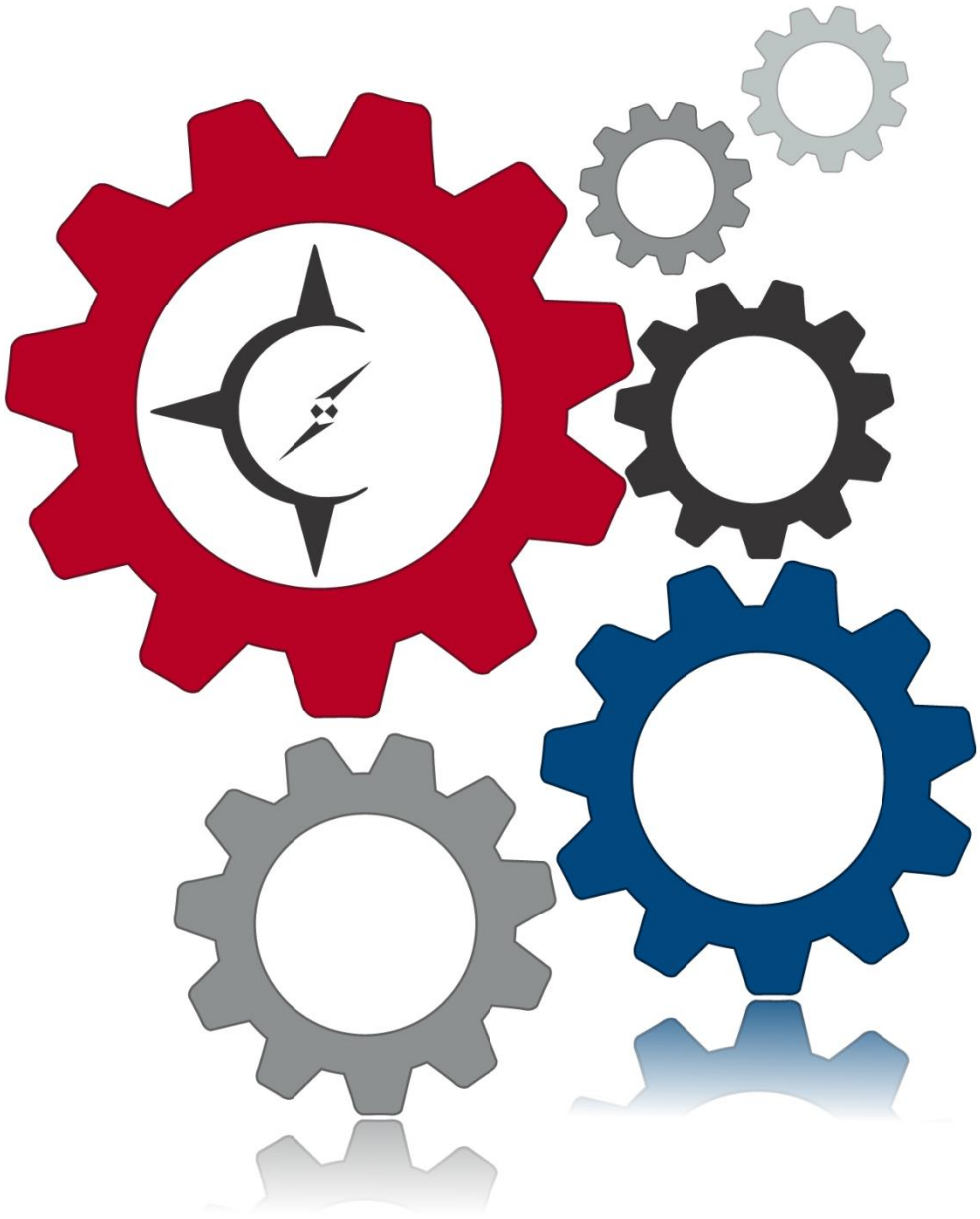
A Quantitative Analysis of Weight Bias and Healthcare Attitudes in Aotearoa New Zealand



Olivia Rowe

Kelvin Xiao

COMPASS RESEARCH CENTRE

FACULTY OF ARTS
UNIVERSITY OF AUCKLAND
Waipapa Taumata Rau

Introduction

Humans have a fundamental right to healthcare - physical, mental, and social health is essential for maintaining personal and societal wellness. While access to healthcare itself is important, the quality of this care is paramount in ensuring that positive outcomes are achieved for patients. Among many factors, healthcare quality can be impacted by the prejudice and bias that healthcare practitioners may hold towards different groups of people.

