

Barriers to providing oral health care to pre-school children—differences between paediatric dentists' and general dental practitioners' beliefs

G.H.M. Lee¹, C. McGrath² and C.K.Y. Yiu³

Faculty of Dentistry, The University of Hong Kong, Hong Kong SAR, China

Background: The unmet dental needs of pre-school children indicate there are barriers in 'accessing' appropriate oral health care and this warrants consideration of care providers' beliefs. **Objective:** To explore the beliefs and attitudes of dentists in Hong Kong towards providing oral health care to pre-school children; and to determine difference in attitudes between general dental practitioners (GDPs) and paediatric dentists (PDs). **Methods:** A random sample of 476 GDPs (~25% of all registered dentists) and all registered PDs (28) were invited to participate in the study. Both groups were asked to complete the *Barriers to Childhood Caries Treatment* (BaCCT) questionnaire: a 29-item measure considering child, parent, dentist and health care system factors. Differences in attitudes of GDPs and PDs were examined in bivariate and regression analyses. **Results:** The overall response rate of the study was 61.5% (310/504). There were significant differences in overall BaCCT scores and across all domains between GDPs and PDs ($p < 0.05$). Furthermore, variations across many aspects (as described at an item level) were apparent. Regression analyses confirmed differences in BaCCT between GDPs and PDs, controlling for practice and other factors. **Conclusions:** Differences exist between GDPs' and PDs' perceptions of barriers to care for early childhood caries. This has implications for how to address 'access' issues with likely implications on how to overcome barriers to care for pre-school children.

Key words: dental care delivery, dental care for children, dental caries, pre-school children, guidelines, Hong Kong, BaCCT, GDP, paediatric dentist

Introduction

The diagnosis and management of dental caries has advanced in recent decades yet the problem of dental caries among pre-school children remains a worldwide public concern, owing not only to its high prevalence but also the fact that most caries remains 'untreated' (Brown *et al.*, 2000; Petersen, 2003). For example, in Hong Kong, more than 90% of pre-school children have untreated dental caries (Lo *et al.*, 2009).

Undoubtedly, prevention remains a key objective to avoid or minimise dental caries in pre-school children but this in itself has limitations; and particularly so when relying on population-based preventive measures (Lawrence *et al.*, 2008; McGrath *et al.*, 2012; Wei *et al.*, 1986). Clearly parents/primary caregivers (hereafter parents) have a key role to play in the prevention of early childhood caries in terms of diet, oral hygiene and use of fluoride (Hooley *et al.*, 2012; Ramos-Gomez, 2012; Whittle *et al.*, 2008). Parents' attitudes to dental care of children are related to their own behavioural and social factors, such as attendance patterns, their own dental anxiety and their perceptions of their children's dental anxiety, past dental treatment experiences and also the socio-economic status of the family (Hooley *et al.*, 2012; Iida and Rozier 2013; Schroth *et al.*, 2007; Tickle *et al.*, 1999; 2002; 2003).

Use of dental services (appropriately) is important for both prevention and management of caries in young children (Ramos-Gomez *et al.*, 2010). Findings from many settings have indicated that use of dental services among pre-school children is less than adequate (Beil *et al.*, 2009; Kim and Kaste, 2013). Despite advances in the dental care of young children, most fail to benefit from oral health care services. Dental caries that remains untreated has implications for children's general health and well-being and has potentially life-long effects (Wong *et al.*, 2011). This in part relates not only to parents' attitudes and behaviour, but also oral health care providers attitudes and practices.

There has been a growing interest in understanding the attitudes of oral health care providers in providing oral health care services to young children (Hassall *et al.*, 1999; Pine *et al.*, 2004a,b; Splieth *et al.*, 2009). The attitudes of general dental practitioners (GDPs) and paediatric dentists (PDs) in providing oral health care services to young children have not been studied. Understanding differences in attitudes is likely to have implications in identifying potential barriers within oral health care service systems, which inform practice and policy (guidelines). The aims of the study were to explore beliefs and attitudes of GDPs and PDs, and to determine any differences in attitude, to providing oral health care to pre-school children in primary care.

