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Preferences for dental decisional control and associations with quality of life among third molar patients attending public dental services

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Objectives: To explore: (1) the prevalence of dental decisional control preferences (DDCP) among third molar (TM) patients attending public dental services and associated individual's characteristics, and (2) the association between DDCP and quality of life (QoL). **Methodology:** Participants were adult public dental patients with internet access referred for TM consultation. Collected data included patients' socio-demographic variables, the Control Preferences Scale (CPS), the Oral Health Impact Profile (OHIP-14) and the EuroQol EQ-5D-5L. **Results:** Participants ($n=163$) were mainly females (73.6%) with a mean age of 26.2 years ($SD=8.3$). Most participants preferred an active DDCP ($n=71$, 44.1%) followed by a collaborative DDCP ($n=60$, 37.3%) while a minority preferred a passive DDCP ($n=30$, 18.6%). Gender ($P=.05$) and education ($P=.03$) were associated with DDCP. In a multinomial logistic regression model for DDCP, females were more likely to have an active DDCP ($OR=2.73$, $P=.04$) as were participants who had tertiary education ($OR=2.72$, $P=.04$). In a linear regression model for OHIP-14, active DDCP ($P=.05$) and collaborative DDCP ($P=.04$) were associated with less impact on oral health-related QoL. **Conclusion:** Patients attending public dental services preferred to be involved (either actively or collaboratively) in dental treatment decision-making. Being a female and/or having tertiary education were associated with an active DDCP. The positive association between patients' involvement in decision-making and oral health-related QoL might support the benefit for enhancing patients' involvement in decision-making.

Keywords: Decision-making, health outcomes, oral health-related quality of life, OHRQoL, health-related quality of life, HRQoL, OHIP-14, EQ-5D-5L and the Control Preference Scale, CPS.

Introduction

1 Dental decision-making is an interactive form of dentist-patient
2 communication and information sharing. It aims to allow
3 an evidence-based treatment choice that respects patients'
4 beliefs and values. Over time, the health professional-patient
5 relationship in clinical decision-making has changed from a
6 paternalistic relationship to an informed relationship, with
7 the concept of shared decision-making (SDM) being officially
8 introduced in the United States in 1998 (Lipkin, 2013; The
9 President's Advisory Commission on Consumer Protection
10 and Quality in the Health Care Industry, 1998). However,
11 the implementation of SDM into clinical practice within
12 Australia is facing some challenges (Hoffmann *et al.*, 2014).
13 Several factors contribute to SDM including the current
14 clinical practice, clinical uncertainty and patient preference
15 for decisional control (Mulley, 2006). Patient preferences
16 for decisional control might be in the form of being active,
17 collaborative or passive (Degner *et al.*, 1997). Actively in-
18 volving patients in decision-making is becoming necessary
19 not only for moral reasons but also due to the practicing of
20 an evidence-based health care and the increase in available
21 treatment options (Entwistle, 2009). This has made the pa-
22 tient's involvement in treatment decisions a cornerstone for
23 providing patient-centered care (Lucia, 2016). However, there

24 are limited studies that explore preferences for decisional
25 control in dental patients.

26 Decisional control preferences are known to be associated
27 with some individual characteristics. In the medical field,
28 educational attainment, increase in age (outside age extremes)
29 and being a female have been found to be associated with
30 an active decisional control preference (DCP) (Lucia, 2016).
31 In contrast, low-income patients were more likely to have
32 a passive DCP (Lucia, 2016) since the majority of them are
33 less educated and consequently have a low health literacy.
34 Accordingly, it might be argued that public dental patients
35 are more likely to be passive in their dental decisional control
36 since most are socio-economically disadvantaged which makes
37 them eligible to receive government supported dental services
38 (Brennan *et al.*, 2008). However, the recent increase in health
39 information access enabled by the internet (Hoffmann *et al.*,
40 2014), individualism and consumerism (Alden *et al.*, 2012)
41 might have an effect on the DCP of public dental patients.
42 It might be beneficial to understand dental decisional control
43 preferences (DDCP) among a specific group of public dental
44 services' users such as third molar (TM) patients and factors
45 contributing to these preferences.