As Fitzgerald and Hurst (2017) outlined, most physicians and nurses harbour some form of bias. With external reinforcement of social stereotypes and personal experiences causing people to develop unconscious understandings and beliefs (Baron & Banaji, 2006), it is no surprise that some level of bias exists for most healthcare professionals, and this is typically acknowledged as such. However, awareness of bias within the healthcare sector does not deny the fact that stereotypes or prejudice from healthcare professionals can have dire impacts on a patient's physical and mental health outcomes. Whether through a lack of compassion and consideration for different circumstances, preferences in treating some groups over others, practitioners being unaware of the best way to accommodate different individuals' needs, or impolite non-verbal behaviour, these actions can have serious repercussions. Most commonly, patients comment on misdiagnosis and impractical or substandard treatment options, preventing them from accessing their required level of care. It is not simply the existence of bias that becomes an issue, but the subsequent influence bias can have on clinician-patient interactions and health outcomes (Peek et al., 2016).

Although this issue may affect many demographics, weight bias, in particular, is a matter of increasing prevalence. A meta-analysis concerning United States and European populations detailed that weight bias has been experienced by 19.2% of those with class I obesity and 41.8% of individuals with class II obesity (Spahlholz et al., 2016), and a 2018 United Kingdom survey found that 88% of higher weight participants had experienced weight bias (All-Party Parliamentary Group on Obesity, 2018). Weight bias refers to the negative stereotypes, ideas, and assumptions about individuals with higher body weight and is often expressed through prejudicial attitudes and discriminatory behaviours (Papadopoulos & Brennan, 2015; Tomiyama et al., 2018). Interpersonal, institutional, and structural contexts can inform discriminatory and unfair treatment toward particular body weights (Pescosolido & Martin, 2015). While this can affect people of any weight, those of higher weights typically experience this the most (Alberga et al., 2016; Puhl & Suh, 2015). Within general everyday life, weight bias typically results in those on the receiving end experiencing worse body image, depression, anxiety, and stress and internalising these ideas around weight (Bennett et al., 2022; Hayward et al., 2018; Phelan et al., 2015).

Regarding weight bias in healthcare, a study found that 74% of medical students in the United States of America exhibited implicit weight bias, and 67% showed explicit weight bias (Phelan et al., 2014), while Sikorski et al. (2013) outlined that, in Germany, "only 25% [of health professionals] graded current healthcare of obese patients to be 'good' or 'very good'" (p. 512). Across Australia, Canada, France, Germany, the United Kingdom and the United States of America, Puhl et al. (2021) found that two-thirds of participants experienced weight bias from their doctors. Evidently, weight bias in healthcare is a significant issue, with numerous studies presenting similar results (Goff et al., 2023; Lawrence et al., 2021; Sobczak & Leoniuk, 2021).

As a result of the weight bias present in the healthcare system, patients with higher weight typically experience healthcare professionals shaming them by implying that their weight is a fault of their own doing and that they are solely responsible (Alberga et al., 2019; Lee & Pausé, 2016). Additionally, practitioners hold assumptions that patients of higher weight will have less ability and motivation to adhere

to their recommendations, which can affect the quality of care that these patients receive (Amy et al., 2006) and leave them feeling that weight bias contributes to decreased healthcare quality (Drury & Louis, 2002; Persky et al., 2014). Individuals with higher BMI feel that physicians make assumptions about the type of care that they require and provide generic and inconsistent advice (Doolan-Noble et al., 2019). Specifically, medical guidance for higher-weight individuals often includes unrelated and unsolicited comments about dieting and losing weight without being provided with treatment options or advice on how to do so (Ferrante et al., 2016). A New Zealand study found that many higher-weight participants felt disempowered in their relationship with their healthcare provider, as health concerns were often dismissed, with body size being placed as the focus of diagnostic reasoning (Russell & Carryer, 2013).

This issue is present in many areas across the world and is only increasing with rising levels of obesity. Thus, in Aotearoa New Zealand, where obesity prevalence was 34.3% higher than the OECD average (OECD, 2023) and one in three New Zealand adults is classified as obese (Ministry of Health, 2021), it should be expected that weight bias is a considerable problem. However, there is currently limited evidence or research on weight bias within New Zealand healthcare.

Knowing the extent to which biases can impact patient health outcomes, and with weight bias becoming increasingly prevalent, the effect of weight bias in healthcare is a significant issue that calls for further research. Consequently, using the International Social Survey Programme (ISSP) 'Health and Healthcare' survey data of the 2021 New Zealand adult population, this research aims to provide a quantitative analysis of the potential relationship between a patient's body weight and their healthcare experience. Controlling for the effect of other socio-demographic factors, we aim to identify the effects of weight bias and focus on how it affects a patient's attitudes and beliefs towards the New Zealand healthcare system. Specifically, our research questions are as follows:

What is the relationship between body mass index (BMI) and...

1. ...confidence in the New Zealand healthcare system?
2. ...trust in New Zealand doctors?
3. ...confidence in New Zealand doctors' medical skills?
4. ...confidence in getting the best treatment available?
5. ...satisfaction with the New Zealand healthcare system?
6. ...satisfaction with treatment received during the last doctor's visit?

