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Material Well-Being, Oral Health and Affordability of Dental Care in Late-Middle-Aged New Zealanders

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ABSTRACT

Background: Little is known about oral health among New Zealanders in late middle age. Planning for the needs of older people should be informed by adequate information on the oral health and dental service use of those who will be entering old age. Accordingly, we investigated material well-being-related inequalities in self-reported oral health, self-care and dental care affordability among late-middle-aged New Zealanders.

Method: This study was based on an analysis of data from the New Zealand Health, Work, and Retirement (HWR) 2016 study focused on its 6th biennial wave (2016–2018). There were 1952 participants (58% female) aged 55–64 years. Key dependent variables were self-reported oral health, chewing ability and the perceived affordability of dental care. The exposure variable of interest was material well-being, controlling for other socio-economic status (SES) measures (household income and educational qualifications). Cross-tabulations and logistic regression estimated the associations between financial and material well-being and the oral-health-related variables.

Results: Approximately 90% of participants had retained at least one natural tooth, and over half had more than 20 teeth remaining (functional dentition). Approximately 70% reported having good oral health. There were consistent gradients in self-rated oral health and dentition status by education level, household income and material well-being, with higher proportions among those who were better off. Just under one third of participants (30%) reported experiencing issues with dental care affordability. Material well-being showed the strongest associations with the abovementioned aspects of oral health and access to dental care than the other SES measures.

Conclusion: The findings provide important evidence of the association between material well-being in oral health and access to dental care.

1 | Introduction

Globally, the older population is increasing, with even higher growth rates observed among females, older individuals, and those from lower socioeconomic status or ethnic minority groups [1–5]. Profound socioeconomic inequalities in oral health are evident, suggesting that individuals with lower socioeconomic status are at a higher risk of oral problems such as tooth loss,

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dental decay and periodontal disease [6, 7]. However, a notable research gap exists, with a lack of published information on the oral health of those in late middle age [4].

Middle age is the period beyond early and mid-adulthood but before the onset of old age. It involves the start of the transition between work and retirement, with differences in biological ageing making it difficult to define it with a particular chronological age range. There will be changes in life routines and expectations during this transition, along with changes in health, including oral health. Census data from 2018 indicated that the 587,380 people in the 55–64 age group comprised 12.0% of the Aotearoa/New Zealand population. There has been a lack of published research specifically focusing on late-middle-aged people (typically, they are included in national surveys and their subsequent technical reports, but the informative published secondary analysis papers which soon emerge for younger and older age groups are conspicuous by their general absence), and so little is known about their oral health or use of dental services. Much research has been published on younger adults and on those aged 65 and older. There are more and more older people, an increasing proportion of whom are retaining their teeth [1]. Hence, it is necessary and important to recognise and understand their oral health (and other) challenges and needs in this important transition phase of life. The insights gained from such research will be useful for ensuring that their oral health and dental care is appropriate. Because of the cumulative effect of social and economic factors that impact on access to health care and the lack of priority given to oral health in general, these people may have limited resources and opportunities to meet their ongoing oral health care needs.

Oral health services in New Zealand involve a mix of publicly and privately funded care, depending on age group and socioeconomic status (SES). Oral health care for adults is mostly provided by private dental professionals on a user-pays basis [8, 9]. The 2009 New Zealand Oral Health Survey showed that one in two 55- to 64-year-olds had visited a dental professional in the previous 12 months (with rates lower among men and Māori and Pacific adults), but about one in three felt they did not see a dental professional often enough, with many having avoided dental care in the previous year due to cost [8].

That was the situation in 2009, but more recent data on oral health and the affordability of dental care for this little-studied age group are lacking. Accordingly, we investigated socioeconomic inequalities in self-reported oral health (SROH), self-care and dental care affordability among late-middle-aged New Zealanders, focusing particularly on financial and material well-being. Our research questions were: what is the nature and magnitude of the association between material poverty and aspects of SROH in 55- to 64-year-old New Zealanders; and how affordable is dental care for 55- to 64-year-old New Zealanders?