46 The benefits of involving TM patients in decision-
47 making might include the improvement of decision qual-
48 ity and a reduction in decisional conflict. For example,

1 while the current Australian figures suggest that TM are 55
2 prophylactically removed (Anjrini *et al.*, 2015), there is a 56
3 lack of evidence to support the prophylactic removal of 57
4 asymptomatic impacted TM (Ghaeminia *et al.*, 2016; Mettes 58
5 *et al.*, 2012). In addition, patients themselves might obtain
6 inconsistent recommendations regarding TM extractions from
7 the Internet (Hanna *et al.*, 2015) which might be a potential 59
8 source of decisional conflict. It might be possible to eliminate 60
9 decisional conflict when patients are involved in treatment 61
10 decision-making (Friedlander *et al.*, 2015; Graskemper, 62
11 2016; Kremer *et al.*, 2007). Understanding the individual's 63
12 characteristics contributing to DDCP might assist clinicians 64
13 and patients achieving the desired DDCP. 65

14 When patients are involved in decision-making they are 66
15 more likely to adhere to treatment recommendations, are 67
16 more informed, are more satisfied with the decisions and 68
17 are able to make high quality decisions (Shay and Lafata, 69
18 2015; Street *et al.*, 2009) which might improve health out- 70
19 comes. Among health outcomes, quality of life (QoL) has 71
20 become an important end-point for health services research 72
21 (Bowling, 2003). However, few studies have explored the 73
22 association between DDCP and QoL among public dental 74
23 patients. Therefore, it might be useful to explore whether 75
24 DDCP is associated with QoL. 76

25 The objectives of this study were to determine: (1) the 77
26 prevalence of different DDCP among public TM patients
27 and the associated individual characteristics and (2) the as-
28 sociation between DDCP and QoL. 78

79 Methods

80 *Data source and ethical approvals*

29 Data used in this study were from the baseline survey of
30 the "Engaging Patients in Decision-Making" trial. This
31 trial received ethical approvals from the Low Risk Human
32 Research Ethics Committee (HREC), The University of 83
33 Adelaide (HS-2013-23) and was approved by the Royal 84
34 Adelaide Hospital HREC (approval number: HREC/14/RAH 85
35 /160). The trial was registered on the Australian and New 86
36 Zealand Clinical Trial Register (ACTRN12614000593639) 87
37 (Hanna *et al.*, 2014). This study was undertaken with the 88
38 understanding and written consent of each participant and 89
39 per the World Medical Association Declaration of Helsinki
40 (version 2008) principles.

90 *Participants and setting*

41 Participants were recruited from patients eligible to receive 91
42 public dental services provided by the South Australia Dental 92
43 Services (SADS) and were referred by their dentist for TM 93
44 consultation. For inclusion, participants needed to be aged 94
45 18 years or over and have access to the Internet. Participants 95
46 were recruited by the Department of Oral and Maxillofacial 96
47 Surgery administrative officer at the Adelaide Dental Hospital 97
48 (ADH) with an invitation package which included a SADS 98
49 approach letter, participants' information sheet, consent form, 99
50 baseline survey, a reply-paid envelope and a flyer for a \$10 100
51 conditional gift voucher on participation.

101 *Participants' socio-demographic characteristics*

52 Participants were asked to provide their socio-demographic 101
53 information such as age, gender, educational attainment, 102
54 income level, employment status, occupation, place of birth 103

(as a proxy for ethnicity), private health insurance (PHI)
status, health cards held (eligibility category for receiving
government supported dental services), and their contribution
to their TM treatment's costs.