Methods

Data source

The International Social Survey Programme carries out annual surveys, each year regarding a different social science related topic (ISSP, 2024). In 2021, this topic was 'health and healthcare', and this research uses data from the New Zealand portion of the 2021 survey. A stratified random sample of 5925 adults aged 18+ was taken from the New Zealand Electoral Roll. This was stratified by age, gender, and ethnicity. Areas with high numbers of Pacific and Asian ethnic groups were oversampled to improve representativeness of these populations, who typically have lower survey response rates. Similarly, the New Zealand Electoral Roll was used to sample Māori at a higher rate than the population rate. The questionnaire was sent to 5925 individuals, of which 1135 returned completed responses between 1 February 2022 and the end of July 2022. This produced a raw response rate of 19.16% and a standardised response rate of 22.98% - the level of response that would have been reached if each stratum had received surveys relative to their actual portion of the population (von Randow et al., 2021). To compensate for this oversampling and response rate differences, we used sampling weights in our analyses.

Description of variables

Independent Variable:
Our independent variable – body mass index (BMI) – was calculated as weight divided by height^2 from participants' self-report of height (cm) and weight (kg). Participants who did not include height and/or weight measurements in their survey answers were excluded from the data analysis as BMI could not be calculated. This left us with 925 participants to use in our analysis. BMI values were classified based on the standard BMI classifications and the number of responses within each classification, and were finally categorised as less than 25, between 25 and 29.9, between 30 and 34.9, and 35+.

Outcomes:
This research looked to identify the effect of weight bias on patient attitudes and beliefs towards the New Zealand healthcare system. Within the 2021 ISSP survey, several questions revolved around trust, confidence, and satisfaction with healthcare, and these formed the key outcomes that were used when investigating the effect of weight bias. Each question was asked on a Likert scale, and participants answered by selecting a statement (from 5–7 options per question) that best fit how they felt. Answer categories were then grouped and treated as binary or ternary responses.

The six outcomes that were focused on were:

Confidence in the Healthcare System
Healthcare confidence was garnered from the question, "In general, how much confidence do you have in the health care system in New Zealand?". The response categories were "complete confidence", "a great deal of confidence", "some confidence", "very little confidence", and "no confidence at all".
The responses were grouped into three levels:

1. Low confidence ("very little" or "no confidence")
2. Some confidence
3. High confidence ("a great deal of" or "complete confidence")

Trust in Doctors
Trust in doctors was obtained from the statement, "All things considered, doctors can be trusted". The response categories were "agree strongly", "agree", "neither agree nor disagree", "disagree", and "disagree strongly".
The responses were grouped into two levels:

1. Lack of trust ("neither agree nor disagree", "disagree", or "disagree strongly")
2. Trust ("agree" or "agree strongly")

Confidence in Doctors' Skills
Confidence in doctors' medical skills was measured based on the statement, "The medical skills of doctors are not as good as they should be". The response categories were "agree strongly", "agree", "neither agree nor disagree", "disagree", and "disagree strongly".
The responses were grouped into three levels:

1. Low confidence ("agree strongly" or "agree")
2. Some confidence ("neither agree nor disagree")
3. High confidence ("disagree" or "disagree strongly")

Confidence in Receiving the Best Treatment
Confidence in receiving the best treatment was determined from the question, "How likely is it that you would get the best treatment available in New Zealand if you become seriously ill?". The response categories were "certain I would", "likely I would", "equal chance of getting and not getting", "likely I would not", and "certain I would not".
The responses were grouped into three levels:

1. Low confidence ("likely I would not" or "certain I would not")
2. Some confidence ("equal chance of getting and not getting")
3. High confidence ("certain I would" or "likely I would")

Satisfaction in the Healthcare System
Healthcare satisfaction was ascertained from the question, "In general, how satisfied or dissatisfied are you with the healthcare system in New Zealand?". The response categories were "completely satisfied", "very satisfied", "fairly satisfied", "neither satisfied nor dissatisfied", "fairly dissatisfied", "very dissatisfied", and "completely dissatisfied".
The responses were grouped into three levels:

1. Dissatisfied ("fairly dissatisfied", "very dissatisfied" or "completely dissatisfied")
2. Neither satisfied nor dissatisfied
3. Satisfied ("completely satisfied", "very satisfied", "fairly satisfied")

Satisfaction with Last Doctor's Visit
Satisfaction with last doctor's visit was gauged from the question, "How satisfied or dissatisfied were you with the treatment you received when you last visited a doctor?". The response categories were "completely satisfied", "very satisfied", "fairly satisfied", "neither satisfied nor dissatisfied", "fairly dissatisfied", "very dissatisfied", and "completely dissatisfied".
The responses were grouped into two levels:

1. Not satisfied ("fairly dissatisfied", "very dissatisfied", "completely dissatisfied" "neither satisfied nor dissatisfied")
2. Satisfied ("completely satisfied", "very satisfied", "fairly satisfied")

Sociodemographic factors:

1. *Age* was categorised as 18–30, 31–45, 46–60, 61–75, and 76+ years.
2. *Deprivation* was measured by the 2018 New Zealand Deprivation Index (Atkinson et al., 2019), using data from the 2018 Census of Population and Dwellings. 'Small areas' with age and sex standardised proportions of inhabitants were created based on Statistics New Zealand's 'Statistical Area 1' (SA1), clusters of small geographical areas of typically 100–200 residents. Each area was

given a deprivation rating from 1 to 10 – least deprived to most deprived. Using these data, adjacent deprivation values were combined to create quintiles.
3. *Gender* was recorded as male or female.
4. *Personal income* was categorised as 0–20,000, 20,001–40,000, 40,001–70,000, or 70,000+ New Zealand dollars.
5. *Ethnicity* was categorised as European, Māori, Samoan, Other Pacific peoples, Chinese, Indian, Other Asian, or Other ethnicity. Individuals could identify with more than one ethnicity.
6. *Education level* was measured based on the highest level of qualification: High school or below, diploma or trade certificate, or degree (undergraduate degree or above).

Other covariates:

1. *General health*. 'How would you rate your health (physical and mental).' Responses were categorised into "excellent", "very good", "good", "fair", and "poor".
2. *Chronic health*. 'Do you have a long-standing illness, a chronic condition or a disability?' Responses were "yes" or "no".

Data Analysis

We performed unadjusted analyses with crosstabulations of BMI against attitudes towards healthcare in New Zealand, followed unadjusted weighted binary and ordinal logistic regressions between BMI and our dependent outcomes. Pearson's chi-squared tests were used to determine whether there were significant relationships between BMI and each of the outcomes.

To isolate the relationship between BMI and its downstream effects and our outcomes, we performed adjusted regression analyses. Our adjusted models included the sociodemographic factors and covariates described above.

All analyses were performed using R Statistical Software (v4.2.1; R Core Team 2022) with the aid of the `tidyverse` R package (v2.0.0; Wickham, 2019). The binomial logistic regressions were run with the `survey` R package (v4.2; Lumley, 2023), and the ordinal logistic regression were run using the `ordinal` R package (v2023.12.4; Christensen, 2023).

We used marginal standardisation with the `marginaleffects` R package (v0.18.0; Arel-Bundock, 2024) to obtain predicted probabilities of each outcome given BMI (Muller & MacLehose, 2014).

For our unadjusted and adjusted ordinal models, we tested our models against the proportional odds assumption using the `Hmisc` R package (v5.1.1; Harrell Jr, 2023) – the odds ratios across the levels of the outcomes remained approximately constant (Appendix 1-4). We reported crude and adjusted odds ratios and 95% confidence intervals for all our regressions. We considered statistical significance to be at the two-tailed 5% level.

Results

Descriptive Statistics

Table 1 shows a weighted and unweighted summary of the sociodemographic of our sample. The full survey contained 1135 participants, however, due to missing BMI values, the usable sample was closer to 940. The sample was mostly European (76%), followed by Māori at 15%. No other ethnicity reached over 5% of the sample.

Table 1. Weighted and unweighted sociodemographic characteristics of the 1135 New Zealanders who responded to the ISSP 2021: Health & Healthcare survey.

	Weighted		Unweighted	
Characteristic	**N**	**N = 1,135[1]**	**N**	**N = 1,135[2]**
BMI	940		925	
<25		351 (31%)		338 (30%)
25-29.9		316 (28%)		341 (30%)
30-34.9		170 (15%)		149 (13%)
35+		102 (9.0%)		97 (8.5%)
(Missing)		195 (17%)		210 (19%)
Gender	1075		1061	
Female		475 (42%)		501 (44%)
Male		600 (53%)		560 (49%)
(Missing)		60 (5.3%)		74 (6.5%)
Age	1101		1076	
18-30		204 (18%)		127 (11%)
31-45		260 (23%)		187 (16%)
46-60		294 (26%)		225 (20%)
61-75		248 (22%)		301 (27%)
76+		94 (8.3%)		236 (21%)
(Missing)		34 (3.0%)		59 (5.2%)
Ethnicity[3]	1126		1123	
European		865 (76%)		840 (74%)
Māori		169 (15%)		177 (16%)
Samoan		18 (1.6%)		25 (2.2%)
Other Pacific peoples		42 (3.7%)		46 (4.1%)
Chinese		48 (4.2%)		66 (5.8%)
Indian		32 (2.9%)		33 (2.9%)