Method

Two groups of dental practitioners working in Hong Kong were recruited for this survey: General Dental Practitioners (GDPs) and Paediatric Dentists (PDs). Sample size was calculated using G*Power v.3.1.1 (www.gpower.hhu.de). It was found that a minimum of 167 GDPs and 3 PDs were needed to have a significance (α) of 0.05 and a power ($1-\beta$) of 0.80 with a mean difference of 15 in the *Barriers to Childhood Caries Treatment* (BaCCT) total score and a standard deviation of 10 in GDPs and 5 in PDs, respectively. Assuming a response rate of 40%, a simple random sample of 476 registered general dental practitioners (GDPs) in Hong Kong was drawn from the General Register of Dental Council of Hong Kong (25% of all 1905 registered dentists dated September 2009) and all 29 specialists in Paediatric Dentistry (PDs) appearing on the list of the Specialist Register of the Dental Council of Hong Kong were selected except one specialist who was also a member of the study team.

Each selected dentist was sent a questionnaire incorporating the Barriers to Childhood Caries Treatment (BaCCT) instrument and questions about their demographic background and practice profile. Four reminders were sent out to maximise the response rate. The study was approved by the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster (HKUHA HKW IRB ref. UW 10-039).

The BaCCT instrument is a standardised measure examining dentists' beliefs and attitudes in providing dental care for young children (Pine *et al.*, 2004a,b). This measure was used to identify the characteristics of health services and dental providers that are likely to minimise exclusion of children with childhood caries. BaCCT was validated and had been used in a cross-national study (Pine *et al.*, 2004a; b). An analogous version of the measure was used in this study (Splieth *et al.*, 2009). Specifically, BaCCT assesses the dentists' view of children's coping abilities, parents' expectations, dentists' own attitudes, and the restorative treatment need of primary teeth. It consists of five domains which cover potential barriers to dental care of children: Child domain (6 items), Dentists I domain (7 items on dentists' attitude towards offering restorative treatment for young children), Dentists II domain (7 items regarding dentists' beliefs on the need to restore primary teeth), Parents domain (5 items) and Health care system domain (4 items). A total of 29 statements (items) were included in the measure. Dentists were asked to rate their level of agreement with each statement on a 5-point Likert scale (1, strongly disagree; 2, disagree; 3, neither agree nor disagree; 4, agree; 5, strongly agree), regarding dental care for pre-school children (≤ 5 -year-old).

Additional questions regarding the dentists themselves and their current work, such as gender, years and types of practice, perception of having adequate training in paediatric dentistry, postgraduate training and qualification, weekly working hours, percentage of adult and paediatric patients seen per day, were also included in the questionnaire.

Data were coded and analysed using SPSS® v.20. Several items were re-coded to ensure that the direction of all items was the same as some items were deliber-

ately constructed so that disagreement would represent a barrier, rather than agreement. Items with a mean value under 3 were considered 'barriers'.

Simple frequency distribution tables of the dentists' demographic profile were produced. Distributions and mean values were calculated and compared in the subgroup analyses using Chi-square test. The sum and average scores of the measure and the five domains were generated. The differences in mean values between the groups were analysed using Mann-Whitney U test. The level of statistical significance was set at $\alpha=0.05$. Dropout analysis using Chi-square test was conducted to examine the difference between practitioners who had and had not participated.

In addition, to identify the key factors associated with barriers to oral health care, Poisson regression analysis was carried out using a backward selection method until only variables demonstrating a statistically significant association at the 5% level remained in the final model. The dependent variable was sum scores of BaCCT. The construct validity of BaCCT was explored on the full sample using factor analysis. Internal consistency reliability was also assessed using Cronbach's alpha.

Results

The response rate for the general dental practitioners was 60.1% (286/476) and 85.7% (24/28) for the paediatric dentists making 61.5% overall. Dropout analysis using Chi-square test showed no significant difference by gender ($\chi^2(1)=1.92$, $p=0.166$; GDPs $\chi^2(1)=1.26$, $p=0.261$; PDs $\chi^2(1)=0.40$, $p=0.527$), by type of practice: private or non-private practice ($\chi^2(1)=0.32$, $p=0.575$; GDPs $\chi^2(1)=0.30$, $p=0.586$; PDs $\chi^2(1)=0.97$, $p=0.755$), by place of basic training: Hong Kong or elsewhere ($\chi^2(1)=0.38$, $p=0.539$; GDPs $\chi^2(1)=0.47$, $p=0.493$; PDs $\chi^2(1)=0.23$, $p=0.629$) and by having or without additional qualification ($\chi^2(1)=0.28$, $p=0.597$; GDPs $\chi^2(1)=2.39$, $p=0.122$; among PDs: no statistics available as all have an additional qualification) between practitioners who had, or had not, participated. Socio-demographic background and practice profile of dentists participating in the study are provided in Table 1. There were marked difference in where PDs worked - most working in public dental services ($p<0.001$), number of working hours ($p<0.01$) and number of patients/consultations seen per day compared to GDPs ($p<0.001$).