The Control Preferences scale (CPS)

The CPS was developed by Degner *et al.* (1997) and validated
for its transferability into dentistry (Chapple *et al.*, 2003).
Our participants were asked "Please select only one theme
that reflects your preferred role in making a dental treatment
decision". Participants were provided with five themes that
reflect their preferred role in making a treatment decision.
The CPS themes and their scores were: "I make the final
decision about which treatment I will receive" (score = 5),
"I make the final selection after seriously considering my
dentist's opinion" (score = 4), "My dentist and I share the
responsibility for the decision about which treatment is the
best for me" (score = 3), "My dentist makes the final deci-
sion about which treatment will be used but has seriously
considered my opinion" (score = 2) and "I leave all deci-
sions regarding my treatment to my dentist" (scores= 1).
Three DDCP categories were created: passive (for scores
1 or 2), collaborative (score 3) or active (for score 4 or 5).
Such a categorization has been used before (Chawla and
Arora, 2013).

Measuring quality of life

This study used a dual approach in measuring QoL using
a generic health related QoL (HRQoL) measure combined
with an organ specific oral health-related QoL (OHRQoL)
measures in order to capture different QoL elements (Bren-
nan and Spencer, 2004).

Health-related quality of life using the EuroQoL EQ-5D-5L

The EQ-5D-5L has 5-items developed to measure HRQoL
(The EuroQoL Group, 2005). Each item represents a single
domain of mobility, self-care, pain, anxiety or daily activities.
The reference period is "today". Each item uses a 5-point
response scale ranging from 0 for "I have no problems"
to 4 for "I have extreme problems". The total EQ-5D-5L
score ranges from 0 to 20.

Oral health-related quality of life using the Oral Health Impact Profile-Short Form (OHIP-14)

The OHIP-14 is a 14-item scale (Slade, 1997), a shorter
version of OHIP-49, based on Locker's conceptual model
for oral health and adapted from the World Health Or-
ganization framework for impairment (Slade and Spencer,
1994). Each of the seven domains is represented by two
items (functional limitation, physical pain, psychological
discomfort, physical disability, psychological disability, social
disability and handicap). Items are scored on a 5-point scale
ranging from 0 for "Never" to 4 for "very often". The total
OHIP-14 scores range from 0 to 56. The reference period
is "over the past 12 months".

The single-item global rating of oral health and general health

The single-item global oral health measure was developed
by Locker and Allen (2007) as a self-rating for oral health
status. Participants were asked to "rate your oral health"

1 and their responses were scored on a 5-point scale rang-
 2 ing from 5 for “Excellent” to 1 for “Poor”. The self-rated
 3 general health measure uses the same scoring system for
 4 the single-item self-rated oral health.

Data analysis

5 Data were analyzed using SPSS statistics for Windows
 6 V 23.0 (IBM Corp, 2015). To test associations between
 7 participants’ characteristics and DDCP, Chi-square (χ^2) as-
 8 sociations were calculated. Furthermore, this association was
 9 explored in an adjusted analysis using multinomial logistic
 10 regression model for DDCP. Scales mean, SD, reliability
 11 were calculated and the convergent validity of these scales
 12 were tested. To test the association between DDCP and QoL
 13 among other covariates, a multivariable linear regression
 14 model for each of the selected QoL measures was conducted.

Results

15 A total of 163 valid responses were included (5 participants
 16 were excluded due to lack of internet access and 2 were

17 excluded due to excess missing information). Most partic-
 18 ipants were female ($n=120$, 73.6%) and the largest age
 19 group comprised those aged 19–25 years ($n=67$, 42.4%).
 20 Most had a “secondary school or less” education ($n=94$,
 21 58.5%), with “tertiary education” less prevalent ($n=67$,
 22 41.6%). Nearly half of the participants were unemployed
 23 ($n=76$, 46.6%) and the majority earned “less than \$20,000”
 24 annually ($n=110$, 71%). Nearly half preferred an active
 25 DDCP ($n=71$, 44.1%) followed by a collaborative DDCP
 26 ($n=60$, 37.3%) while a few ($n=30$, 18.6%) preferred a
 27 passive DDCP (Table 1).

The association between individual’s characteristics and DDCP

DDCP was significantly associated with both gender
 ($\chi^2=6.01$, $P=.05$) and educational attainment ($\chi^2=6.99$, $P=.03$)
 (Table 1). The multinomial logistic regression model for
 DDCP was performed with “Passive” DDCP as the reference
 category (Table 2). Women and people with a tertiary educa-
 tion were more likely to have an active DDCP ($OR=2.73$,
 $P=.04$ and $OR=2.72$, $P=.04$ respectively).