Other Asian		37 (3.3%)		38 (3.3%)
Other Ethnicity		35 (3.1%)		28 (2.5%)
(Missing)		9 (0.8%)		12 (1.1%)
Education	1118		1107	
High school or below		430 (38%)		417 (37%)
Diploma or trade certificate		306 (27%)		303 (27%)
Degree		382 (34%)		387 (34%)
(Missing)		17 (1.5%)		28 (2.5%)
Personal income	1060		1034	
$0-$20,000		209 (18%)		228 (20%)
$20,001-$40,000		240 (21%)		282 (25%)
$40,001-$70,000		265 (23%)		249 (22%)
$70,000+		346 (30%)		275 (24%)
(Missing)		75 (6.6%)		101 (8.9%)
Socioeconomic deprivation	1135		1135	
Quintile 1 (least deprived)		263 (23%)		267 (24%)
Quintile 2		231 (20%)		223 (20%)
Quintile 3		231 (20%)		229 (20%)
Quintile 4		212 (19%)		203 (18%)
Quintile 5 (most deprived)		198 (17%)		213 (19%)
(Missing)		0 (0%)		0 (0%)
General health	1125		1124	
Poor		68 (6.0%)		62 (5.5%)
Fair		208 (18%)		177 (16%)
Good		449 (40%)		460 (41%)
Very good		322 (28%)		343 (30%)
Excellent		77 (6.8%)		82 (7.2%)
(Missing)		10 (0.9%)		11 (1.0%)
Chronic illness	1122		1113	
No		722 (64%)		672 (59%)
Yes		401 (35%)		441 (39%)
(Missing)		13 (1.1%)		22 (1.9%)

[1] n (%)

[2] n (unweighted) (% (unweighted))

[3] Percentages add to over 100% as individuals can identify with more than one ethnicity.

Unadjusted Analysis

Table 2 shows crosstabulations between BMI and attitudes towards New Zealand healthcare. Those with higher BMI seemed to have less trust in doctors (*p*-value = 0.015). Conversely, those with higher BMI seemed to have greater satisfaction with their last doctor's visit compared to those with lower BMI (*p*-value = 0.013).

Table 2. Crosstabulations of BMI against attitudes towards healthcare in New Zealand

	Confidence in the healthcare system (n= 936, *p*-value = 0.2)			**Confidence in receiving the best treatment** (n = 916, *p*-value = 0.6)		
BMI	**Low Confidence**	**Some Confidence**	**High Confidence**	**Low Confidence**	**Some Confidence**	**High Confidence**
<25	40 (11.4%)	196 (55.8%)	115 (32.8%)	29 (8.4%)	108 (31.4%)	207 (60.2%)
25-29.9	59 (18.7%)	140 (44.4%)	116 (36.8%)	30 (9.7%)	79 (25.6%)	199 (64.6%)
30-34.9	23 (13.6%)	88 (52.1%)	58 (34.3%)	8 (4.9%)	58 (35.4%)	98 (59.8%)
35+	26 (25.5%)	46 (45.1%)	30 (29.4%)	11 (11.0%)	24 (24.0%)	65 (65.0%)
(Missing)	55	70	71	21	59	107

	Satisfaction in the healthcare system (n = 934, *p*-value = 0.4)			**Confidence in doctors' skills** (N = 916, *p*-value = 0.3)		
BMI	**Dissatisfied**	**Neither Satisfied nor Dissatisfied**	**Satisfied**	**Low Confidence**	**Some Confidence**	**High Confidence**
<25	116 (33.4%)	172 (49.6%)	59 (17.0%)	73 (21.8%)	110 (32.8%)	152 (45.4%)
25-29.9	98 (31.0%)	136 (43.0%)	82 (25.9%)	73 (23.3%)	75 (24.0%)	165 (52.7%)
30-34.9	65 (38.5%)	77 (45.6%)	27 (16.0%)	54 (32.5%)	50 (30.1%)	62 (37.3%)
35+	40 (39.2%)	40 (39.2%)	22 (21.6%)	26 (25.7%)	31 (30.7%)	44 (43.6%)
(Missing)	75	77	40	54	43	87

	Trust in doctors (n = 937, *p*-value = 0.015)		**Satisfaction with last doctors' visit** (n = 917, *p*-value = 0.013)	
BMI	**Lack of Trust**	**Trust**	**Not Satisfied**	**Satisfied**
<25	58 (16.5%)	293 (83.5%)	81 (23.8%)	260 (76.2%)
25-29.9	86 (27.4%)	228 (72.6%)	46 (14.9%)	263 (85.1%)
30-34.9	56 (32.9%)	114 (67.1%)	17 (10.2%)	149 (89.8%)
35+	34 (33.7%)	67 (66.3%)	10 (9.9%)	91 (90.1%)
(Missing)	66	127	20	163

Table 3 shows the unadjusted relationship between BMI and attitudes towards healthcare in New Zealand. For those with a BMI under 25, the odds of being more confident in the healthcare system (having high confidence as opposed to some confidence or having some confidence as opposed to low confidence) are 1.61 [1.05, 2.50] times that of those with a BMI over 35.