Regarding barriers to dental care for children, Table 2 shows the mean ratings of each statement of the BaCCT, and illustrated differences in PDs and GDPs views. Across almost all the ratings there was a significant difference between PDs and GDPs ($p<0.05$), except for the following items: *Children get upset easily* (Child domain); *Parents expect dentists to fill their children's decayed teeth* (Parents domain); *The dental care for young children puts more emphasis on fillings rather than prevention* (Health care system domain); and *I feel that the dental care in Hong Kong provides a good service for young children* (Health care system domain).

Table 3 tabulates the mean sum and average scores of the BaCCT measure and sub-domains. An item average value of under three is deemed a potential barrier to dental treatment. The mean sum and average scores of the PDs were all statistical significantly lower than GDPs

Table 1. Socio-demographic background and practice profile of general dental practitioners (GDPs) and paediatric dentists (PDs)

	PDs (n=24)		GDPs (n=286)		Overall		p
	n	(%)	n	(%)	n	(%)	
Gender							0.168
Female	10	(41.7)	81	(28.3)	91	(29.4)	
Male	14	(58.3)	205	(71.7)	219	(70.6)	
Years of practicing dentistry							0.096
less than 10 years	0	(0)	67	(23.4)	67	(21.6)	
11 to 20 years	8	(33.3)	82	(28.7)	90	(29.0)	
21 to 30 years	11	(45.8)	104	(36.4)	115	(37.1)	
More than 30 years	5	(20.8)	33	(11.5)	38	(12.3)	
Type of practice							<0.001
Private practice	9	(37.5)	263	(92.0)	272	(87.7)	
Non-private practice (including non-government organisation, government or hospital)	15	(62.5)	23	(8.0)	38	(12.3)	
Obtained basic training (i.e. BDS) in Hong Kong							0.912
Yes	15	(62.5)	182	(63.6)	197	(63.5)	
No	9	(37.5)	104	(36.4)	113	(36.5)	
Received adequate training in paediatric dentistry							0.168
Yes	14	(58.3)	205	(71.7)	219	(70.6)	
No	10	(41.7)	81	(28.3)	91	(29.4)	
Obtained additional qualification(s)							<0.001
Yes	24	(100)	76	(26.6)	100	(32.3)	
No	0	(0)	210	(73.4)	210	(67.7)	
Average consultation/patients seen per day							<0.001
Less than 10	10	(41.7)	75	(26.2)	85	(27.4)	
11 to 20	3	(12.5)	174	(60.8)	177	(57.1)	
more than 20	7	(29.2)	31	(10.8)	38	(12.3)	
not applicable	4	(16.7)	6	(2.1)	10	(3.2)	
Average consultation/patients (child ≤5 years) seen per week							<0.001
Less than 10	10	(41.7)	233	(81.5)	243	(78.4)	
11 to 20	3	(12.5)	35	(12.2)	38	(12.3)	
more than 20	6	(25.0)	9	(3.1)	15	(4.8)	
not applicable	5	(20.8)	9	(3.1)	14	(4.5)	
Average percentage of adult dentistry							<0.001
Less than 20%	20	(83.3)	3	(1.0)	23	(7.4)	
21 to 40%	1	(4.2)	2	(0.7)	3	(1.0)	
41 to 60%	1	(4.2)	16	(5.6)	17	(5.5)	
61 to 80%	1	(4.2)	50	(17.5)	51	(16.5)	
81 to 100%	1	(4.2)	215	(75.2)	216	(69.7)	
Average percentage of paediatric dentistry (child ≤5 yrs)							<0.001
Less than 20%	11	(45.9)	264	(92.3)	275	(88.7)	
21 to 40%	3	(12.5)	15	(5.2)	18	(5.8)	
41 to 60%	0	(0)	5	(1.7)	5	(1.6)	
61 to 80%	6	(25.0)	2	(0.7)	8	(2.6)	
81 to 100%	4	(16.7)	0	(0)	4	(1.3)	
Average working hours per week (mean, range)	37.2	(12-50)	43.8	(10-70)	43.3	(10-70)	0.002

Statistically significant *p* values (≤ 0.05) by Pearson Chi-square test shown in **bold**.