Table 1. Participants characteristics and its association with their decisional control preference

	Participants Total $n=163$		Dental Decisional Control Preference									
	n	Passive			Collaborative			Active			χ^2 association	
		%	n	%	n	%	n	%	n	%	χ^2	df
Age group												
18 years or less	23	14.6%	5	21.7%	9	39.1%	9	39.1%	2.63	6	0.85	
19-25 years	67	42.4%	15	22.7%	22	33.3%	29	43.9%				
26-36 years	48	30.4%	6	12.8%	21	44.7%	20	42.6%				
36 years and over	20	12.7%	4	20.0%	7	35.0%	9	45.0%				
Gender												
Female	120	73.6%	17 _a	14.4%	44 _{a,b}	37.3%	57 _b	48.3%	6.01	2	0.05*	
Male	43	26.4%	13 _a	30.2%	16 _{a,b}	37.2%	14 _b	32.6%				
Education												
Secondary school or less	94	58.4%	22 _a	23.7%	38 _{a,b}	40.9%	33 _b	35.5%	6.99	2	0.03*	
Tertiary education	67	41.6%	8 _a	11.9%	22 _{a,b}	32.8%	37 _b	55.2%				
Employment status												
Unemployed	76	46.6%	16	21.6%	27	36.5%	31	41.9%	1.655	4	0.80	
Student	50	30.7%	7	14.0%	18	36.0%	25	50.0%				
Employed	37	22.7%	7	18.9%	15	40.5%	15	40.5%				
Income level												
Less than \$20,000	110	71.0%	24	22.0%	39	35.8%	46	42.2%	1.59	2	0.45	
\$20,000 or more	45	29.0%	6	13.3%	17	37.8%	22	48.9%				
Private health insurance												
No	145	89.5%	28	19.4%	53	36.8%	63	43.8%	0.60	2	0.74	
Yes	17	10.5%	2	11.8%	7	41.2%	8	47.1%				
Who pay for your TMs treatment												
Patient pay all expenses	19	11.7%	3	15.8%	6	31.6%	10	52.6%	2.98	6	0.81	
Patient pay some	28	17.2%	4	14.3%	12	42.9%	12	42.9%				
Patient pay none	34	20.9%	9	26.5%	13	38.2%	12	35.3%				
Not specified	82	50.3%	14	17.5%	29	36.3%	37	46.3%				
Place of birth												
Australia	145	89.5%	28	19.4%	50	34.7%	66	45.8%	3.78	2	0.15	
Outside Australia	17	10.5%	2	11.8%	10	58.8%	5	29.4%				

Note: Values in the same row and subtable not sharing the same subscript are significantly different at $p < .05$ in the two-sided test of equality for column proportions. Tests assume equal variances. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

* The Chi-square statistic is significant at the .05 level.

Table 2. Multinomial logistic regression model for dental decisional control preferences ^a

	B	Std. Er	Sig.	OR	95% CI for OR	
					Lower Bound	Upper Bound
Collaborative DCCP						
Intercept	-0.36	0.88	0.685			
Age (years)	0.01	0.03	0.623	1.02	0.96	1.08
Gender (female)	0.62	0.48	0.197	1.86	0.73	4.75
Tertiary education ^b	0.31	0.51	0.546	1.36	0.50	3.68
Income ≥ \$20,000 ^c	0.39	0.58	0.506	1.47	0.47	4.58
Active DCCP						
Intercept	-0.33	0.90	0.713			
Age (years)	0.00	0.03	0.915	1.00	0.94	1.06
Gender (female)	1.00	0.49	0.042	2.73	1.04	7.17
Tertiary education ^b	1.00	0.49	0.043	2.72	1.03	7.14
Income ≥ \$20,000 ^c	0.45	0.58	0.435	1.57	0.50	4.90

^a Reference category = Passive.