Individuals with a BMI under 25 had 1.92 [1.12, 3.33], 2.50 [1.32, 4.76], and 2.63 [1.22, 5.56] times the odds of being more trusting in doctors than those with BMI 25-29.9, 30-34.9, and 35+ respectively. There was no relationship between BMI and confidence in the skills of doctors, confidence in receiving the best treatment available in New Zealand, and satisfaction in the healthcare system.

For those with BMI over 35, the odds of having greater satisfaction in their doctors was 2.73 [1.10, 6.75] times as much as the odds for those with BMI under 25. For those with BMI 30-34.9, the odds were 2.65 [1.23, 5.73] times as much compared with BMI under 25.

Table 3. Results of binomial and ordinal logistic regressions showing the unadjusted relationship between BMI and attitudes towards New Zealand healthcare.

	Confidence in healthcare system[1]	Trust in doctors[2]	Confidence in doctors' skills[1]	Confidence in receiving best treatment[1]	Satisfaction in healthcare system[1]	Satisfaction with last doctor's visit[2]
BMI						
<25	—	—	—	—	—	—
25-29.9	0.95 [0.71, 1.27]	0.52* [0.30, 0.89]	1.19 [0.89, 1.59]	1.17 [0.86, 1.60]	1.32 [0.99, 1.76]	1.78 [0.97, 3.24]
30-34.9	0.99 [0.70, 1.40]	0.40** [0.21, 0.76]	0.66* [0.47, 0.94]	1.03 [0.72, 1.49]	0.86 [0.61, 1.20]	2.65* [1.23, 5.73]
35+	0.62* [0.40, 0.95]	0.38* [0.18, 0.82]	0.90 [0.60, 1.36]	1.14 [0.72, 1.81]	0.93 [0.61, 1.41]	2.73* [1.10, 6.75]

[1]Ordinal logistic model with three levels
[2]Binomial logistic model
[3]*p<0.05; **p<0.01; ***p<0.001

Adjusted Analysis

After adjusting for sociodemographic factors and health-related covariates, there was no evidence of a relationship between BMI category and confidence in the healthcare system (Table 4). Trust in doctors remained low among those with a BMI over 25. Those with BMI under 25 had 2.00 [1.06, 3.85] and 2.38 [1.18, 5.00] times the odds of being more trusting in doctors as those with BMI 25-29.9 and 30-34.9, respectively. Table 5 shows those with a BMI of 30-34.9 and a BMI over 35 had more than twice the probability of lacking trust in doctors than those with a BMI less than those with a BMI less than 25.

The adjusted odds ratios of the BMI categories were not significantly different from each other for confidence in the skills of doctors, confidence in receiving the best treatment available in New Zealand, and satisfaction in the healthcare system. Table 6 shows that the distribution of attitudes towards healthcare was relatively even among different BMI categories.

For those with BMI 25-29.9, 30-34.9 and over 35, the adjusted odds of being more satisfied with their last doctor's visit were 2.40 [1.19, 4.84], 4.94 [2.08, 11.7] and 4.75 [1.65, 13.7] times as much as those with BMI less than 25, respectively (Table 4). Those with a BMI of 35-34.9 and over 35 were 20% more likely to be satisfied with the treatment received during their last doctor's visit than those with a BMI under 25 (Table 6).

Those who were 61-75 and 76+ years old had much higher odds of having positive attitudes towards healthcare in New Zealand than those who were 18-30 (Table 4). Those with self-reported good, very good, and excellent health generally had significantly higher odds of having positive attitudes towards healthcare than those in poor health, except for the more interpersonal outcomes of trust and satisfaction in doctors. There was no significant relationship based on gender.

Table 4. Adjusted odds ratios and 95% confidence intervals for binomial and proportional odds models for healthcare attitudes.