($p < 0.05$). The mean-average scores of three domains for the GDPs were over 3: Child domain (3.52, sd 0.69), Dentists I domain (3.19, sd 0.64) and Health care system domain (3.06, sd 0.58). All the mean-average scores of the PDs were below 3.

In Poisson regression analysis (Table 4), two key factors were associated with BaCCT score: dentist group (PDs vs. GDPs) and having postgraduate education. Being a PD was associated with a decrease in BaCCT total score (sum) by a factor of 0.77 compared to being a GDP ($p < 0.001$). In addition, having obtained postgraduate qualification compared to those who had not was associated with a decrease of BaCCT score

by a factor of 0.95 ($p < 0.001$). Dentist group was also the key factor associated with the total scores (sum) of other sub-domains: by a factor of 0.82 in Child domain, 0.61 in Dentists I domain, 0.67 in Dentists II domain, 0.85 in Parents domain and 0.93 in Health care system domain ($p < 0.05$).

A maximum likelihood analysis with oblimin rotation for 29 items from the BaCCT was reported (Table 5). The Kaiser-Meyer Olkin measure of sampling adequacy suggested that the sample was factorable (KMO=0.852). Scree plot (Figure 1) illustrated the eigenvalue against the seven associated factors. The items of Child domain were all loaded onto Factor 5; items of Dentists I do-

Table 2. Agreement with questionnaire statements describing barriers to restorative treatment in under 5 year olds by general dental practitioners (GDPs) and paediatric dentists (PDs) in Hong Kong

Domain	Item	GDPs	PDs	p
Child	Children get upset easily	3.58	3.58	0.924
	Children cannot cope very well with dental treatment	3.61	2.63	<0.001
	Children do not like sitting in the dental chair	3.33	2.54	<0.001
	Children cannot accept dental treatment	2.75	1.96	<0.001
	Most children are fearful of dental treatment	3.72	3.00	<0.001
Dentists I (attitude towards offering restorative treatment for children ≤5 years)	Children do not like the sound of the dental drill	4.15	3.71	0.010
	I do not like giving local anaesthetics to children	3.59	2.25	<0.001
	I prefer to refer children to be treated by other colleagues	2.99	1.46	<0.001
	I find filling children's teeth stressful	3.38	2.33	<0.001
	I rarely have enough time to spend with child patients	2.89	1.67	<0.001
	I enjoy filling children's teeth	3.42	2.25	<0.001
	I feel apprehensive if I have to do a filling in a child	2.85	1.71	<0.001
	Providing dental treatment for children is troublesome	3.20	2.00	<0.001
Dentists II (necessity of restoring primary teeth)	I feel there is no reason to fill primary teeth	1.78	1.08	<0.001
	If decayed primary molars are not causing any symptoms, they are best left untreated	1.97	1.42	0.004
	I do not fill cavities in children who attend regularly	1.89	1.46	0.002
	The time it would take to fill primary teeth would be better spent with other patients	2.80	1.50	<0.001
	On the whole, decayed primary teeth are best left untreated, rather than filled	1.84	1.17	<0.001
	I do not fill cavities in children who are not regular attenders	1.92	1.29	<0.001
	I feel there is little point in filling primary teeth	1.83	1.21	<0.001
Parents	If a child has toothache, parents are more likely to ask for extractions	2.80	1.92	<0.001
	If a child had a decayed molar, parents would expect it to be extracted	2.79	1.79	<0.001
	Parents do not want dentists to fill their children's decayed teeth	2.23	1.67	<0.001
	Parents expect dentists to fill their children's decayed teeth	2.28	2.17	0.566
	Parents do not see the need for filling primary teeth	2.84	2.21	0.001
Health care system	The payment I would receive for putting a filling in a primary tooth is inadequate	3.40	2.96	0.011
	The payment I receive for providing preventive care to children is inadequate	3.28	2.96	0.022
	The dental care for young children puts more emphasis on fillings rather than prevention	2.50	2.21	0.184
	I feel that the dental care in Hong Kong provides a good service for young children	3.06	3.00	0.965

Scale anchors: 1, strongly disagree; 5, strongly agree with values >3 considered barriers perceived by dentists.