2 | Methods

The New Zealand Health, Work, and Retirement (HWR) 2016 Study is a longitudinal population-based study focused on ageing [9]. Data in these analyses were collected through a biennial postal data collection, the 6th biennial wave of the study (2016–2018), which involved 4029 community-dwelling older individuals. This cohort was recruited from random samples of older adults drawn from the New Zealand electoral roll, on which approximately 97.6% of eligible voters aged 50+ are enrolled. Oversampling of persons of Māori descent was conducted to ensure adequate representation of this group of older adults in Aotearoa/New Zealand [10]. For this 2016 cohort, the overall response rate was 50.5%.

The study was conducted with approval from the Massey University Human Ethics Committee (Massey University, Southern A, Application #15/73). Data were collected in June–December 2016, with participants mailed information packs including introductory letters, information sheets, questionnaire forms and a return-addressed reply-paid envelope. Consent to participate in the survey component of the study was implied by return of a full or partially completed survey form.

This report is based on an analysis of self-report data from participants aged 55–64 years, utilising information on sociodemographic characteristics (sex and education), financial well-being, material well-being and aspects of oral health. The latter included:

TABLE 1 | Socio-economic characteristics, by sex (brackets contain column percentages unless otherwise indicated).

	Male	Female	Total
All (row %)	818 (41.9)	1134 (58.1)	1952 (100.0)
Education			
No qualifications	179 (21.9)	202 (17.8)	381 (19.5)
Secondary school qualifications	170 (20.8)	304 (26.8)	474 (24.3)
Post-secondary certificate	303 (37.0)	344 (30.3)	647 (33.2)
University degree	166 (20.3)	284 (25.0)	450 (23.0)
Household income (before tax)			
< $30,000	114 (16.0)	177 (19.1)	291 (17.8)
$30,000–$60,000	116 (16.3)	211 (22.7)	327 (20.0)
$60,001–$100,000	177 (24.9)	238 (25.7)	415 (25.3)
$100,000 and over	305 (42.8)	301 (32.5)	606 (37.0)
Material well-being (ELSI-SF)			
Hardship	125 (15.6)	188 (17.0)	313 (16.4)
Comfortable	200 (25.0)	277 (25.0)	477 (25.0)
Good	475 (59.4)	642 (58.0)	1117 (58.6)

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(a) Locker's self-reported global oral health rating [11] ('How would you describe the health of your teeth and mouth?'; response options 'Excellent', 'Very good', 'Good', 'Fair', 'Poor');

(b) the number of remaining teeth ('How many natural teeth do you have remaining?'; response options 'Over 21', '11–20', '1–10', 'None');

(c) their self-rated chewing ability ('Can you bite and chew on hard foods such as a firm apple?'; response options 'Yes, without difficulty', 'Yes, with difficulty', 'No'); and

(d) an item on the affordability of dental care ('I can afford to go to a dentist if I need to'; response options used a five-option scale with the left and right anchors being 'Not true for me at all' and 'Definitely true for me').

The participants' economic standard of living was measured using the short form New Zealand Economic Living Standard Indicator (ELSI-SF) [12], in which financial well-being factors included self-reported income, pension, household dependants, cost-cutting activities and material standard of living. The ELSI-SF scores range from 0 to 31, with scores of 16 or below considered to indicate 'material hardship', while those scoring 17–24 and 25–30 are categorised as 'comfortable' and 'good', respectively. Complementary measures of socioeconomic position included self-reported educational qualifications (on a 4-point Likert scale from no qualifications through to 'tertiary level') and household income (on a 4-point Likert scale from <$30,000 NZD through to >$100,000 NZD).

Data analyses were conducted using Stata (version 17) [13]. Cross-tabulations with Chi-squared tests and linear-by-linear trend tests were used to compare variables related to overall oral health, dentition status and mastication function. Owing to the complex sampling strategy used, survey-adjusted ordinal logistic regression was used, with orthogonal polynomial postestimation (ologit contrast in Stata) to test for evidence that these linear associations held after adjusting for sample weighting. Finally, survey-adjusted logistic regression was used to estimate the associations between material well-being and the key oral health variables with adjustment for key covariates.

