਲਜ ਆਫ ਹੈਲਥ ਸਾਇੰਸ

6 ਅਤੇ 12 ਸਾਲ ਦੀ ਦੰਦਾਂ ਦੀ ਬਿਮਾਰੀਆਂ ਬਾਰੇ ਖੋਜ ਭਾਰਤ ਵਿੱਚ ਦੰਦਾਂ ਦੀ ਸੰਭਾਲ ਬਾਰੇ

ਪਿਆਰੇ ਮਾਤਾਂ ਪਿਤਾ,

ਮੈਂ ਤੁਹਾਡੇ ਬੱਚੇ ..... ਦਾ ਅੱਜ ਚੈਕਅਪ ਕੀਤਾ ਹੈ ਅਤੇ ਤੁਹਾਨੂੰ ਦਸੱਣਾ ਚਾਹੁੰਦਾ ਹਾਂ ਕਿ ਉਸਨੂੰ ਦੰਦਾਂ ਦੇ ਕਲੀਨਿਕ ..... ਵਿੱਚ ਜਰੂਰੀ ਇੰਲਾਜ ਵਾਸਤੇ ਦਾਖਲਾ ਜਰੂਰੀ ਹੈ ।

ਆਪ ਜੀ ਦਾ ਸੁਭਚਿੰਤਕ,

ਡਾ. ਵਿਸ਼ਾਲ ਛਾਬੜਾ
ਡੈਨਟਿਸਟ

Appendix B.

Letter to the District Education Officer seeking permission for conducting the survey.

The University of Sydney

Faculty of Dentistry
Faculties of Health

Wendell Evans, *MDS, DDSc*
Associate Professor
Community Oral Health and Epidemiology

Westmead Centre for Oral Health
Westmead Hospital
Australia NSW 2145

Tel: +61 2 9845 7537; Fax +61 2 9845 8306
Email: w.evans@dentistry.usyd.edu.au

21 February 2007

The District Education Officer
Ferozepur
Punjab
INDIA

Dear Sir,

Dental survey of 6 year olds and 12 year olds in India

I am the director of the Master of Dental Science (MDSc) program in the discipline of Community Oral Health and Epidemiology, Faculty of Dentistry, University of Sydney. Most candidates enrolled in this program are international students preparing to become specialists in Public Health Dentistry. During year 2 of the MDSc program, international students conduct a research project in their country of origin, relevant to a Public Health Dentistry theme of importance in that country.

My MDSc student, Dr Vishal Chhabra from India, graduated in dentistry from Baba Farid University of Health Sciences and Research and he is registered to practice dentistry with the Punjab Dental Council, India. He wishes to conduct his research project in Ferozepur in 2007. This will entail a dental survey of children attending schools in Ferozepur. The survey will comprise (1) a brief dental examination of the children that will be conducted according to World Health Organisation protocols, and (2) a short set of questions on oral habits and sugar intake to be answered by the children.

Altogether we plan to survey 1600 children; 400 in rural areas (200 6-year olds and 200 12-year olds) and 1200 in urban areas 3 x (6-year olds and 200 12-year olds) that is 400 in poor urban areas, 400 in lower middle-class areas and 400 in upper middle-class areas.

It is anticipated that this survey will take place during the months of February to August 2007.

I would be grateful if you advice on two matters. Firstly, what is the process for obtaining permission from your office for Dr Chhabra to conduct this proposed survey? Secondly, what are the requirements in relation to obtaining consent from the school principals and the parents of the children?

Thank you for your help and I look forward to hearing from you shortly.

Yours faithfully,

Wendell Evans

Appendix C.

Clinical Examination Form.