^b Reference category =Secondary school or less.

^c Reference category = < \$20,000.

Table 3. Linear regression model for OHIP-14

	Unstandardized Coefficients		Standardized Coefficients	<i>p</i>
	B	Std. Error	Beta	
(Constant)	21.35	4.60		0.00
Age (years)	0.40	0.15	0.22	0.01
Gender (male)	-10.44	2.62	-0.32	0.00
Tertiary education ^a	-3.88	2.37	-0.13	0.10
\$20,000 or more ^b	-2.32	2.69	-0.07	0.39
Dental decisional control preference ^c				
Collaborative	-6.66	3.22	-0.22	0.04
Active	-6.40	3.20	-0.22	0.05

^a Reference category = “secondary school or less”

^b Reference category = “< \$20,000”

^c Reference category = “Passive”

The association between DDCP and OHIP-14

1 The OHIP-14 mean score was 21.7 (*SD*=14.5). OHIP-14
 2 scores correlated with the global self-rated oral health
 3 (*r*=-.33, *P*<.01). In a multivariable linear regression model
 4 for the OHIP-14 controlling for age, gender, educational
 5 attainment and income, having an active (*B*=-6.40, *P*=.05)
 6 or collaborative DDCP (*B*=-6.66, *P*=.04) were associ-
 7 ated with better OHRQoL when compared with passive
 8 DDCP (Table 3).

The association between DDCP and the EQ-5D-5L scores

9 The EQ-5D-5L mean score was 3.1 (*SD*=2.5) and were
 10 correlated with the global self-rated general health (*r*=-.34,
 11 *P*<.01). In a multivariable linear regression model for the
 12 EQ-5D-5L controlling for age, gender, educational attainment
 13 and income, DDCP was not associated with HRQoL (Table 4).

Discussion

14 We found a wide preference among TM patients attending
 15 public dental services for involvement in making dental
 16 treatment choices. Active involvement was preferred by
 17 women and/or those with tertiary education and was associ-

ated with better OHRQoLs. While an observed association
 between DDCP and HRQoL was not statistically significant,
 the positive direction of the association could be tested in
 further studies with greater statistical power or a different
 HRQoL measure that might capture more QoL domains to
 verify this potential relationship.

The high prevalence for more involvement in dental
 decision-making differed from the evidence suggested by
 medically-related studies in disadvantaged adults (Say *et al.*,
 2006). This might be attributed to differences in the
 complexity of the condition as patients tend to prefer to be
 involved in treatment decision-making when the condition is
 not critical (Wilkinson *et al.*, 2008). Furthermore, medically-
 related studies indicated that frequent visiting is associated
 with greater preference for involvement (Alden *et al.*, 2012), a
 finding which might need to be considered for the DDCP. In
 addition, there is a greater tendency for patients to participate
 in decision-making (Chewning *et al.*, 2012) as advocated in
 Australian healthcare policies (Lucia, 2016). The prevalence
 of high involvement preference might also be attributed to
 decreased power distance enabled by more lay access to
 information (Oetzel and Ting-Toomey, 2013).

Women’s greater preference for involvement in
 decision-making is consistent with a review that in-
 cluded medical studies (Say *et al.*, 2006). Alden *et al.*

Table 4. Linear regression model for EQ-5D-5L

	Unstandardized Coefficients		Standardized Coefficients	<i>p</i>
	B	Std. Error	Beta	
(Constant)	2.67	0.79		0.00
Age (years)	.06	0.02	0.20	0.01
Gender (male)	-1.35	0.46	-0.24	0.00
Tertiary education ^a	-.47	0.42	-0.09	0.26
\$20,000 or more ^b	.05	0.13	0.03	0.72
Dental decisional control preference ^c				
Collaborative	-.77	0.57	-0.15	0.18
Active	-.99	0.57	-0.19	0.08

^a Reference category = “secondary school or less”

^b Reference category = “< \$20,000”

^c Reference category = “Passive”