Statistically significant ($p \leq 0.05$) values by Mann-Whitney U test shown in **bold**

Table 3. Comparison of the sum and average scores of Barriers to Childhood Caries Treatment (BaCCT) and domains with respect to general dental practitioners (GDPs) and Paediatric dentists (PDs) in Hong Kong

	Summed scores			Averaged scores		
	GDPs	PDs	p	GDPs	PDs	p
	(n=286) Mean (sd)	(n=24) Mean (sd)		(n=286) Mean (sd)	(n=24) Mean (sd)	
Child	21.13 (4.11)	17.42 (3.83)	<0.001	3.52 (0.69)	2.90 (0.64)	<0.001
Dentists I	22.33 (4.48)	13.67 (3.67)	<0.001	3.19 (0.64)	1.95 (0.52)	<0.001
Dentists II	14.03 (3.63)	9.12 (2.32)	<0.001	2.00 (0.52)	1.30 (0.33)	<0.001
Parents	12.94 (3.32)	9.75 (2.38)	<0.001	2.59 (0.66)	1.95 (0.48)	<0.001
Health care system	12.24 (2.31)	11.13 (1.96)	0.021	3.06 (0.58)	2.78 (0.49)	0.021
BaCCT total score	82.67 (11.41)	61.08 (8.65)	<0.001	2.85 (0.39)	2.11 (0.30)	<0.001

All p values statistically significant (≤ 0.05) in Mann-Whitney U test

Table 4. Poisson regression model for the total score (sum) of Barriers to Childhood Caries Treatment (BaCCT)

Model	Estimated coefficients		95% confidence	
	B	Std. error	p	interval
(Constant)	83.71	4.72	<0.001	82.48, 84.95
Dentist groups (1, Paediatric dentists; 0, General dental practitioners)	0.77	0.03	<0.001	0.72, 0.81
Obtained postgraduate qualifications (1, Yes; 0, No)	0.95	0.01	0.001	0.93, 0.98

Wald Chi-Square = 104.78 ($p < 0.001$)

Table 5. Factor loadings (≥ 0.20) based on a maximum likelihood analysis with oblimin with Kaiser normalization rotation for 29 items from the *Barriers to Childhood Caries Treatment* (BaCCT) (n=310)

<i>Domain</i>	<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>	<i>Factor 5</i>	<i>Factor 6</i>	<i>Factor 7</i>
Child	Children get upset easily.					0.671		
	Children cannot cope very well with dental treatment.					0.732		
	Children do not like sitting in the dental chair.					0.709		
	Children cannot accept dental treatment.			0.253		0.477		
	Most children are fearful of dental treatment.					0.767		
	Children do not like the sound of the dental drill.					0.667		
Dentists I (attitude towards offering restorative treatment for children ≤ 5 years)	I do not like giving local anaesthetics to children.			0.324				
	I prefer to refer children to be treated by other colleagues.			0.677				
	I find filling children's teeth stressful.			0.710			-0.214	
	I rarely have enough time to spend with child patients.			0.681				
	I enjoy filling children's teeth.			0.724				
	I feel apprehensive if I have to do a filling in a child.			0.589				
	Providing dental treatment for children is troublesome.	0.202		0.599				
Dentists II (necessity of restoring primary teeth)	I feel there is no reason to fill primary teeth.				0.609		-0.530	
	If decayed primary molars are not causing any symptoms, they are best left untreated.				0.673		-0.490	
	I do not fill cavities in children who attend regularly.				0.558			
	The time it would take to fill primary teeth would be better spent with other patients.			0.461			0.303	
	On the whole, decayed primary teeth are best left untreated, rather than filled.				0.736			
	I do not fill cavities in children who are not regular attenders.				0.547			
	I feel there is little point in filling primary teeth.				0.811			
Parents	If a child has toothache, parents are more likely to ask for extractions.	0.770						
	If a child had a decayed molar, parents would expect it to be extracted.	0.900						
	Parents do not want dentists to fill their children's decayed teeth.	0.234						0.866
	Parents expect dentists to fill their children's decayed teeth.							0.407
	Parents do not see the need for filling primary teeth.	0.501						0.325
Health care system	The payment I would receive for putting a filling in a primary tooth is inadequate.		0.952					
	The payment I receive for providing preventive care to children is inadequate.		0.613					
	The dental care for young children puts more emphasis on fillings rather than prevention.			0.240				
	I feel that the dental care in Hong Kong provides a good service for young children.							0.213
	Eigenvalues	7.354	3.470	2.202	2.021	1.550	1.208	1.005
Percentage of total variance		25.359	11.967	7.594	6.969	5.344	4.165	3.466