3 | Results

Summary data on the socio-demographic characteristics of the 1952 participants for whom complete data were available are presented in Table 1. Just over half were female. Approximately 80% of participants had at least completed secondary school, earned more than $30,000, or were classified as being in the 'Comfortable' category at least with respect to material well-being.

TABLE 2 | Self-rated oral health by socio-demographic characteristics (brackets contain row % unless otherwise indicated).

	Overall self-rated oral health					
	Poor	**Fair**	**Good**	**Very good**	**Excellent**	**Total (column %)**
Sex						
Male	99 (9.1)	175 (21.3)	235 (28.6)	223 (27.2)	89 (10.8)[a]	821 (42.5)
Female	101 (12.1)	184 (16.5)	303 (27.2)	344 (30.9)	181 (16.3)	1113 (57.5)
Education						
No qualifications	74 (20.6)	85 (23.6)	80 (22.2)	90 (25.0)	31 (8.6)[b]	360 (19.0)
Secondary school qualifications	54 (11.6)	86 (18.4)	149 (31.9)	122 (26.1)	56 (12.0)	467 (24.5)
Post-secondary certificate	46 (7.2)	111 (17.5)	189 (29.8)	197 (31.0)	92 (14.5)	635 (33.3)
University degree	21 (4.8)	68 (15.4)	112 (25.3)	153 (34.6)	88 (19.1)	442 (23.2)
Household income (before tax)						
<$30,000	61 (21.6)	69 (24.5)	85 (30.1)	43 (15.2)	24 (8.5)[b]	282 (17.6)
$30,000–$60,000	39 (12.3)	59 (18.6)	99 (31.2)	85 (26.8)	35 (11.0)	317 (19.7)
$60,001–$100,000	25 (6.1)	68 (16.6)	130 (31.8)	136 (33.3)	50 (12.2)	409 (25.5)
$100,000 and over	19 (3.2)	91 (15.2)	138 (23.1)	229 (38.3)	121 (20.2)	598 (37.2)
Material well-being (ELSI-SF)						
Hardship	99 (32.8)	76 (25.2)	69 (22.9)	39 (12.9)	19 (6.3)[b]	302 (16.2)
Comfortable	53 (11.5)	97 (21.0)	162 (35.1)	109 (23.6)	40 (8.7)	461 (24.8)
Good	36 (3.3)	164 (14.9)	290 (26.4)	404 (36.7)	206 (18.7)	1100 (59.0)
All combined	200 (18.3)	359 (26.3)	538 (29.6)	567 (20.8)	270 (5.0)	1934 (100.0)

[a]Linear association test $p = 0.0033$.
[b]Linear association test $p < 0.0001$.

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TABLE 3 | Dentition status by socio-demographic characteristics (brackets contain row% unless otherwise indicated).

	Dentition status				
Characteristics	**No teeth**	**1–10 teeth**	**11–20 teeth**	**21+ teeth**	**Total (column %)**
Sex					
Male	64 (7.8)	81 (9.9)	249 (30.3)	427 (52.0)	821 (42.1)
Female	117 (10.3)	90 (8.0)	258 (22.8)	666 (58.9)[a]	1131 (57.9)
Education					
No qualifications	91 (24.6)	62 (16.8)	109 (29.5)	108 (29.2)[b]	370 (19.3)
Secondary school qualifications	35 (7.5)	47 (10.0)	127 (27.1)	260 (55.4)	469 (24.4)
Post-secondary certificate	39 (6.1)	41 (6.4)	168 (26.2)	392 (61.3)	640 (33.3)
University degree	13 (2.9)	19 (4.3)	89 (20.1)	321 (72.6)	442 (23.0)
Household income (before tax)					
< $30,000	53 (18.4)	44 (15.3)	82 (28.5)	109 (37.8)[b]	288 (17.8)
$30,000–$60,000	36 (11.3)	24 (7.5)	90 (28.2)	169 (53.0)	319 (19.7)
$60,001–$100,000	23 (5.6)	25 (6.1)	102 (24.8)	261 (63.5)	411 (25.4)
$100,000 and over	17 (2.8)	24 (4.0)	131 (21.8)	429 (71.4)	601 (37.1)
Material well-being (ELSI-SF)					
Hardship	68 (22.1)	57 (18.5)	93 (30.2)	90 (29.2)[b]	308 (16.4)
Comfortable	49 (10.5)	45 (9.6)	142 (30.4)	231 (49.5)	467 (24.8)
Good	58 (5.2)	59 (5.3)	246 (22.3)	742 (67.2)	1105 (58.8)
All combined	181 (9.3)	171 (8.7)	507 (26.0)	1093 (56.0)	1952 (100.0)