Characteristic	Confidence in healthcare system[1]	Trust in doctors[2]	Confidence in doctors' skills[1]	Confidence in receiving best treatment[1]	Satisfaction in healthcare system[1]	Satisfaction with last doctor's visit[2]
BMI						
<25	—	—	—	—	—	—
25-29.9	0.94 [0.67, 1.31]	0.50* [0.26, 0.94]	1.24 [0.87, 1.75]	1.20 [0.83, 1.73]	1.22 [0.87, 1.71]	2.40* [1.19, 4.84]
30-34.9	1.12 [0.75, 1.67]	0.42* [0.20, 0.85]	0.77 [0.51, 1.15]	1.25 [0.81, 1.94]	0.88 [0.58, 1.32]	4.94*** [2.08, 11.7]
35+	0.73 [0.44, 1.23]	0.62 [0.28, 1.39]	1.43 [0.86, 2.42]	1.72 [0.97, 3.10]	1.11 [0.67, 1.86]	4.75** [1.65, 13.7]
Gender						
Female	—	—	—	—	—	—
Male	1.03 [0.77, 1.37]	0.86 [0.52, 1.43]	0.71* [0.53, 0.95]	0.91 [0.67, 1.24]	0.90 [0.68, 1.20]	0.88 [0.50, 1.56]
Age						
18-30	—	—	—	—	—	—
31-45	0.72 [0.47, 1.09]	1.81 [0.86, 3.80]	0.7 [0.46, 1.07]	0.98 [0.63, 1.53]	0.9 [0.59, 1.38]	0.64 [0.28, 1.47]
46-60	1.19 [0.78, 1.82]	2.18* [1.04, 4.57]	1.25 [0.81, 1.93]	1.19 [0.75, 1.89]	1.34 [0.88, 2.06]	1.34 [0.55, 3.25]
61-75	2.22*** [1.42, 3.47]	3.83*** [1.81, 8.13]	1.94** [1.23, 3.07]	1.96** [1.20, 3.21]	2.88*** [1.85, 4.52]	2.37 [0.99, 5.68]
76+	2.91** [1.52, 5.65]	9.36*** [2.94, 29.8]	1.31 [0.69, 2.53]	3.12** [1.50, 6.85]	6.98*** [3.61, 13.7]	8.13** [2.19, 30.1]
European						
No	—	—	—	—	—	—
Yes	0.34*** [0.20, 0.56]	0.65 [0.29, 1.46]	0.60 [0.35, 1.02]	0.66 [0.39, 1.11]	0.21*** [0.12, 0.35]	0.31* [0.12, 0.77]
Māori						
No	—	—	—	—	—	—
Yes	0.54** [0.34, 0.86]	0.61 [0.31, 1.18]	0.75 [0.48, 1.16]	0.53** [0.33, 0.86]	0.43*** [0.26, 0.70]	0.49 [0.23, 1.04]
Samoan						
No	—	—	—	—	—	—
Yes	0.34 [0.08, 1.35]	0.35 [0.07, 1.67]	0.13** [0.03, 0.53]	0.47 [0.13, 1.81]	0.48 [0.11, 1.98]	0.11* [0.02, 0.75]
Other Pacific peoples						
No	—	—	—	—	—	—
Yes	0.49 [0.22, 1.08]	0.29* [0.10, 0.85]	0.77 [0.35, 1.70]	1.24 [0.55, 2.92]	1.01 [0.42, 2.36]	0.71 [0.20, 2.47]
Chinese						
No	—	—	—	—	—	—
Yes	0.18*** [0.08, 0.41]	0.17** [0.05, 0.59]	0.22*** [0.10, 0.49]	0.40* [0.17, 0.94]	0.20*** [0.09, 0.46]	0.52 [0.15, 1.78]
Indian						
No	—	—	—	—	—	—
Yes	0.28** [0.12, 0.64]	0.85 [0.23, 3.12]	0.11*** [0.04, 0.28]	0.46 [0.19, 1.10]	0.05*** [0.02, 0.14]	0.06*** [0.01, 0.27]
Other Asian						
No	—	—	—	—	—	—
Yes	0.24*** [0.11, 0.56]	0.05*** [0.01, 0.15]	0.22*** [0.10, 0.52]	0.65 [0.27, 1.57]	0.27** [0.11, 0.64]	0.14* [0.04, 0.50]