The University of Sydney

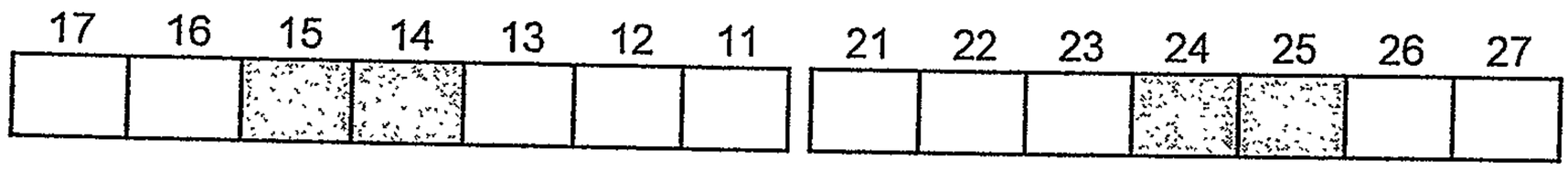
All India Dental Survey

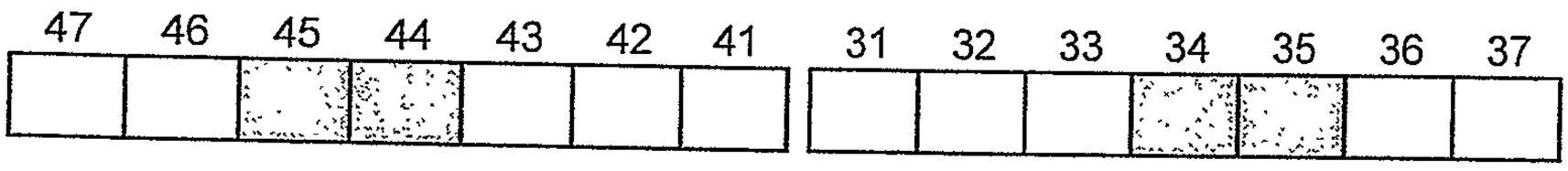
Clinical examination for children aged 12

Name _____

School _____ ☐

ID ☐ **SEX** ☐ **CLASS** ☐ **AGE** ☐





0 = Sound
1 = Cavity at least 1mm diameter as seen using sharp eyes.
2 = Cavity of this size O (4mm) or greater (indicating need for urgent care)
3 = Filled and decayed
M = Missing due to caries
F = Filled and sound
T = Tooth that is fractured, discoloured, or missing due to trauma
8 = Unerupted permanent tooth and any remaining primary tooth
9 = Tooth extracted for orthodontic reasons

☐

Fluorosis score (Based on upper central incisors)

0 Normal
1 Questionable
2 Very mild
3 Mild
4 Moderate
5 Severe
X Not recorded for any reason

Appendix D.

Questionnaire (English and Punjabi).

The University of Sydney

All India Dental Survey

Name _____ ID

School _____ School

Class/Grade _____ Age

1 How do you clean your teeth?

1 Use a toothbrush.
2 Use finger.
3 Use neem sticks.
0 Do not clean.

2 Some children clean their teeth...

1 Once a week
2 Twice a week
3 Daily
0 Never

.....how often do you clean your teeth?

3 Which of the following toothpastes do you use?

(To be selected from a basket containing commonly used toothpastes, and other tooth cleaning items used in India)

5 Which of the following sugar containing food item you consume during meals?

(Food items to be included will be those food items commonly consumed in community under investigation.)

6 Some children chew or use betel nut/pan?

1 Once a week
2 Twice a week
3 Once daily
4 More than once daily
0 Never

.....how often do you chew or use betel nut/pan?

7 Have you been to a dentist ?

0 No
1 Yes

8 Why did you visit a dentist ?

1 Had toothache
2 Needed a filling
3 Need a checkup
4 To have my teeth straightened
5 Other _____

12 ਸਾਲ ਦੇ ਦੰਦਾ ਦੀ ਬੀਮਾਰੀਆ ਬਾਰੇ ਖੋਜ ਪ੍ਰਸ਼ਨਾਵਲੀ

1) ਤੁਸੀ ਆਪਣੇ ਦੰਦ ਕਿਸ ਤਰ੍ਹਾਂ ਸਾਫ ਕਰਦੇ ਹੋ ?
1) ਟੁਥ ਬ੍ਰਸ਼ ਨਾਲ 2) ਉਰੰਗਲ ਨਾਲ 3) ਨੀਮ ਦੀ ਦਾਤਨ ਨਾਲ 4) ਕਰਦੇ ਨਹੀ

2) ਤੁਸੀ ਕਿੰਨੀ ਬਾਰ ਦੰਦ ਸਾਫ ਕਰਦੇ ਹੋ ?
1) ਹਫਤੇ ਚ ਇਕ ਬਾਰੀ 2) ਹਫਤੇ'ਚ ਦੋ ਬਾਰੀ 3) ਰੋਜ ਇਕ ਬਾਰੀ 4) ਰੋਜ ਤੋ ਜਿਆਦਾ ਬਾਰੀ 5) ਕਰਦੇ ਨਹੀ ।

3) ਤੁਸੀ ਕਿਹੜਾ ਟੂਥ ਪੇਸਟ ਵਰਤਦੇ ਹੋ ?