1 (2012) believed that females have more life experience 47
2 which might explain this phenomenon. The association 48
3 between educational attainment and active DDCP is un- 49
4 derstandable considering that clinical decision-making is
5 an interactive communication process where literacy is
6 known to be important. Although evidence from medical
7 studies suggests that being on a low-income, in general, 50
8 is associated with preferring a passive decisional control 51
9 (Say *et al.*, 2006), findings from the adjusted analysis 52
10 excluded this association. 53

11 Preference for involvement in dental treatment deci- 54
12 sion-making was positively associated with OHRQoL. It 55
13 has been argued that when patients are involved in clinical 56
14 decision-making, it improves the quality of the decision 57
15 (Street *et al.*, 2009), and in turn health outcomes. These 58
16 findings provide some evidence to support the possible 59
17 benefit of involving patients in dental treatment decision- 60
18 making to improve their OHRQoL. Patients’ involvement 61
19 in decision-making was not associated with HRQoL, 62
20 which might be due to the limited domains in EQ-5D-5L 63
21 (Hanna *et al.*, 2017). Variations in the domains present in 64
22 QoL instruments affect the apparent relationships between 65
23 different QoL measures with the same oral health status 66
24 (Brennan, 2013; Hanna *et al.*, 2017). Furthermore, the 67
25 reference period of “today” for the EQ-5D-5L versus a 68
26 longer reference period of “over the past 12 months” for
27 the OHIP-14 might underestimate the impact of a specific
28 condition on HRQoL (Durham *et al.*, 2015).

29 This study has some limitations related to the sample 69
30 size due to the low response rate associated with mail 70
31 recruitment for studies targeting young adults. However, 71
32 the sample size is larger than that reported in a similar 72
33 medically-related study (Wilkinson *et al.*, 2008). In addition, 73
34 the study was not able to make inferences about the causal 74
35 association between DDCPs and QoL. However, the way in
36 which the CPS was worded suggests that our participants
37 adopted the selected role in their previous dental treatment
38 decision-making. The generalizability of our findings is
39 limited by the specified sampling frame. On the other hand,
40 this study has several strengths. It contributes to the field of
41 dental decision-making by revealing a positive association
42 between active DDCP and QoL and identified individual
43 characteristics associated with DDCP. This is important for 75
44 enhancing clinical practice; by not only changing beliefs 76
45 about the perceived preference of public dental patients for 77
46 a passive decisional control, but also improving clinicians’ 78

sensitivity to their patients’ desired DDCP. The clinician’s
ability to encourage their patients to take the desired DDCP
might improve their patients’ QoL.

Conclusion

In contrast with what was traditionally believed for public
dental patients preferring a passive role in decision-
making, most participants in this study preferred to be
involved in making their dental treatment choices. Being
a female and/or having a tertiary education was associated
with a greater preference for active decisional control. The
best way to find out a patient’s preferred DDCP is for
clinicians to ask their patients. However, understanding
the patients’ characteristics associated with DDCP might
enable clinicians to be more sensitive to their patients’
preference. Participants who preferred to be involved
(either actively or collaboratively) had better OHRQoL.
Although this positive association was maintained in
regards to HRQoL, it was not found to be statistically
significant. This might suggest the need for future studies
with greater statistical power or using a different HRQoL
instrument. These data provide some support for the need
for clinicians to enhance their patients’ involvement in
decision-making to improve their quality of life.

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Declaration of Conflicting Interests

The Authors declare that there is no conflict of interest.

Abbreviations

ADH: Adelaide Dental Hospital
ANZCTR: Australian and New Zealand Clinical Trial
Register
CPS: The Control Preferences Scale

- 1 DCP: Decision Control Preferences
- 2 DDCP: Dental Decisional Control Preference
- 3 HREC: Human Research Ethics Committee
- 4 HRQoL: Health-Related Quality of Life
- 5 OHIP-14: Oral Health Impact Profile –short form
- 6 OHRQoL: Oral Health-Related Quality of Life
- 7 RCT: Randomized Controlled Trial
- 8 SADS: South Australia Dental Services
- 9 SDM: Shared Decision-Making
- 10 TM: Third Molar

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