[a]Linear association test, $p = 0.2544$.
[b]Linear association test, $p < 0.0001$.

Data on self-rated oral health are summarised in Table 2. Approximately 70% of the participants reported at least good oral health, and this was higher among females. Across the categories, there were more females than males who reported good oral health, especially in the excellent category (16.3% and 10.8%, respectively). There were consistent gradients in self-rated oral health by education level, household income and material well-being, whereby those who were better off reported better oral health. Two in ten of the participants who had poor oral health earned <$30,000, had no educational qualifications, and were in the 'Hardship' category.

Data on dentition status are presented in Table 3. Approximately 90% of participants had at least one natural tooth remaining and over half met the criteria for a functional dentition (having more than 20 teeth). Higher proportions of female participants had functional dentition (58.9%, 52.0%, respectively). There were consistent gradients in dentition status by education level, household income and material well-being, whereby higher proportions of those who were better off reported having more teeth.

Data on the affordability of dental care are presented in Table 4. Overall, approximately 30% reported that they could not afford to go to the dentist if they wanted to, and this proportion was higher in the 'Hardship' category.

Data on participants' ability to bite and chew on hard foods are presented in Table 5. Approximately 90% of them were able (or with only some difficulty) to bite and chew on the hard foods, with little evidence of sex differences. More of those who had the lowest educational qualifications, earned less than $30,000, or were in the 'Hardship' category (approximately 10%) were unable to bite and chew on hard foods.

'Good' or 'comfortable' material well-being was associated with greater odds of self-reported good oral health, functional dentition and material well-being, while being associated with lower odds of being unable to afford needed dental care, a finding that held after adjusting for sex, education and household income (Table 6). Those with 'Good' material well-being were six times more likely to be able to bite and chew on hard foods than those in 'Hardship' and almost two times more likely than those in the 'Comfortable' category.

4 | Discussion

We investigated the association between material well-being and aspects of oral health, observing consistent gradients by education level, household income and material well-being, by which those who were better off reported better oral health, dentition status and chewing ability. Material well-being showed important associations with those aspects of oral health, and findings persisted even after accounting for household income. Those experiencing material hardship may have competing financial

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TABLE 4 | Ability to afford dental care (brackets contain row% unless otherwise indicated).

Characteristics	'I can afford to go to a dentist if I need to'					Total (column %)
	Not true for me at all	2	3	4	Definitely true for me	
Sex						
Male	116 (14.4)	56 (6.9)	93 (11.5)	151 (18.7)	392 (48.5)[a]	808 (42.0)
Female	169 (15.1)	76 (6.8)	141 (12.6)	211 (18.9)	519 (46.5)	1116 (58.0)
Education						
No qualifications	118 (31.6)	29 (7.8)	57 (15.3)	48 (12.9)	121 (32.4)[b]	373 (19.4)
Secondary school qualifications	70 (15.0)	35 (7.5)	54 (11.5)	92 (19.7)	217 (46.4)	468 (24.4)
Post-secondary certificate	62 (9.8)	43 (6.8)	84 (13.2)	134 (21.1)	313 (49.2)	636 (33.1)
University degree	34 (7.7)	25 (5.6)	37 (8.3)	88 (19.8)	260 (58.6)	444 (23.1)
Household income (before tax)						
< $30,000	108 (38.7)	31 (11.1)	41 (14.7)	37 (13.3)	62 (22.2)[b]	279 (17.4)
$30,001–$60,000	59 (18.6)	29 (9.1)	59 (18.6)	67 (21.1)	104 (32.7)	318 (19.9)
$60,001–$100,000	17 (4.2)	27 (6.6)	52 (12.8)	106 (26.0)	206 (50.5)	408 (25.5)
$100,000 and over	10 (1.7)	16 (2.7)	41 (6.9)	101 (17.0)	427 (71.8)	595 (37.2)
Material well-being (ELSI-SF)						
Hardship	182 (58.2)	42 (13.4)	41 (13.1)	19 (6.1)	29 (9.3)[b]	313 (16.5)
Comfortable	66 (14.0)	69 (14.7)	109 (23.2)	125 (26.6)	101 (21.5)	470 (24.8)
Good	25 (2.3)	20 (1.8)	83 (7.5)	211 (19.0)	773 (69.5)	1112 (58.7)
All combined	285 (15.0)	132 (6.9)	234 (12.2)	362 (18.8)	911 (47.3)	1924 (100.0)