4) ਤੁਸੀ ਕਿੰਨੀ ਬਾਰ ਮਿੱਠੀ ਚੀਜ ਖਾਨੇ ਦੇ ਵਿਚਕਾਰ ਖਾਦੇ ਹੋ ?
1) ਚਾਕਲੇਟ 2) ਕੋਲਡ ਡ੍ਰਿਕ 3) ਬਿਸਕੁਟ 4) ਮਿਠਾਈਆ
5) ਚਾਹ ਜਾਂ ਕੋਫੀ 6) ਹੋਰ ਕੁਝ

5) 1) ਤੁਸੀ ਪਾਨ ਜਾਂ ਇਲਾਚੀ ਕਿੰਨੀ ਬਾਰ ਖਾਂਦੇ ਹੋ ?
1) ਹਫਤੇ'ਚ ਇਕ ਬਾਰ 2) ਹਫਤੇ'ਚ ਦੋ ਬਾਰ 3) ਹਫਤੇ'ਤ ਇੱਕ ਬਾਰ
4) ਰੋਜ ਇਕ ਤੋ ਬਾਰ 5) ਕਦੇ ਨਹੀ

6) ਕੀ ਤੁਸੀ ਦੰਦਾ ਦੇ ਡਾਕਟਰ ਕੋਲ ਗਏ ਹੋ ?
1) ਨਾਂ 2) ਨਹੀ

7) ਤੁਸੀ ਦੰਦਾ ਦੇ ਡਾਕਟਰ ਕੋਲ ਕਿਓ ਗਏ ?
1) ਦੰਦਾ ਦਰਦ ਸੀ 2) ਦੰਦ ਭਰਾਨ ਲਈ
3) ਦੰਦ ਚੈਕ ਕਰਾਉਣ ਲਈ 4) ਸਿਧੇ ਕਰਾਣ ਲਈ

Appendix E.

Letters regarding survey and consent from respective schools.

ASSUMPTION CONVENT SCHOOL

(Affiliated to the Council for the Indian School Certificate Examination)

Assumption Nagar, Sito Guno Road, ABOHAR (Pb.)

Pin - 152 116, P.B. No. 5

Ref. No......

Dated .....

30/04/2007

TO WHOM IT MAY CONCERN

Certified that Dr.Vishal Chhabra from the University of Sydney (Australia) performed a dental check up of the students (age group of 6 to 12) on 3rd April 2007, at our school premises.

We extent our sincere thanks to him for the same and wish him a bright future.

Principal
Assumption Convent School
(Recognised)
ABOHAR-152116

LRS
D.A.V. Sr. Sec. Model School
D.A.V. Campus, ABOHAR-152116 (Pb.)
Communications: davabh@sancharnet.in Fax: +91 1634 220755
+91 1634 224326, +91 1634 220792, +91 1634 224190, +919872642884
Web Site : www.davabh.com

Ref. No. DAV/1105/07

Dated 30.04.2007

TO WHOM IT MAY CONCERN

Certified that Dr. Vishal Chhabra from the University of Sydney (Australia) did dental examination of 6 to 12 years old children in this school on 30.04.2007.

The school administration, staff and the students are thankful to him for the same and wish him a bright future.

PRINCIPAL
Principal
L.R.S. D.A.V. Sr. Sec. Model School
ABOHAR-152116

Vijay Luxmy

✆ Offi. : 01634-220497
Resi.: 220497, 22497

Amrit Model Sr. Sec. School

(Affiliated to P.S.E.B.) For Boys & Girls

ABOHAR-152116 (PB.)

To_____

Ref. No.....

Dated.....

TO WHOM IT MAY CONCERN

Certified that Dr. Vishal Chhabra from the University of Sydney (Australia) did dental examination of 6 to 12 years old children in this school on April 16 & 17 , 2007 .

The School administration, staff and the students are thankful to him for this good cause and wish him a bright future.

Principal
Amrit Model Sr. Sec. School
(Affiliated to P.S.E.B.)
ABOHAR (PB.)

PRINCIPAL

Flower Valley Public Sr. Sec. School

(Affiliated to Punjab School Education Board Mohal
6, Patel Nagar, ABOHAR-15211
Ph.: 01634-22192

Ref. No. _____

Dated 02/05/07

To whom it may concern

certified that Dr. Nishal Chhabra from the University of Sydney (Australia) performed a dental check up of the students (age group of 6 to 12) on 11th April 2007, at our school premises.

We extent our sincere thanks to Ii for the same and wish him a very bright future.