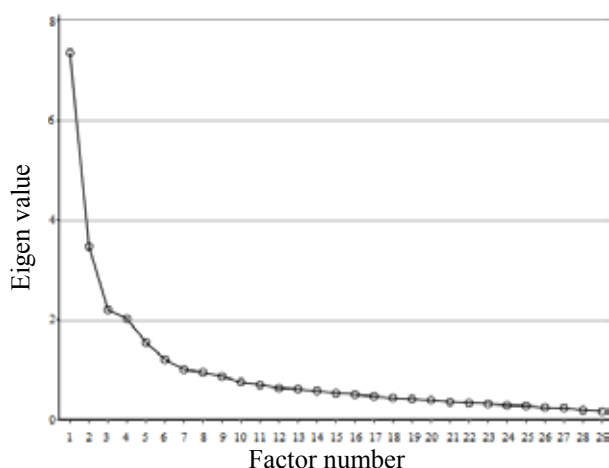


Figure 1. Scree plot illustrating the eigenvalue against the seven associated factors for 29 items from the Barriers to Childhood Caries Treatment (BaCCT)

main were all loaded onto Factor 3; items of Dentists II domain were all loaded onto Factor 4; items of Parents domain were loaded onto both Factor 1 and 7; and items of Health Care system domains were loaded onto Factor 2, 3 and 7. All factors showed eigenvalues higher than 1, accounting for 64.87% of the total variance. This indicated that BaCCT had good construct validity.

Internal reliability (Cronbach's alpha) of BaCCT was 0.877 (95% CI: 0.856, 0.895). For the sub-domain scales of BaCCT, internal reliability was 0.856 (95% CI: 0.829, 0.879) in Child domain, 0.847 (95% CI: 0.820, 0.872) in Dentists I domain, 0.779 (95% CI: 0.740, 0.815) in Dentists II domain, 0.819 (95% CI: 0.785, 0.849) in Parents domain and 0.367 (95% CI: 0.244, 0.475) in Health care system domain. The BaCCT and its sub-scales had a good internal consistency and were suitable for comparisons, except the Health care system domain.

Discussion

A modest response rate was obtained but higher for PDs than GDPs. Involving practitioners in research can be problematic and response rates are typically low (in most places) (Tan and Burke 1997). The use of multiple reminders did produce a response rate of >60%. Nonetheless, it accepted that some element of response bias for GDPs exists albeit that the gender, practice profile and years in practice approximates that of the dentist in Hong Kong (Lo and Yeung 2001) and dropout analysis findings which showed no significant difference between practitioners who had, or had not, participated by gender, type of practice, place of basic training and postgraduate qualification. Of note, difference existed in practice profile of GDPs and PDs - type of practice, hours of work, number of consultations, and type of patients - all as expected.

BaCCT is a standardised measure examining dentists' beliefs and attitudes in providing dental care for young children in different cultural locations worldwide. It was devised from an explanatory model and validated in a cross-national study by Pine *et al.* (2004a; 2004b). Hong Kong was one of the evaluation centres. The

measure should be suitable for the use in Hong Kong. This was confirmed by the results of Cronbach's alpha and exploratory factor analysis of BaCCT conducted in the study. Confirmatory factor analysis was considered. However, it was not the main purpose of this study to evaluate the construct model of BaCCT. Moreover, for comparison across countries and in the literature, original BaCCT with all 29 items would be better.

Child, dentist, parents and healthcare system barriers were evident from GDPs perspectives. For example, GDPs frequently felt "*children get upset easily*"; that they "*find filling children's teeth stressful*"; and that the "*payment they would receive for putting a filling in a primary tooth is inadequate*"; to name a few (see Table 2). This concurs with other reports in the literature that dentists (GDPs) often find treating young children to be stressful and distressing for child and parents (Ananaba *et al.*, 2010). In contrast, PDs rarely perceived a barrier to dental care for children, although they did acknowledge that "*children get upset easily*".