[a]Linear association test, $p = 0.5166$.
[b]Linear association test, $p < 0.0001$.

pressures, meaning oral health suffers. Material well-being is an important issue to consider when investigating socio-economic inequalities in oral health among people in later middle age.

The strengths of this study include the comprehensive exploration of financial and material well-being factors in relation to self-rated oral health and affordability of dental care. As well as the usual approach of collecting household income data, we captured detailed aspects of participants' financial and material well-being using the ELSI-SF, providing a more nuanced understanding of household economic circumstances. By incorporating a range of oral health indicators such as overall oral health condition, dentition status and chewing ability, we were able to explore the complexity of oral health and well-being.

On the other hand, the study's reliance on self-report may be a weakness because self-report oral health data are subjective, notwithstanding sound evidence for the validity of the Locker measure in New Zealand. It is acknowledged that the findings may still have been subject to social desirability and non-response bias. Moreover, while the study provided valuable insights into the oral health and well-being of late middle-aged New Zealanders, the findings may not be generalisable to other populations or contexts. Finally, the study did not collect detailed data on other factors that could influence oral health, such as the manner of use of dental services or sugars intake.

The study findings show that the association between material poverty and aspects of self-reported oral health (SROH) in 55- to 64-year-old New Zealanders is primarily influenced by material well-being rather than income and education. Participants with 'Good' material well-being were six times more likely to have good oral health than those in the 'Hardship' category of material well-being. Income, on the other hand, showed the weakest association with oral health in this age group. This can be attributed to the stable socio-economic circumstances of late middle-aged individuals, who have typically paid off their mortgages and acquired assets. Nevertheless, it is important to note that a significant percentage (about 1 in 6) do not fall into this situation. During the transition from work to retirement, health-related concerns become a priority, and income is allocated towards health-related expenses.

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TABLE 5 | Ability to bite and chew on hard foods, by socio-demographic characteristics (brackets contain row% unless otherwise indicated).

Characteristics	Ability to bite or chew on hard foods			Total (column %)
	Not able	Able with difficulty	Able without difficulty	
Sex				
Male	40 (4.9)	160 (19.4)	623 (75.7)[a]	823 (42.0)
Female	66 (5.8)	214 (18.9)	853 (75.3)	1133 (58.0)
Education				
No qualifications	44 (11.8)	112 (30.0)	217 (58.2)[b]	373 (19.4)
Secondary school qualifications	20 (4.3)	88 (18.9)	358 (76.8)	466 (24.2)
Post-secondary certificate	22 (3.5)	111 (17.4)	504 (79.1)	637 (33.1)
University degree	18 (4.0)	54 (12.0)	377 (84.0)	449 (23.3)
Household income (before tax)				
< $30,000	28 (9.8)	94 (33.0)	163 (57.2)[b]	285 (17.6)
$30,000–$60,000	15 (4.6)	75 (23.2)	233 (72.1)	323 (19.9)
$60,001–$100,000	14 (3.4)	60 (14.6)	336 (82.0)	410 (25.3)
$100,000 and over	12 (2.0)	55 (9.1)	536 (88.9)	603 (37.2)
Material well-being (ELSI-SF)				
Hardship	48 (15.7)	127 (41.6)	130 (42.6)[b]	305 (16.2)
Comfortable	20 (4.3)	116 (24.7)	333 (71.0)	469 (24.9)
Good	33 (3.0)	110 (9.9)	967 (87.1)	1110 (58.9)
All combined	106 (12.5)	374 (29.4)	1476 (58.1)	1956 (100.0)

[a]Linear association test, $p = 0.8037$.
[b]Linear association test, $p < 0.0001$.