Principal
FLOWER VALLEY PUBLIC SCHOOL
(Affl. to Pb. School Edu. Board)
ABOHAR (Ferozepur)

ਵੱਲੋਂ

ਮੁੱਖ-ਅਧਿਆਪਕ

ਸਰਕਾਰੀ ਮਾਡਲ ਹਾਈ ਸਕੂਲ

ਅਬੋਹਰ (ਫਿਰੋਜ਼ਪੁਰ)

ਫੋਨ : 01634-220370

ਵੱਲ

_____

_____

_____

ਪੱਤਰ ਨੰ: ਏ/ਆਰ 14-3/

ਮਿਤੀ 21/4/07

ਵਿਸ਼ਾ/ਹਵਾਲਾ ਨੰ: Dental survey of 6 and 12 years old children.

To whom it may Concern

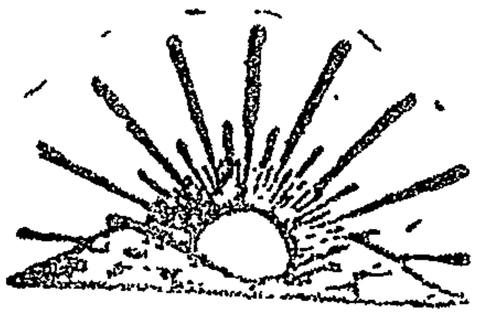
Dr. Vishal Chabra from the University of Sydney did dental examination of 6 and 12 years old children in our Schoolon 21/4/07.

We are thankful to him in this regard.

Headmaster

॥ ॐ ॥

EXCELSIOR



LEAD ME FROM DARKNESS TO LIGHT

ANMOL HIGH SCHOOL

(AFFILIATED TO P. S. E. B.)

NAI ABADI, ABOHAR-152116

☎ Offi : 22581
Resi. : 22551

Ref No.....

Dated 29.4.2017

To whom it may Concern

Certified that Dr Vishal Chabbra from the University of Sydney (Australia) visited our school and did dentalexam mahan of 6 to 12 years students on 29.4.2017 Dr Mr Dr Vishal Chabbra did detailed examination thoroughly and gave many suggestion regarding dental examination

The school staff and the students are thankful to him and we all wish happy and prosperous life and bright future

Principal
ANMOL HIGH SCHOOL
Affiliated to PSEB
Nai Abadi, ABOHAR

ਵੱਲੋਂ:-

ਹੈਡਮਾਸਟਰ

ਸਰਕਾਰੀ ਹਾਈ ਸਕੂਲ

ਬਜ਼ੀਦਪੁਰ ਕੱਟਿਆਂ ਵਾਲੀ

(ਫਿਰੋਜ਼ਪੁਰ)

ਵੱਲ:-

ਮੀਮੋ ਨੰ:

ਮਿਤੀ 21/4/07

ਵਿਸ਼ਾ:- Dental Survey of 6 and 12 year old children

To whom it may concern

Dr. Vishal Chhabra from the University of Sydney did dental examination of 6 and 12 year old children in our school on 21/4/07.

We are very thankful to him in this regard.

ਮੁਖ ਅਧਿਆਪਕ

Govt Middle School

Mamnu-Khera

Subject - Dental Survey of 6 and 12 year old children.

To Whom it may concern.

Dr. Vishal Chhabra from the university of Sydney, did dental examination of 6 and 12 year old children in our school on 3/5/07.

We are very thankful to him in this regard.

Amita Rani 3/5/07

मुख्य अध्यापक
सरकारी मिडल स्कूल
मामू खेड़ा (सिरसापुर)

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School _____

Name of School Principal _____

Signature _____

Date _____

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School Assumption Convent School

Name of School Principal SR: AMBROSIA

Signature Sr. Ambrosia

Date 29-3-2007

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School L.R.S.D.A.V. SR. SEC. MODEL SCHOOL, GAZIAR

Name of School Principal Mrs. KUSUM KHUNGAR

Signature

Date 30th April, 2007

Vijay Laxmi

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School Amrit Model School

Name of School Principal kcc 17/4/07 (K.C. Kohli)

Signature kcc 17.4.07

Date 17.4.07

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School Flower Valley Public School

Name of School Principal Miss Renu Popli

Signature Renu

Date 12 April, 2007

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School Government middle School, Mammurkhera

Name of School Principal Arifa Rani

Signature

Date 3/5/07

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School Ammal Hifi School Aboh.v.

Name of School Principal Kailash Chander Wadhwa

Signature K.C. Wadhwa

Date 30.4.2007

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School G. H. S. Bajid pur kalhanwali

Name of School Principal OM PARKASH

Signature Omparkash

Date 21/4/09

The University of Sydney

Dental survey of 6 year olds and 12 year olds in India

CONSENT FORM

Consent to allow for the Dental Survey

I agree for the Dental Survey of children aged 6 and 12 years to be conducted in my school.

