Task shifting, interprofessional collaboration and education in oral health care

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CHAPTER 3

Reasons that Dutch dentists and dental hygienists oppose or support an extended scope of practice for dental hygienists

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Abstract

Introduction – In the Netherlands, the scope of dental hygiene practice was expanded beginning in 2006. The objective of this study was to explore reasons for supporting or opposing an extended scope of practice and to find explanatory factors.

Materials and methods - A questionnaire containing pre-defined reasons and an open-ended question was distributed among 1674 randomly selected members of two Dutch professional associations (874 dentists; 800 dental hygienists). Data were analyzed with binary logistic regression with BIC model selection.

Results - Response concerned 541 practitioners (32.3%), i.e., 233 dentists (43.1%) and 308 dental hygienists (56.9%). Non-response analysis revealed no differences and representativeness analysis showed similarities between samples and target populations. Most often, dentists reported flexible collaboration (50.2%) and dental hygienists indicated task variation (71.1%) as supportive reasons. Also, dentists generally reported quality of care (41.2%) and dental hygienists self-competence (22.7%) as opposing reasons. Reasons were explained by profession, gender, and new style practitioners. Discussion – Dentists and dental hygienists conveyed different reasons for supporting or opposing an extended scope of dental hygiene practice.

Conclusion - Outcomes can be categorized as reasons related to economic, professional status, quality, job satisfaction, and flexible collaboration and are not only explained by profession.

Key words: Policy, Extended scope of practice, Dental Hygienists, Dentists, Perceptions, Dental care, Allied health care

Introduction

The scope of dental hygiene practice continues to develop due to changing legislation and policies in many countries (Battrell, 2012; Gibson-Howell Hicks, 2010). Nevertheless, the implementation of this extended scope policy is limited as well as the understanding of why an extended scope of dental hygiene practice is supported or opposed (Abelsen & Olsen, 2008; Adams, 1999; Capaciteitsorgaan, 2013). Profession related factors have been identified as influential barriers to extending this scope (Reinders, Krijnen, Onclin, Van der Schans & Stegenga, 2017a; Reinders, Krijnen, Stegenga & Van der Schans, 2017b; Northcott et al., 2013; Kravitz & Treasure, 2007). Thus far, it is not clear what reasons are considered as most relevant to support or oppose it.

An extended scope of dental hygiene practice concerns the rational redistribution of tasks between dentists and dental hygienists (Sibbald, Laurant & Scott, 2006). The recognized profession of Dutch dental hygienists was extended beginning in 2006 with certain dental tasks such as dental check-ups, administration of local anesthesia, diagnosis and treatment of initial caries, and taking dental radiographs (Jerkovic, Van Offenbeek, Slot & Van Der Schans, 2010). An extended scope can enhance efficiency (DeAngelis & Goral, 2000), increase patient comfort (DeAngelis & Goral, 2000), make oral health care more accessible (Edgington & Pimlott, 2000), and reduce costs (Fortner, 2008). Nevertheless, this policy is stagnating in the Netherlands (Capaciteitsorgaan, 2013). It is likely that the reasons to support or oppose an extended scope of dental hygiene practice will differ depending on the professional position, and these reasons may provide explanations as to why this stagnation occurs and what factors might obstruct or enhance this extended scope of practice.

Factors including the type of profession (Abelsen & Olsen, 2008), gender (Adams, 2004), age (Virtanen, Pellikka, Singh & Widström, 2015), old or new style (practitioners trained before or after the introduction of an extended scope of dental hygiene practice; Jerković-Ćosić, Van Offenbeek & Van der Schans, 2012), work experience (Isman & Farrell, 2014), and working hours (Vick, 2015) may influence the considerations to support or oppose an extended scope of dental hygiene practice. Dental hygienists could aspire to obtain a professional status and extending their scope of practice with certain dental tasks might enhance this (Gillis, & Praker, 1996). Dentists who would like to expand their practice might have more business related motives for supporting an extended scope of dental hygiene practice (Kempster, Luzzi & Roberts-Thomson, 2015). Business revenues could be increased because of lower wages of dental hygienists. Wanting to expand a business is more likely among male dentists since they are more often practice owner than female dentists (McKay et al., 2016). Age might also explain reasons to support or oppose this policy. Dentists older than 60 years are less likely to be practice owners than younger dentists. In the Netherlands, a distinction can be made between old and new style dental hygienists (Jerkovic et al., 2010; Jongbloed-Zoet, Bol-van den Hil, La Rivière-Ilsen & Van der Sanden-Stoelinga, 2012). Many of the first new style dental hygienists, those with an extended scope of practice, graduated in 2006 and were trained together with dental students. Work experience and work hours related to an extended scope are also likely to explain the reasons of dental hygienists for influencing perceptions regarding this policy Jerkovic et al., 2010). So far, it is uncertain to what degree these profession related factors can explain why practitioners consider supporting or opposing an extended scope of dental hygiene practice.

The objective of this study was to explore the reasons of dentists and dental hygienists regarding an extended scope of dental hygiene practice and, in addition, to explore profession related explanatory factors.

Materials and methods

Survey construction

A hard-copy questionnaire and a cover letter (including a link to an online version of the questionnaire) were sent by mail on 27 March 2012. This questionnaire was distributed among Dutch dentists (n=874) and dental hygienists (n=800) who were randomly selected members of two Dutch professional associations using the random sampling function of SPSS. To maximize the response, each of the 1674 practitioners was offered the choice to complete a hard copy or a digital version of the questionnaire. A reminder was sent on 20 April 2012 after no completed surveys were received by the authors for a period of two weeks. The final data entry took place in March 2013.