TABLE 6 | Oral health and ability to afford care by material well-being.[a]

Odds ratios	Good oral health	Dentition status	Ability to bite or chew hard foods	Inability to afford dental care
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Material well-being[b]				
Hardship (reference category)				
Comfortable	2.9 (1.9, 4.3)	1.9 (1.3, 2.8)	2.7 (1.8, 3.9)	0.26 (0.17, 0.39)
Good	5.9 (3.9, 9.0)	3.1 (2.1, 4.5)	6.0 (3.8, 9.6)	0.06 (0.04, 0.10)

[a]Model adjusts for sex, educational achievements, and household income.
[b]Reference category = ELSI-SF Hardship.

Material well-being is an important determinant of not just having good oral health, but of being able to afford dental care. Dental care tends to be expensive, especially for complex treatments, and those experiencing material hardship are likely to have competing expenses that take higher priority than their teeth; thus, even after controlling for income, material hardship means dental care is less accessible.

The point of difference in this study is the focus on late-middle-aged New Zealanders, a population group for which there is limited research available. While there is extensive research on younger adults and those aged 65 and older, little is known about the oral health and dental service usage of individuals in the late-middle age group. Given the increasing proportion of older individuals retaining their teeth, understanding the oral health challenges and needs of this population becomes crucial. Moreover, the use of a large and representative sample strengthens the generalisability of the study's findings to the broader late-middle-aged population in New Zealand. Additionally, the study's focus on late-middle-aged individuals fills a significant gap in the existing literature, since there is limited research on this specific age group. This contributes to a more comprehensive understanding of oral health challenges and needs during an important transitional phase of life.

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This study stands out by exploring detailed aspects of financial and material well-being, including income, dependent support, personal belongings, living cost-saving activities, standard of living and medical and dental care utilisation. Unlike other surveys that collect superficial data on financial well-being or income, this study delves into each item to examine its association with self-rated oral health and affordability of dental care. The comprehensive measurement of material well-being provides a more accurate depiction of the households' economic situations. The recognition of a robust association between material well-being and oral health outcomes holds important implications for policymakers. By using this understanding, policymakers can develop targeted strategies and allocate resources effectively to address the specific needs of late-middle-aged individuals concerning oral health and dental care affordability. The findings provide significant insights into understanding the true state of oral health well-being among late-middle-aged individuals, which in turn can guide government planning of health budgets and services. By acknowledging and proactively addressing the oral health challenges and needs of this population, policymakers can ensure the provision of appropriate oral health care to meet their ongoing requirements within the broader healthcare system.

In summary, this study describes the association between material well-being and oral health well-being, as well as the affordability of dental care in late-middle-aged New Zealanders. The findings illustrate the importance of using comprehensive measures of material well-being when examining the association between poverty and oral health. The findings also underscore the value of nationally representative oral health survey data for reporting population oral health patterns and needs.

Author Contributions

N.N. and W.M.T. conceived and designed the study. N.N., W.M.T. and J.M.B. undertook the analyses and drafted the paper. All authors contributed critical feedback and interpretation of findings and approved the final manuscript.

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Ethics Statement

The study was conducted with approval from the Massey University Human Ethics Committee (Massey University, Southern A, Application #15/73).

Consent

Participants were mailed information packs including introductory letters, information sheets, questionnaire forms and a return-addressed reply-paid envelope. Consent to participate in the survey component of the study was implied by return of a full or partially completed survey form.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from New Zealand Health, Work, and Retirement Study. Restrictions apply to the availability of these data, which were used under licence for this study.

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