On behalf of the children and their parents who are not English literate, I give consent for the children to be examined.

I acknowledge that the purpose of the survey and how it will be conducted has been explained to me.

I understand that the examination is not compulsory and that any child who is not willing to be examined may refuse without prejudice.

Name of School _____

Name of School Principal _____

Signature _____

Date 16/04/07

Appendix F.

Map of Ferozepur (Punjab).

Map not to scale

Appendix G.

Press cutting regarding survey.

ਨਾਰੀ ਐਲੀਮੈਂਟਰੀ ਸਕੂਲ ਕੰਧਵਾਲਾ ਗਾਜ਼ਰ ਖਾਂ ਵਿਚ ਮੈਡੀਕਲ ਕੈਂਪ
ਨ ਦੌਰਾਨ ਚ ਮਾਹਿਰ ਡਾ. ਵਿਸ਼ਾਲ ਛਾਬੜਾ ਆਪਣੀ ਟੀਮ ਅਤ ਸਕੂਲ

NEWS IN INDIAN NATIONAL NEWSPAPER (AJEET)

FLUORIDE A BIG ENEMY OF DENTAL CARIES- Dr.CHHABRA

Village Arniwala, 7 May (Sandhu)- Dr Vishal Chhabra who is doing dental specialization from University of Sydney, has done dental check up of 55 childre among 6 and 12 year old age group. He told that the ground water in this area i un fit to drink as it has high levels of fluoride concentration which is leading to discoloration and loss of tooth structure. In order to protect teeth from decay water must haveideally1ppm levels of fluoride. More than that can cause systemic side effects. Even toothpastes companies add fluoride. So people of this area must use filter water for drinking. Dr.Chhabra is the son of Mr. Jagjeet Chhabra from Abohar (Firozepur). He has altogether examined 1600 children from different villages and towns in Firozepur, Punjab. His team includes Anita chhabra, Ragini Chhabra and Simar Kaur.

(Photograph Enclosed)

Sd. Jagjit Chhabra

NOTARY PUBLIC M.P Singh Distt. Ferozepur (Pb) Regd.No. 1179 Phone

NOTARY NAME M.P SINGH Area ABOHAR Reg. No. 179 GOVT. OF INDIA

'TRANSLATION FROM PUNJABI/ HINDI TO ENGLISH IS CORRECT

ATTESTED 14.8.07
Mohinder Pal Singh
NOTARY
App. by Govt. of India
ABOHAR

TO TAKE EFFECT IN ANY COUNTRY OR PLACE OUTSIDE INDIA

Appendix H.

The [Indian] National Oral Health Policy resolutions.

The [Indian] National Oral Health Policy resolutions

1. Oral health policy to become an integral part of National health policy.
2. A National Oral Health Program to be launched to provide oral health care in rural and urban areas.
3. To create a Dental Advisor post in the Directorate of General Health Services.
4. To prevent the rising trend of dental diseases in India through preventive and promotive oral health services at the primary care level.
5. To establish a pilot project in five districts in five state to implement the services identified in (4) above initially, and later in all states.
6. To legislate for statuary warnings about the causes of oral disease to be placed on confectionary and tobacco products.
7. To establish a National Training Centre to oversee the training of oral health care personnel.
8. Dental clinics to be set up in all District Hospitals and Community Health Centers.
9. All dental colleges should train dental hygienists and dental technicians.
10. To establish a National Institute for Dental Research to determine national oral health needs.

Appendix I.

The [Indian] National Oral Health Care Programme (NOHCP) Goals.

The [Indian] National Oral Health Care Programme (NOHCP) Goals

1. Oral Health for all by the year 2010.
2. To bring down the incidence of oral and dental diseases to less than 40% from the existing prevalence of 90%.
3. To bring down the DMFT (decayed, missing, filled teeth) in school children aged 6-12 years from approximately 4 at present to less than 2.
4. To reduce high prevalence of periodontal diseases to lower prevalence.
5. At the age of 18 years, 85% should retain all their teeth.
6. To achieve 50% reduction in edentulousness between the age of 35-44 years.
7. To achieve 25% reduction in edentulousness at the age of 65 years and above.
8. To achieve 50% reduction in the present level of malocclusion and dento-facial deformities.
9. To reduce the number of new cases of Oral Cancers and precancerous lesions from the existing levels.

****