Two methods were combined in sequential order to collect reasons that were considered salient to the support or opposition of extending the scope of dental hygiene practice. First, a literature search was conducted using the 'related articles' function in PubMed (Chang, Heskett & Davidson, 2006). The first article (Abelsen & Olsen, 2008) related to an extended scope of dental hygiene practice, dentists, and dental hygienists was identified with a regular Boolean search in PubMed. The 'related articles' of this publication were traced and screened to identify topics on the appreciation of an extended scope of practice. Second, individual open-ended interviews with field coding were conducted with two dentists and two dental hygienists to verify the already identified topics and to identify additional topics. The following topics were identified: income (Fortner, 2008), costs (Ross, Ibbetson & Turner, 2007), social status (Swanson Jaecks, 2009), professional identity (Gorter & Freeman, 2005), quality of care (DeAngelis & Goral, 2000; Swanson Jaecks, 2009), self-competence (perceived ability) (DeAngelis & Goral, 2000), work barriers[2,4], task variation (Jerković-Ćosić et al., 2012), job enrichment (Jerković-Ćosić et al., 2012), and flexible collaboration (Rashid, Manoharan, Abufanas & Gallagher, 2013). Old or new style, practitioners that graduated before 2006 and those who graduated in or after 2006, respectively, were also included since the first Dutch dental hygienists with an extended scope of practice graduated in 2006. All of the identified topics were included in the final version of the survey. The entire set of survey items was introduced by 'When the dental hygienist performs these new tasks, this will impact…' followed by, for example, an item such as 'my income, this is why I would / would not* let them perform these new tasks.' Respondents were requested to mark through what was not applicable. In addition, open-ended questions were added. Finally, two dentists and two dental hygienists were asked to pre-test the survey's comprehensibility. All survey items are shown in Figure 1.

Figure 1.
Questionnaire: reasons to support or oppose an extended scope of dental hygiene practice

This question concerns task shifting towards the dental hygienist 'new style'. When the dental hygienist performs these new tasks, this will impact…

More alternatives are possible
**Cross-out what is not applicable*

- ❍ my income, this is why I would / would not* let them perform these new tasks.
- ❍ the status of my profession, this is why I would / would not* let them perform these new tasks.
- ❍ the quality of oral health care, this is why I would / would not* let them perform these new tasks.
- ❍ the identity of my profession, this is why I would / would not* let them perform these new tasks.
- ❍ the flexibility of collaboration, this is why I would / would not* let them perform these new tasks.
- ❍ the costs, this is why I would / would not* let them perform these new tasks.
- ❍ the freedom to perform more complex tasks, this is why I would / would not* let them perform these new tasks.
- ❍ as an obstruction of my work, this is why I would / would not* let them perform these new tasks.
- ❍ the enrichment of my work, this is why I would / would not* let them perform these new tasks.
- ❍ my competence, this is why I would / would not* let them perform these new tasks.
- ❍ other, namely…….. this is why I would / would not* let them perform these new tasks.

NOTE: The dental hygienist questionnaire omitted the phrase 'let them'.

Non-response analyses
To determine potential non-response bias, differences between responders and potential non-responders were compared using Chi-square tests and an independent t-test. Initial respondents were compared with potential non-respondents (Gorter & Freeman, 2005). Potential non-respondents were approached with a reminder after no completed surveys were returned after a continuous period of two weeks.

Representativeness analyses

To determine potential selection bias, the representativeness of the samples was analyzed by comparing their characteristics with the target populations (populations of interest: all dentists and dental hygienists in the Netherlands). This was analyzed with a one-sample t-test.

Statistical analyses

The reasons for dentists and dental hygienists to support or oppose an extended scope of dental hygiene practice were compared using a Chi-square test. A binary logistic regression with minimum Bayesian Information Criterion (BIC) model selection was used. Explanatory factors of reasons to support or oppose an extended scope of dental hygiene practice were determined with this analysis. To explore differences between old and new style dentists and dental hygienists and differences between age categories per profession, a Chi-square test and a Mann-Whitney test were performed, respectively.

Ethical approval

The Institutional Review Board of the Hanze University of Applied Sciences approved the study. The study fulfills all of the requirements for respondent anonymity and is in agreement with regulations for publication of patient and respondent data.

Results

Non-response analysis

The total response concerned 541 practitioners (32.3%); 233 dentists (43.1%); and 308 dental hygienists (56.9%). In Table 1, it can be observed that characteristics of the potential non-response group (II) are similar to the initial response group (I). When comparing age distribution, gender distribution, type of employment, and working hours, no statistical differences were determined.

Table 1.
Non-response analysis

Characteristics	Non-response analysis							
	Response group (all respondents)		Statistical comparison of response groups					
	I	II						
Age distribution	(n=460)	(n=81)	χ2	df	p			
≤ 29	12.8%	4.9%	7.718	4	.102			
30-39	27.8%	27.2%						
40-49	26.5%	23.5%						
50-59	26.1%	32.1%						
≥60	6.7%	12.3%						
Gender distribution								
male	71.7%	65.4%	1.325	1	.250			
male	28.3%	24.0%						
			t	df	p			
Working hours*	0.73 fte	0.74 fte	-.335	535	.738			
			Comparison response groups per profession					
			Dentists			Dental hygienists		
Type of employment	Dentists / Dental hygienists	Dentists / Dental hygienists	χ^2	df	p	χ^2	df	p
Practice owner	54.4% / 36.2%	60.5% / 44.2%	4.856	5	.434	1.197	3	.754
Production-based employment (or payroll employed by a dental practice)	19.0% / 47.9%	15.8% / 44.2%						
Production-based employment or payroll employed by a dental hygiene practice	n.a. / 3.8%	n.a. / 2.3%						
Working in a dental center	19.0% / n.a.	21.1% / n.a.						
Pay roll employment	4.1% / n.a.	0.0% / n.a.						
Freelance/ substitute	3.1% / n.a.	0.0% / n.a.						
Other	0.5% / 12.1%	2.6% / 9.3%						

*fte=full time equivalent based on a work week of 40 hours / I= initial response / II= response after reminder / n.a. = not applicable (not measured according to the classification of Capaciteitsorgaan, 2013)

Representativeness analysis

In Table 2, the results of the representativeness analysis are described. No significant differences were ascertained regarding gender distribution between the samples of dentists and dental hygienists compared to values of their target populations. Within the sample of dentists, a majority of respondents (152 (65.2%)) were male and, within the sample of dental hygienists, six were male (1.9%). In addition, the types of employment of dental hygienists did not differ between the sample and target populations. The majority of dental hygienists (146 (47.4%)) was production-based employed or payroll employed by a dental practice. More than one-third (115 (37.3%)) of the dental hygienists owned their own practice. Differences between the sample and target populations were found with regard to the type of employment among dentists (χ^2=69.298, df=5, p=.001). Relatively more dentists (45 (19.3%)) working in a dental center were part of the sample compared with the target populations (531 (6%)). Age distributions differed between sample and target population values among dentists (χ^2=18.276, df=4, p=.001) and dental hygienists (χ^2=26.753, df=4, p<.001). The age category of dentists between 55 and 59 years old was larger in the sample (97 (41.6%)) compared to the value of the target population (2568 (29%)). The age category of dental hygienists younger than 29 years old was smaller in the sample (43 (14.0%)) compared to the value of the target populations (836 (26%)).