Marked differences existed between the perceptions of GDPs and PDs. Indeed, across 25 of the 29 potential barriers, GDPs more frequently than PDs perceived there to be barriers. Previous studies using the BaCCT have identified that barriers are common for treating young children in many settings (irrespective of health care system) (Pine *et al.*, 2004a,b; Splieth *et al.*, 2009). Our study expands upon other studies by highlighting marked differences in the perceptions of barriers to oral health care for children between GDPs and PDs. Differences remained after controlling for practice and other demographic factors (regression analyses). While valuable insight into 'barriers' can be derived from GDPs' perceptions (and should be considered in planning oral health care services), PDs' views provide insights into good practice and offer means of overcoming barriers.

Another factor to emerge as significantly associated with the perceptions of barriers to care was whether dentist obtained a postgraduate qualification or not. This in part may also be related to being a specialist, as typically requires some form of postgraduate training and/or qualification. It is also possible to speculate that having a postgraduate qualification provides greater knowledge and insight into the profession and thereby increased problem-solving ability and to overcome barriers, such as barriers to oral health care for children.

Conclusions

The beliefs and attitudes of dentists in Hong Kong towards providing oral health care to pre-school children were explored. The dentists agreed that carious primary teeth should be restored and saw the value in the dental treatment for pre-school children. Dentists' beliefs for the parental expectation on dental treatment were no barrier for children's oral health care. However, the general dental practitioners considered children's coping skills to dental treatment as a problem and had negative attitude to the provision of dental care for children. They identified greater barriers to providing dental care for pre-school children than the paediatric dentists.

The findings have implications for practice, dental education and policy making regarding dental care for

pre-school children. Developing guidelines on dental care for pre-school children and advocating continuing education could improve practitioners' attitude and willingness to provide dental care to young children. Further research on the concepts and methods for improving the attitudes and beliefs of dental practitioners towards providing dental treatment to pre-school children may be indicated.