Table 2
Representativeness analysis

	Sample dentists*	**Population dentists****	**Statistical analysis of representativeness**			**Sample dental hygienists***	**Population dental hygienists****	**Statistical analysis of representativeness**		
	(n=233)	(n=8.854)	One sample Chi2 test			(n=308)	(n=3.216)	One sample Chi2 test		
Age distribution			Chi2	df	p			Chi2	df	p
≤ 29	8.6%	11%	18.276	4	.001	14.0%	26%	26.753	4	.000
30-39	16.7%	21%				36.0%	34%			
40-49	19.7%	24%				30.8%	24%			
50-59	41.6%	29%				15.9%	14%			
≥60	13.3%	15%				3.2%	2%			
Gender distribution										
female	34.8%	34%	0.061	1	.806	98.1%	97%	1.171	1	.279
male	65.2%	66%				1.9%	3%			
Type of employment										
Practice owner	55.4%	62%	69.298	5	.001	37.3%	36%	4.455	3	.216
Production-based employment (or payroll employed by a dental practice)	18.5% (3.4%)	18% (5%)				47.4%	46%			
Production-based or payroll employed by a dental hygiene practice						3.6%	6%			
Working in a dental center	19.3%	6%				-	-			
Freelance/ substitute	2.6%	2%				-	-			
Other	0.9%	2%				11.7%	14%			

*Practitioners in the sample of this study / **Dutch populations of dentists and of dental hygienists, source: Capaciteitsorgaan. Capaciteitsplan 2013. Voor de medische, tandheelkundige, klinisch technologische en aanverwante (vervolg)opleidingen. Utrecht: Stichting Capaciteitsorgaan voor Medische en Tandheelkundige Vervolgopleidingen. 2013 *Dutch*

Comparison of professions and considerations on extended scope of dental hygiene practice
Reasons to support or oppose an extended scope of dental hygiene practice vary per profession (Table 3). Dentists considered flexible collaboration (117 (50.2%)), job enrichment (81 (34.8%)), quality of care (70 (30.0%)), and task variation (65 (27.9%)) as the four most important topics when supporting an extended scope of dental hygiene practice. Quality of care (96 (41.2%)) was one reason dentists opposed it.

The five considerations for an extended scope of dental hygiene practice most often reported by dental hygienists were task variation (219 (71.1%)), quality of care (152 (49.4%)), flexible collaboration (144 (46.8%)), job enrichment (142 (46.4%)), and professional identity (126 (40.9%)). In all of the cases, these topics were considered as being supportive for extending it.

Dental hygienists reported more topics in consideration of supporting an extended scope of dental hygiene practice compared to the dentists. The five most significant differences between dentists and dental hygienists concerned task variation, self-competence, quality of care, professional identity, and social status (Table 3). The odds ratios in Table 3 show differences in consideration between dentists and dental hygienists, e.g., it is approximately six times more likely that task variation will be considered as a reason to support an extended scope of dental hygiene practice by a dental hygienist compared to a dentist.

Table 3

Comparison of reasons of dentists (n=233) and dental hygienists (n=308) to support or oppose on an extended scope of dental hygiene practice.

	In favor of an extended scope of dental hygiene practice					Against an extended scope of dental hygiene practice				
Reason	**% Dentists**	**% Dental hygienists**	**χ^2**	**p**	**Odds ratio***	**% Dentists**	**% Dental hygienists**	**χ^2**	**p**	**Odds ratio***
Income	15.9	23.4	4.634	.031	1.587	8.6	10.1	0.341	.559	1.190
Costs	24.9	15.6	7.295	.007	0.557	7.3	9.1	0.560	.454	1.271
Social status	12.0	30.2	25.243	<.001	3.178	11.6	10.1	0.321	.571	0.851
Professional identity	11.2	40.9	58.116	<.001	5.657	22.3	14.6	5.355	.021	0.608
Quality of care	30.0	49.4	20.437	<.001	2.274	41.2	20.8	26.563	<.001	0.361
Self-competence	6.4	42.9	88.911	<.001	10.900	12.4	22.7	9.378	.002	2.069
Work barriers	6.9	8.4	0.459	.498	1.250	8.6	21.8	17.048	<.001	2.961
Task variation	27.9	71.1	99.302	<.001	6.360	7.3	1.6	10.942	.001	0.210
Job enrichment	34.8	46.4	7.439	.006	1.626	10.7	4.2	8.605	.003	0.367
Flexible collaboration	50.2	46.8	0.636	.425	0.871	2.1	1.9	0.026	.872	0.906
Other	4.7	3.9	0.222	.638	0.818	7.3	11.7**	2.896	.089	1.682

*dental hygienist=1; df=1; **4.9% of dental hygienists have similar answers: 'an extended scope of practice is a threat to dental hygiene core business'

Explanatory variables supporting an extended scope of dental hygiene practice

Table 4 shows the odds ratios from the binary logistic regression including the lower and upper confidence intervals. Six factors were used to explain the reasons for supporting an extended scope of dental hygiene practice.

Table 4

Odd ratios (and lower and upper confidence intervals) of binary logistic regression after BIC model selection for reasons to support an extended scope of dental hygiene practice

	Explanatory factors					
Reasons to support extended scope	**Type of profession[a]**	**Gender[b]**	**Age[c]**	**Old or new style[d]**	**Work experience[e]**	Working hours[f]
Income	4.18 (1.96,10.11)	0.26 (0.11, 0.58)	-	-	-	-
Costs	-	0.50 (0.32, 0.78)	-	-	-	-
Social status	4.36 (2.61, 7.52)	-	1.10 (1.03, 1.16)	-	0.91 (0.86, 0.96)	-
Professional identity	15.26 (6.42, 45.34)	0.26 (0.09, 0.66)	-	-	-	-
Quality of care	6.02 (3.27, 12.03)	0.25 (0.12, 0.48)	-	-	-	-
Self-competence	34.76 (11.87, 150.25)	0.22 (0.05, 0.67)	-	-	-	-
Work barriers	-	-	-	-	-	-
Task variation	6.41 (4.38, 9.48)	-	-	-	-	1.02 (1.01, 1.04)
Job enrichment	1.61 (1.13, 2.30)	-	-	1.88 (1.15, 3.09)	-	-
Flexible collaboration	-	-	-	2.01 (1.23, 3.35)	-	-
Other	-	-	1.05 (1.01, 1.10)	-	-	-

a= dental hygienist; b=female; c=older; d=new style practitioners (graduated in or after 2006 when extended scope was incorporated in Dutch curricula); e=more years of work experience; f=more working hours per week; (95% lower confidence interval, 95% upper confidence interval)

Self-competence, professional identity, task variation, and quality of care were reasons to support an extended scope of dental hygiene practice and were explained by profession. Self-competence is mentioned almost 35 times more often by dental hygienists than dentists. Dental hygienists perceived self-competence as a reason to support an extended scope between at least eleven times and, at most, one hundred fifty times more often than dentists. Dental hygienists mentioned professional identity fifteen times more often compared to dentists. Dental hygienists perceived professional identity between at least six and, at most, forty-five times more important than dentists when supporting this policy. Besides self-competence and professional identity, dental hygienists considered task variation and quality of care as most important compared to dentists when supporting an extended scope.

Costs, income, professional identity, quality of care, and self-competence as reasons to support an extended scope of dental hygiene practice were explained by gender. It was more likely that a male rather than a female would perceive costs as a reason to support an extended scope of practice. Male practitioners perceived costs between at least one and a half times and, at most, nine times more important than those that were female. Male practitioners were four times more likely to report income, professional identity, quality of care, and self-competence as a reason to support an extended scope of dental hygiene practice. Lower and upper confidence intervals ranged from approximately one and a half to twenty times where men reported these reasons more often than women.
To the new style dentists and dental hygienists, flexible collaboration was more important compared to the old style practitioners. They also considered flexible collaboration a benefit of an extended scope of dental hygiene practice.

Explanatory variables opposing an extended scope of dental hygiene practice
Table 5 depicts the odds ratios of a binary logistic regression including the lower and upper confidence intervals. Six factors were used to explain reasons to oppose an extended scope of dental hygiene practice.

Table 5

Odd ratios (and lower and upper confidence intervals) of binary logistic regression after BIC model selection for reasons to oppose an extended scope of dental hygiene practice

	Explanatory factors					
Reasons to oppose extended scope	Type of profession[a]	gender[b]	age[c]	old or new style[d]	work experience[e]	working hours[f]
Income	-	-	-	-	-	-
Costs	-	-	-	-	-	-
Social status	-	-	-	-	-	0.96 (0.92, 0.99)
Professional identity	-	-	-	-	-	-
Quality of care	0.36 (0.24, 0.53)	-	-	-	-	-
Self-competence	-	-	0.89 (0.82, 0.94)	-	1.13 (1.05, 1.22)	-
Work barriers	2.96 (1.77, 5.17)	-	-	-	-	-
Task variation	0.22 (0.07, 0.58)	-	-	-	-	-
Job enrichment	-	0.34 (0.18, 0.67)	-		-	-
Flexible collaboration	-	-	-	-	-	-
Other	-	-	-	-	-	-

a= dental hygienist; b=female; c=older; d=new style practitioners (graduated in or after 2006 when extended scope was incorporated in Dutch curricula); e=more years of work experience; f=more working hours per week; (95% lower confidence interval, 95% upper confidence interval)

Quality of care, task variation, and work barriers as reasons to oppose an extended scope of dental hygiene practice were explained by profession. Quality of care was more important to dentists compared to dental hygienists as a reason to oppose an extended scope of practice. Perception regarding quality of care was at least two times and, at most, four times more important to dentists than to dental hygienists. Task variation was approximately four and a half times more important to dentists as a reason to oppose this policy. This perception regarding task variation was at least one and a half times and, at most, fourteen times more important to dentists than to dental hygienists. To dental hygienists, work barriers are almost three times more often a reason to oppose an extended scope of practice. This perception regarding work barriers was at least one and a half times and, at most, fourteen times more important to dental hygienists than to dentists. Job enrichment was almost three times more important to men compared to women. This perception regarding job enrichment was at least one and a half times and, at most, five and a half times more important to men than to women.

Differences among dentists and dental hygienists: old or new style and age categories

Dentists that graduated before 2006 were more supportive of an extended scope of dental hygiene practice regarding quality of care (p=.010) compared to new style dentists. Age was also associated with reasons to support or oppose this extended scope policy. Especially older dentists were more likely to report income as a reason to support the extended scope of practice (p=.023). They also supported social status (p=.005), quality of care (p<.001), professional identity (p=.003), task variation (p=.029), and self-competence (p=.042) more often but were opposed to this policy with regard to costs (p=.014) and job enrichment (p=.009). Especially younger dentists reported quality of care (p=.011) as a reason to oppose an extended scope of practice.

Dentists who graduated before 2006, i.e., the old style dentists, reported additional reasons for supporting an extended scope of dental hygiene practice. Six of those dentists reported that this policy would improve the organization of oral health care (2.6%). Two dentists reported that it would improve the job satisfaction of dental hygienists (0.9%). Additional reasons to oppose this policy were related to the lack of competence of dental hygienists (four dentists, 1.7%), lack of clarity to patients (four dentists, 1.7%), control of dentists over the dental hygienist (five dentists, 2.1%), and a diminish scope of dental practice (one dentist, 0.04%).

New style dental hygienists reported social status (p=.013) more often as a reason to support an extended scope of practice. Quality of care (p=.044), professional identity (p=.008), flexible collaboration (p=.002), job enrichment (p=.001), task variation (p=.003), and self-competence (p=.003) were also reasons generally reported by these new style dental hygienists. Old style dental hygienists more often reported quality of care (p=.010) as a reason to oppose an

extended scope of dental hygiene practice. The age of dental hygienists was associated with their reason to oppose this policy. Especially older dental hygienists reported professional identity (p=.048) as a reason to oppose it.