References

- Ananaba, N., Malcheff, S., Briskie, D. and Inglehart, M. (2010): Infant oral health examinations: attitudes and professional behavior of general and paediatric dentists in Michigan and paediatric dentists in the U.S. *Journal of the Michigan Dental Association* **92**, 38-43.
- Beil, H., Mayer, M. and Rozier, R.G. (2009): Dental care utilization and expenditures in children with special health care needs. *Journal of American Dental Association* **140**, 1147-1155.
- Brown, L.J., Wall, T.P. and Lazar, V. (2000): Trends in untreated caries in primary teeth: of children 2 to 10 years old. *Journal of American Dental Association* **131**, 93-100.
- Hassall, D.C., Mellor, A.C. and Blinkhorn, A.S. (1999): Prevalence and attitudes to fissure sealants in the general dental service in England. *International Journal of Paediatric Dentistry* **9**, 243-251.
- Hooley, M., Skouteris, H., Boganin, C., Satur, J. and Kilpatrick, N. (2012): Parental influence and the development of dental caries in children aged 0-6 years: a systematic review of the literature. *Journal of Dentistry* **40**, 873-885.
- Iida, H. and Rozier, R.G. (2013): Mother-perceived social capital and children's oral health and use of dental care in the United States. *American Journal of Public Health* **103**, 480-487.
- Kim, J. and Kaste, L.M. (2013): Associations of the type of childcare with reported preventive medical and dental care utilization for 1- to 5-year-old children in the United States. *Community Dentistry and Oral Epidemiology* **41**, 432-440.
- Lawrence, H.P., Binguis, D., Douglas, J., McKeown, L., Switzer, B., Figueiredo, R. and Laporte, A. (2008): A 2-year community-randomized controlled trial of fluoride varnish to prevent early childhood caries in Aboriginal children. *Community Dentistry and Oral Epidemiology* **36**, 503-516.
- Lo, E.C.M. and Yeung, Y.J.C.Y. (2001): The 2000 Hong Kong Dental Practice Profile Survey. In: *HKDA Millennium Report, II*, pp 38-42. Hong Kong: Hong Kong Dental Association.
- Lo, E.C.M., Loo, E.K.Y. and Lee, C.K. (2009): Dental health status of Hong Kong preschool children. *Hong Kong Dental Journal* **6**, 6-12.
- McGrath, C., Lawrence, H.P. and Blinkhorn, A. (2012): Guest editorial on the Festschrift "Challenges in population oral health for the 21st century". *Community Dentistry and Oral Epidemiology* **40** Suppl 2, 1-4.
- Petersen, P.E. (2003): The World Oral Health Report 2003: continuous improvement of oral health in the 21st century—the approach of the WHO Global Oral Health Programme. *Community Dentistry and Oral Epidemiology* **31** Suppl 1, 3-23.
- Pine, C.M., Adair, P.M., Petersen, P.E., Douglass, C., Burnside, G., Nicoll, A.D., Gillett, A., Anderson, R., Beighton, D., Jin-You, B., Broukal, Z., Brown, J.P., Chestnutt, I.G., Declerck, D., Devine, D., Espelid, I., Falcolini, G., Ping, F.X., Freeman, R., Gibbons, D., Gugushe, T., Harris, R., Kirkham, J., Lo, E.C., Marsh, P., Maupomé, G., Naidoo, S., Ramos-Gomez, F., Sutton, B.K. and Williams, S. (2004a): Developing explanatory models of health inequalities in childhood dental caries. *Community Dental Health* **21**, 86-95.
- Pine, C.M., Adair, P.M., Burnside, G., Nicoll, A.D., Gillett, A., Borges-Yáñez, S.A., Broukal, Z., Brown, J., Declerck, D., Ping, F.X., Gugushe, T., Hunsrisakhun, J., Lo, E.C., Naidoo, S., Nyandindi, U., Poulsen, V.J., Razanamihaja, N., Splieth, C., Sutton, B.K., Soo, T.C. and Whelton, H. (2004b): Barriers to the treatment of childhood caries perceived by dentists working in different countries. *Community Dental Health* **21**, 112-120.
- Ramos-Gomez, F. (2012): Early maternal exposure to children's oral health may be correlated with lower early childhood caries prevalence in their children. *Journal of Evidence Based Dental Practice* **12** Suppl, 29-31.
- Ramos-Gomez, F., Crystal, Y.O., Ng, M.W., Tinanoff, N. and Featherstone, J.D. (2010): Caries risk assessment, prevention, and management in paediatric dental care. *General Dentistry* **58**, 505-517.
- Schroth, R.J., Brothwell, D.J. and Moffatt, M.E. (2007): Caregiver knowledge and attitudes of preschool oral health and early childhood caries (ECC). *International Journal of Circumpolar Health* **66**, 153-167.
- Splieth, C.H., Bunker, B. and Pine, C. (2009): Barriers for dental treatment of primary teeth in East and West Germany. *International Journal of Paediatric Dentistry* **19**, 84-90.
- Tan, R.T. and Burke, F.J.T. (1997): Response rates to questionnaires mailed to dentists. A review of 77 publications. *International Dental Journal* **47**, 349-354.
- Tickle, M., Milsom, K.M. and Blinkhorn, A.S. (2002): Inequalities in the dental treatment provided to children: an example from the United Kingdom. *Community Dentistry and Oral Epidemiology* **30**, 335-341.
- Tickle, M., Milsom, K.M., Humphris, G.M. and Blinkhorn, A.S. (2003): Parental attitudes to the care of the carious primary dentition. *British Dental Journal* **195**, 451-455.
- Tickle, M., Williams, M.J., Jenner, A.M. and Blinkhorn, A. (1999): The effects of dental attendance and socio-economic status on dental caries experience and treatment patterns in 5-year-old children. *British Dental Journal* **186**, 135-137.
- Wei, S.H., Shi, Y. and Barmes, D.E. (1986): Needs and implementation of preventive dentistry in China. *Community Dentistry and Oral Epidemiology* **14**, 19-23.
- Whittle, J.G., Whitehead, H.F. and Bishop, C.M. (2008): A randomised control trial of oral health education provided by a health visitor to parents of pre-school children. *Community Dental Health* **25**, 28-32.
- Wong, H., McGrath, C., King, N.M. and Lo, E.C.M. (2011): Oral health-related quality of life in Hong Kong preschool children. *Caries Research* **45**, 370-376.