Extending the scope of practice as a threat to the core business of the dental hygienist was an additional reason reported by old style dental hygienists to oppose the policy (13 (4.2%)). Another reason was that especially old style dental hygienists were afraid that this policy would negatively influence the relationship between dentists and dental hygienists (two dental hygienists, 0.6%). A lack of training or qualification (five dental hygienists, 1.6%) was especially reported by old style dental hygienists (dental hygienists with two or three years of training).

Discussion

Dentists and dental hygienists convey different reasons to support or oppose an extended scope of dental hygiene practice. Reasons can be categorized as economic, professional status, quality, job satisfaction, and flexible collaboration. Reasons were mostly explained by profession, gender, and old or new style (practitioners trained before or after the introduction of this policy). Dentists and dental hygienists have opposing opinions regarding task variation, professional identity, quality of care, and job enrichment.

Economic issues were explained by profession and gender and were only considered as reasons to support an extended scope of dental hygiene practice. It was more likely that a dental hygienist would perceive income as a positive reason to extend it. Obviously, additional certain dental tasks can provide additional income. Costs, but especially income, were more important to male practitioners when supporting an extended scope of practice. These perceptions also correspond to career perceptions of male students. This finding supports earlier studies that substantiated that economic motives are more dominant in the career choices of male practitioners (Rashid et al., 2013; Scarbecz & Ross, 2002).

Social status and professional identity were explained by profession and gender and only considered as reasons to support the extended scope of practice. Both are perceived by dental hygienists as more important compared to dentists. This most likely refers to acquiring a full professional status and public acceptance (Gillis, & Praker, 1996) which is a predictable desire of members of a professionalizing occupation (Macdonald, 1995). Dental hygienists are legally recognized in many countries, however, not in some EU Members States and by EU law. Additionally, the development of dental hygiene from an auxiliary to a profession has been opposed by dental associations (Luciak-Donsberger & Eaton, 2009). In our study, professional identity was also more important to men compared to women. This corresponds

with available evidence. Men generally have a stronger professional identification compared to women due to gender related cultural socialization (Lee, Pillutla & Law, 2000; Russ & McNeilly, 1995; Wallace, 1995). Moreover, professional identity is more salient in the intrapersonal social identity hierarchy of men compared to women (Fox & Bruce, 2001; Gaunt & Scott, 2014). Male dental hygienists might also experience societal gender discrimination and have feelings of not belonging to the dental hygiene profession. This was found in a study regarding the experiences of male dental hygienists following graduation (Faust, 1999). Acceptance of the dental hygiene occupation as a profession might change the auxiliary and assistant reputation of the dental hygienist and reduce societal stereotypes about the occupations of men and women.

Quality of care was both a reason to support as well as to oppose an extended scope of dental hygiene practice. This was partially explained by profession and gender. Quality of care was a more important reason for dental hygienists to support it compared to dentists. For this supportive reason, there may be several factors responsible. The main quality of care indicators concern effectiveness, safety, and patient centeredness (Carinci et al., 2015). Certain dental tasks such as local anesthesia and the use of radiographs can enhance the quality of periodontal care by dental hygienists. Furthermore, dentists and dental hygienists who share diagnostic tasks could potentially increase patient safety. Finally, sharing certain dental tasks could also enhance flexible collaboration in general; something that is explicitly reported by many dentists and dental hygienists that participated in this study. Quality of care as a reason to oppose this policy could be grounded in dentists' beliefs regarding the effectiveness of dental hygienists that they are not competent enough to perform certain dental tasks (Morison, & Machniewski, 2011; Hillam, 2008; Ross, 2008). Dentists are often not aware of dental hygiene education and the required competences (Bolk, Kroezen & Van Dam, 2003). Therefore, they overestimate patient concerns about who is delivering the dental care (Cockcroft, 2015; Holden, 2012). However, several studies report positive results regarding the competence of dental hygienists (Brocklehurst, Ashley, Walsh & Tickle, 2012; Daniel & Kumar, 2016; Macey et al., 2015; Post & Stoltenberg, 2014; Richards, 2015; Öhrn, Crossner, Börgesson & Taube, 1996), and patients are satisfied with the care they provided (DeAngelis & Goral, 2000; Edgington & Pimlott, 2000; Jackson, 2015). It is more likely that some dentists perceive the professionalizing dental hygienist as a financial threat (Kravitz & Treasure, 2007; Luciak-Donsberger, 2003; Pourat, 2009; Reitz & Jadeja, 2004) instead of a threat to the quality of care as many dentists delegate certain dental tasks to chair-side assistants who have no formal or qualifying process of education.

Dentists older than 60 years are less likely to be practice owners than younger dentists (McKay et al., 2016). The results of our study show that older dentists are more supportive of this policy. The older dentists report six reasons in favor of this policy and only two against it. In our study, older dentists were slightly underrepresented in our sample compared to the

target population of all Dutch dentists. Therefore, it is likely that more dentists support an extended scope of dental hygiene practice than our study has revealed. In several countries, many dentists support it (Reinders et al., 2017a), and dental hygienists actually perform a wider range of certain dental tasks (Hach, Aaberg, Lempert & Danielsen, 2016). Independent of age, especially dentists in large group practices and those with prior experience with an extended scope of practice delegate at a higher rate and have perceptions that are more positive regarding an extended scope of practice (Blue et al., 2013).

Besides age category, other demographic characteristics of dentists can also be positively related such as practice size and a preventive treatment philosophy of dentists (Bruers, Van Rossum, Felling, Truin & Van 't Hof, 2003). In our study sample, dentists who own a practice are slightly underrepresented compared to the target population of Dutch dentists. This can perhaps distort the perceived importance of business related issues such as income and costs. It is likely that our results are an underestimation of the relative importance of these reasons of dentists to support or oppose an extended scope of dental hygiene practice. Economic motives of dentists to support this policy can be related to the desire to expand their business (Kempster et al., 2015; Pourat, 2009; Hopcraft et al., 2008).

Job satisfaction related reasons including work barriers, task variation, and job enrichment (Hackman & Oldham, 2005) were found especially among dental hygienists and, to a lesser degree, among dentists. The perception of experienced work barriers was more likely to be reported by dental hygienists. This corresponds with previous research that revealed a perceived lack of dental hygiene autonomy to perform certain dental tasks (Jerković-Ćosić et al., 2012). Task variation is a predictor of dental hygienists' job satisfaction and, in our study, is also a reason for them to support this policy. However, task variation through an extended scope of dental hygiene practice may be less desirable for those who have several part-time jobs (Van Offenbeek, Jerković, Weening-Verbree, Schaub & Van Kampen, 2010). In contrast, task variation or the reduction of it is a reason for dentists to oppose the policy. Thus, both oral health care professions seem to perceive certain dental tasks as contributing to their own job satisfaction.

Male practitioners report job enrichment more often as a reason to oppose the policy. Job enrichment is associated with responsibility, independence, and control (Uduji, 2013). Perhaps such job characteristics are relatively more important to male practitioners than female practitioners because men are more focused on career advancement whereas women are more likely to take a career break (McKay et al., 2016; Pallavi & Rajkumar, 2011). However, this explanation does not seem very plausible.

Flexible collaboration was more likely to be reported by the new style of practitioners but was also the most reported reason of all practitioners independent of their professional

background. Those that graduated in or after 2006 were more likely to perceive flexible collaboration as a reason to support this policy. Since this group has not been included in any other study regarding an extended scope of dental hygiene practice, it is difficult to identify why this new group of graduated practitioners is more supportive. Perhaps it is because they are socialized in a new way of thinking as introduced in the renewed Dutch curricula. Interprofessional education can also reduce dentist-centric perceptions of students regarding task distribution between dentists and dental hygienists (Reinders et al., 2017b). This would also emphasize the important role of undergraduate training in changing clinical practice. An extended scope of dental hygiene practice can improve the overall efficiency in oral health care (Richardson, 1999) as it allows more than one profession to perform specific tasks and treatments. This also affirms the claim of Bassoff (1983) that task profiles that overlap in health care teams facilitate flexibility.

Some - especially old style - Dutch dental hygienists spontaneously reported that an extended scope of dental hygiene practice is a threat to their core business. This may imply that an extended scope creates two different identities within a single occupation. However, it is likely that the changing ratio between old and new style dental hygienists will also influence the acceptance of this policy in favor of an extended scope. Additional research is required to explore the potential contradictory effect of an extended scope of dental hygiene practice on the identity formation of dental hygienists.

The response rate of this study was relatively low thus posing a potential threat to the study's representativeness. However, survey response rates have been declining for several decades (Cull, O'Connor, Sharp & Tang, 2005) and there is no scientifically proven minimally acceptable response rate (Johnson & Wislar, 2012). The non-response analysis of this study did not show any differences between first responders and those who responded after a reminder. In addition, the analysis of the representativeness of this study showed that the samples of dentists and dental hygienists were representative with regard to most characteristics compared to the target populations. Demographic representativeness of studies with much lower response rates only slightly differ from studies with high response rates (Holbrook, Krosnick & Pfent, 2008). The representativeness of collected data exceeds the importance of the quantity of collected data.

Since the data of this study is four years old, our findings might perhaps be different or invalid than if the survey was carried out more recently. However, in a meta-analysis regarding attitudes towards an extended scope among dentists and dental hygienists, the publication year did not explain differences in attitudes (Reinders et al., 2017a). In other words, the perceptions of this population would probably not have changed drastically during the last four years.

The sample size in our study was relatively small and was determined by the contact information that was made available by the two Dutch professional associations. We included the maximum numbers of dentists and dental hygienists that were made available to us. A power calculation would have been informative if previous research would have been available to provide true proportions. Therefore, a power calculation would become speculative. This also reflects the exploratory nature of our study. The absolute sample size of 541 professionals is large when considering statistical power.

In our survey, closed-ended questions with predefined reasons to support or oppose the policy were combined with open-ended questions. Open-ended questions allow respondents to answer freely in their own words. On the other hand, respondents can have difficulties properly articulating their own opinions which can explain why these types of questions are prone to low item-response rates (Denscombe, 2008). Since several old style dental hygienists spontaneously reported that an extended scope of practice is a threat to the dental hygiene core business, it is likely even more Dutch dental hygienists that graduated before 2006 will share this opinion.

Conclusion

Flexible collaboration was found to be the most supportive reason for extended practice according to all of the practitioners that participated in this study. Quality of care was a supportive reason of dental hygienists while dentists reported this as a reason to oppose an extended scope. Job satisfaction related reasons were reported by dental hygienists in support of an extended scope.

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References

Abelsen, B. & Olsen, J.A. (2008) Task division between dentists and dental hygienists in Norway. *Community Dentistry and Oral Epidemiology,* 36(6), 558-566.

Adams, T. (1999). Dentistry and medical dominance. *Social Science & Medicine,* 48, 407-420.

Adams, T.L. (2004). Attitudes to independent dental hygiene practice: dentists and dental hygienists in Ontario. *Journal Canadian Dental Association*, 70(8) 535-538.

Bassoff, B.Z. (1983). Interdisciplinary Education as a Facet of Health Care Policy: The Impact of Attitudinal Research. *Journal of Allied Health*, 3, 280-286.

Battrell, A. (2012). Looking at the past to see the future: the role of the dental hygienist in collaborating with dentists to expand and improve oral health care. *Journal of the American College of Dentists*, 79(1), 29-32.

Blue, C.M., Funkhouser, D.E., Riggs, S., Rindal, D.B., Worley, D., Pihlstrom, D.J., Benjamin, P., Gilbert, G.H. & National Dental PBRN Collaborative Group. (2013). Utilization of non-dentist providers and attitudes toward new provider models: findings from the National Dental Practice-Based Research Network. *Journal of Public Health Dentistry,* 73, 237–244.

Bolk, M.H., Kroezen, N.M., & Van Dam, B.A. (2003). [Dental professionals in the future: flexible team players. The vision of dental professionals on future professional structure and occupation]. *Nederlands Tijdschrift voor Tandheelkunde*, 110(7), 289-293. *Dutch*

Brocklehurst, P., Ashley, J., Walsh, T., & Tickle, M. (2012). Relative performance of different dental professional groups in screening for occlusal caries. *Community Dentistry and Oral Epidemiology,* 40(3), 239-246.

Bruers, J.J., Van Rossum, G.M., Felling, A.J., Truin, G.J., & Van 't Hof, M.A. (2003). Business orientation and the willingness to distribute dental tasks of Dutch dentists. *International Dental Journal,* 53(4), 255-263.

Capaciteitsorgaan (2013). *Capaciteitsplan 2013. Voor de medische, tandheelkundige, klinisch technologische en aanverwante (vervolg)opleidingen.* Utrecht: Stichting Capaciteitsorgaan voor Medische en Tandheelkundige Vervolgopleidingen. *Dutch*

Carinci, F., Van Gool, K., Mainz, J., Veillard, J., Pichora, E.C., Januel, J.M., Arispe, I., Kim, S.M., Klazinga, N.S. & OECD Health Care Quality Indicators Expert Group. (2015). Towards actionable international comparisons of health system performance: expert revision of the OECD framework and quality indicators. *International Journal for Quality in Health Care,* 27(2), 137-146.

Chang, A.A., Heskett, K.M., & Davidson, T.M. (2006). Searching the literature using medical subject headings versus text word with PubMed. *Laryngoscope* 116(2), 366-340.

Cockcroft, B. (2015). Dentists overestimate patient worries about who's delivering their dental care. *British Dental Journal*, 218(9), 510.

Cull, W.L., O'Connor, K.G., Sharp, S., & Tang, S.F. (2005). Response rates and response bias for 50 surveys of pediatricians. *Health Services Research,* 40(1), 213-226.

Daniel, S.J. & Kumar, S. (2016). Comparison of dental hygienists and dentists: clinical and teledentistry identification of dental caries in children. *International Journal of Dental Hygiene.* [Epub ahead of print]

DeAngelis, S. & Goral, V. (2000). Utilization of local anesthesia by Arkansas dental hygienists, and dentists' delegation/satisfaction relative to this function. *International Journal of Dental Hygiene,* 74(3) 196-204.

Denscombe, M. (2008). The length of responses to open-ended questions. A comparison of online and paper questionnaires in terms of a mode effect. *Social Science Computer Review,* 26(3), 359-368.

Edgington, E. & Pimlott, J. (2000). Public attitudes of independent dental hygiene practice. *Journal of Dental Hygiene,* 74(4), 261-270.

Faust, C.C. (1999). A qualitative study of male dental hygienists' experiences after graduation. *Journal of Dental Hygiene,* 73(3), 141-148.

Fortner, H.S. (2008). A CDT code for hygienists. *RDH Magazine*, 28-33.

Fox, G.L. & Bruce, C. (2001). Conditional fatherhood: Identity theory and parental investment theory as alternative sources of explanation of fathering. *Journal of Marriage and Family,* 63, 394-403.

Gaunt, R. & Scott, J. (2014). Parents' involvement in childcare: Do parental and work identities matter? *Psychology of Women Quarterly,* 38, 475-489.

Gibson-Howell, J.C. & Hicks, M.J. (2010). Dental Hygienists' Role in Patient Assessments and Clinical Examinations in U.S. Dental Practices: A Review of the Literature. *Journal of Allied Health* 39(1), e1-e6.

Gillis, M.V. & Praker, M.E. (1996). The professional socialization of dental hygienists: from dental auxiliary to professional colleague. *NDA Journal,* 47(1), 7-13.

Gorter, R.C. & Freeman, R. (2005). Dentist–assistant communication style: perceived gender differences in The Netherlands and Northern Ireland. *Community Dentistry and Oral Epidemiology,* 33, 131-140.

Hach, M., Aaberg, K.B., Lempert, S.M., & Danielsen, B. (2016). Work assignments, delegation of tasks and job satisfaction among Danish dental hygienists. *International Journal of Dental Hygiene,* 1-7.

Hackman, J.R. & Oldham, G.R. (2005). *How job characteristics theory happened. The Oxford handbook of management theory: The process of theory development.* Oxford, UK: Oxford University Press.

Hillam, D.G. (2008). Silent revolution. *British Dental Journal,* 204(1), 4-5.

Holbrook, A.L., Krosnick, J.A., & Pfent, A. (2008). The Causes and Consequences of Response Rates in Surveys by the News Media and Government Contractor Survey Research Firms. In J.M. Lepkowski, C.Tucker, J.M.Brick, E. De Leeuw, L.Japec, P.J.Lavrakas, M.W. Link, & R.L. Sangster (Eds.), *Advances in telephone survey methodology.* (pp. 499-678). New York: Wiley.

Holden, A.C.L. (2012). No To Direct Access. *British Dental Journal,* 212, 355.

Hopcraft, M., McNally, C., Ng, C., Pek, L., Pham, T.A., Phoon, W.L., Poursoltan, P., & Yu, W. (2008). Attitudes of the

Victorian oral health workforce to the employment and scope of practice of dental hygienists. *Australian Dental Journal*, 53(1), 67-73.

Isman, B.A. & Farrell, C.M. (2014). Are dental hygienists prepared to work in the changing public health environment? *Journal of Evidence-Based Dental Practice*, 14, 183-190.

Jackson, G. (2015). Placement of preformed metal crowns on carious primary molars by dental hygiene/therapy vocational trainees in Scotland: a service evaluation assessing patient and parent satisfaction. *Primary Dental Journal*, 4(4), 46-51.

Jerkovic, K., Van Offenbeek, M.A.G, Slot, D.E., & Van Der Schans, C.P. (2010). Changes in the professional domain of Dutch dental hygienists. *International Journal of Dental Hygiene*, 8(4), 301-307.

Jerković-Ćosić, K., Van Offenbeek, M.A.G., & Van der Schans, C.P. (2012). Job satisfaction and job content in Dutch dental hygienists. *International Journal Dental Hygiene*, 10(3), 155-162.

Johnson, T.P. & Wislar, J.S. (2012). Response rates and nonresponse errors in surveys. *Journal of the American Medical Association*, 307(17), 1805-1806.

Jongbloed-Zoet, C., Bol-van den Hil, E.M., La Rivière-Ilsen, J., & Van der Sanden-Stoelinga, M.S. (2012). Dental hygienists in The Netherlands: the past, present and future. *International Journal of Dental Hygiene*, 10(3), 148-154.

Kempster, C., Luzzi, L. & Roberts-Thomson. K. (2015). Australian dentists: characteristics of those who employ or are willing to employ oral health therapists *Australian Dental Journal*, 60(2), 154-162.

Kravitz, A.S. & Treasure, E.T. (2007). Utilisation of dental auxiliaries - attitudinal review from six developed countries. *International Dental Journal* 57(4), 267-273.

Lee, C., Pillutla, M., & Law, K.S. (2000). Power-distance, gender, and organizational justice. *Journal of Management*, 26, 685-704.

Luciak-Donsberger, C. (2003). Origins and benefits of dental hygiene practice in Europe. *International Journal of Dental Hygiene*, 29–42.

Luciak-Donsberger, C. & Eaton, K.A. (2009). Dental hygienists in Europe: trends towards harmonization of education and practice since 2003. *International Journal of Dental Hygiene*, 7(4), 273-284.

Macdonald, K.M. (1995). *The Sociology of the Professions*. London: Sage.

Macey, R., Glenny, A., Walsh, T., Tickle, M., Worthington, H., Ashley, J., & Brocklehurst, P. (2015). The efficacy of screening for common dental diseases by hygiene-therapists: a diagnostic test accuracy study. *Journal of Dental Research*, 94(3), 70S-78S.

McKay, J.C., Ahmad, A., Rashid, F., Shaw, J.L., Clancy, A., David, C., Figueiredo, R., & Quiñonez, C. (2016). Gender Differences and Predictors of Practice Ownership in a Sample of Ontario Dentists. *Journal Canadian Dental Association*, 82, g27.

Morison, S., Marley, J., & Machniewski, S. (2011). Educating the dental team: exploring perceptions of roles and identities.

British Dental Journal, 211(10), 477-483.

Northcott, A., Brocklehurst, P., Jerković-Ćosić, K., Reinders, J.J., McDermott, I., & Tickle, M. (2013). Direct access: lessons learnt from the Netherlands. *British Dental Journal*, 215(12), 607-610.

Öhrn, K., Crossner, C.G., Börgesson, I., & Taube, A. (1996). Accuracy of dental hygienists in diagnosing dental decay. *Community Dentistry and Oral Epidemiology*, 24(3), 182–186.

Pallavi, S.K. & Rajkumar, G.C. (2011). Professional practice among woman dentist. *Journal of International Society of Preventive and Community Dentistry*, 1(1), 14-19.

Post, J.J. & Stoltenberg, J.L. (2014). Use of restorative procedures by allied dental health professionals in Minnesota. *Journal of the American Dental Association*, 145(10), 1044-1050.

Pourat, N. (2009). Differences in characteristics of California dentists who employ dental hygienists and those who do not. *Journal of the American Dental Association*, 140(8), 1027-1035.

Rashid, H., Manoharan, A., Abufanas, S., & Gallagher, J.E. (2013). Motivation for a career in dentistry: the views of dental students in the United Arab Emirates. *International Dental Journal*, 63(5), 259-65.

Reinders, J.J., Krijnen, W.P., Onclin, P., Van der Schans, C.P., & B. Stegenga, B. (2017a). Attitudes among dentists and dental hygienists towards extended scope and independent practice of dental hygienists. *International Dental Journal* 67(1), 46-58.

Reinders, J.J., Krijnen, W.P., Stegenga, B., & Van der Schans, C.P. (2017b). Perceived Dentist and Dental Hygienist Task Distribution After Dental and Dental Hygiene Students' Team Intervention. *Journal of Dental Education*, 81(4), 413-419.

Reitz, M. & Jadeja, R. (2004). The collaborative practice of dental hygiene. *International Journal of Dental Hygiene*, 2(1), 36-39.

Richards, D. (2015). Hygiene-therapists could be used to screen for dental caries and periodontal disease. *Evidence Based Dentistry*, 16(4), 116-117.

Richardson, G. (1999). Identifying, evaluating and implementing cost-effective skill mix. *Journal of Nursing Management*, 5, 265-270.

Ross, M.K. (2008). Hygienist-therapist remit. *British Dental Journal*, 204(3), 110-111.

Ross, M.K., Ibbetson, R.J., & Turner, S. (2007). The acceptability of dually-qualified dental hygienist-therapists to general dental practitioners in South-East Scotland. *British Dental Journal*, 202: E8.

Russ, F.A. & McNeilly, K.M. (1995). Links among satisfaction, commitment, and turnover intentions: The moderating effect of experience, gender, and performance. *Journal of Business Research*, 34, 57-65.

Scarbecz, M. & Ross, J.A. (2002). Gender differences in first-year dental students' motivation to attend dental school. *Journal of Dental Education*, 66(8), 952-961.

Sibbald, B., Laurant, M., & Scott, A. (2006). Changing task profiles. In A. Altman, A. Rico, & W. Boerma (Eds.), *Primary*

care in the driver's seat? Organizational reform in European primary care. (pp. 148–164). Maidenhead, England: Open University Press.
Swanson Jaecks, K.M. (2009). Current perceptions of the role of dental hygienists in interdisciplinary collaboration. *Journal of Dental Hygiene*, 83(2), 84-91.

Uduji, J.I. (2013). Job Enrichment: A Panacea to the Problem of the Demotivated Marketing Executives in the Banking Industry in Nigeria. *European Journal of Business and Management*, 5(13), 99-106.

Van Offenbeek, M.A.G., Jerković, K., Weening-Verbree, L., Schaub, R.M.H., & Van Kampen, T.J. (2010). Taakverdeling tussen beroepsgroepen binnen Nederlandse mondzorg praktijken; Groningen: RuG-RHO. *Dutch*

Vick, B. (2015). Career satisfaction of Pennsylvanian dentists and dental hygienists and their plans to leave direct patient care. *Journal of Public Health Dentistry*, 4.

Virtanen, J.I., Pellikka, E., Singh, S., & Widström, E. (2015). The professional role of a dental hygienist in Finland - educators' views. *International Journal Dental Hygiene*, 1-8.

Wallace, J.E. (1995). Organizational and professional commitment in professional and nonprofessional organizations. *Administrative Science Quarterly*, 40, 228-255.