Other Ethnicity						
No	—	—	—	—	—	—
Yes	0.27** [0.12, 0.61]	0.07*** [0.02, 0.24]	0.06*** [0.02, 0.16]	0.47 [0.21, 1.06]	0.26** [0.10, 0.61]	0.40 [0.09, 1.78]
Education						
High school or below	—	—	—	—	—	—
Diploma or trade certificate	0.56** [0.39, 0.79]	0.75 [0.40, 1.39]	0.74 [0.52, 1.05]	0.89 [0.61, 1.29]	0.71 [0.50, 1.01]	0.88 [0.44, 1.77]
Degree	1.06 [0.74, 1.50]	3.31** [1.62, 6.76]	1.58* [1.10, 2.28]	1.31 [0.90, 1.92]	1.11 [0.79, 1.57]	1.49 [0.73, 3.07]
Personal income						
$0-$20,000	—	—	—	—	—	—
$20,001-$40,000	0.93 [0.59, 1.46]	0.72 [0.33, 1.58]	1.43 [0.91, 2.25]	0.92 [0.56, 1.50]	0.76 [0.48, 1.19]	0.72 [0.29, 1.79]
$40,001-$70,000	0.84 [0.54, 1.31]	0.54 [0.25, 1.16]	1.34 [0.86, 2.09]	0.75 [0.46, 1.21]	0.62* [0.40, 0.96]	0.63 [0.26, 1.55]
$70,000+	0.71 [0.46, 1.11]	0.72 [0.33, 1.58]	1.20 [0.77, 1.88]	1.07 [0.66, 1.73]	0.66 [0.42, 1.02]	0.68 [0.28, 1.66]
Socioeconomic deprivation						
Quintile 1 (least deprived)	—	—	—	—	—	—
Quintile 2	1.51* [1.01, 2.26]	1.37 [0.65, 2.88]	0.78 [0.51, 1.19]	0.88 [0.55, 1.38]	1.58* [1.06, 2.35]	0.82 [0.36, 1.83]
Quintile 3	1.45 [0.96, 2.18]	1.81 [0.88, 3.74]	0.60* [0.39, 0.91]	0.63* [0.40, 1.00]	1.32 [0.88, 1.98]	1.8 [0.78, 4.16]
Quintile 4	1.11 [0.72, 1.70]	0.79 [0.38, 1.64]	0.52** [0.34, 0.81]	0.47** [0.30, 0.75]	0.97 [0.63, 1.49]	0.61 [0.25, 1.49]
Quintile 5 (most deprived)	1.03 [0.65, 1.65]	1.17 [0.48, 2.88]	0.59* [0.36, 0.95]	0.80 [0.48, 1.35]	1.03 [0.64, 1.65]	0.85 [0.34, 2.10]
General health						
Poor	—	—	—	—	—	—
Fair	1.80 [0.94, 3.47]	1.05 [0.37, 2.96]	1.55 [0.81, 2.98]	2.56** [1.30, 5.06]	3.07** [1.53, 6.37]	1.34 [0.44, 4.05]
Good	2.00* [1.05, 3.82]	1.91 [0.69, 5.27]	1.43 [0.75, 2.73]	2.09* [1.07, 4.11]	2.69** [1.34, 5.60]	1.27 [0.46, 3.52]
Very good	2.93** [1.50, 5.79]	1.53 [0.51, 4.61]	1.97* [1.01, 3.87]	2.76** [1.37, 5.59]	4.14*** [2.01, 8.79]	1.38 [0.45, 4.24]
Excellent	2.88* [1.25, 6.69]	1.73 [0.39, 7.64]	3.47** [1.45, 8.51]	5.34*** [2.03, 14.7]	5.02*** [2.05, 12.5]	2.39 [0.55, 10.5]
Chronic illness						
No	—	—	—	—	—	—
Yes	1.2 [0.87, 1.66]	0.65 [0.37, 1.12]	0.92 [0.66, 1.27]	1.05 [0.74, 1.49]	0.93 [0.67, 1.29]	0.64 [0.34, 1.18]

[1]Ordinal logistic model with three levels
[2]Binomial logistic model
[3]*p<0.05; **p<0.01; ***p<0.001

Table 5. Predicted probabilities and 95% confidence intervals of the adjusted binomial logistic regression models by BMI.

	Trust in Doctors	
BMI	**Lack of Trust**	**Trust**
<25	16.1 [11.1, 21.1]	83.9 [78.9, 88.9]
25-29.9	28.3 [21.2, 35.4]	71.7 [64.6, 78.8]
30-34.9	36.2 [27.5, 45.0]	63.8 [55.0, 72.5]
35+	33.6 [21.6, 45.7]	66.4 [54.3, 78.4]
	Satisfaction with last doctor's visit	
BMI	**Not Satisfied**	**Satisfied**
<25	25.4 [18.5, 32.3]	74.6 [67.7, 81.5]
25-29.9	14.3 [9.2, 19.4]	85.7 [80.6, 90.8]
30-34.9	9.8 [4.4, 15.3]	90.2 [84.7, 95.6]
35+	10.3 [3.4, 17.1]	89.8 [82.9, 96.6]

Table 6. Predicted probabilities and 95% confidence intervals of the adjusted ordinal logistic regression models by BMI.

	Confidence in Healthcare		
BMI	**Low confidence**	**Some confidence**	**High confidence**
<25	13.1 [9.6, 16.7]	48.9 [44.7, 53.1]	37.9 [32.0, 43.9]
25-29.9	13.9 [10.0, 17.7]	49.6 [45.3, 53.9]	36.5 [30.1, 43.0]
30-34.9	12.0 [7.9, 16.0]	47.7 [42.5, 52.9]	40.3 [32.3, 48.3]
35+	16.8 [10.7, 22.9]	51.5 [46.6, 56.5]	31.7 [22.4, 41.0]
	Confidence in Doctors' Skills		
BMI	**Low confidence**	**Some confidence**	**High confidence**
<25	20.3 [15.7, 25.0]	29.3 [25.7, 32.9]	50.4 [43.9, 56.8]
25-29.9	17.3 [12.6, 21.9]	27.6 [23.7, 31.4]	55.1 [48.0, 62.3]
30-34.9	24.6 [17.8, 31.3]	31.0 [27.1, 34.8]	44.5 [35.8, 53.1]
35+	15.4 [9.6, 21.2]	26.2 [20.9, 31.5]	58.4 [48.2, 68.7]
	Confidence in Getting the Best Treatment		
BMI	**Low confidence**	**Some confidence**	**High confidence**
<25	8.5 [5.7, 11.4]	30.0 [25.3, 34.7]	61.5 [55.1, 67.9]
25-29.9	7.3 [4.6, 9.9]	27.5 [22.6, 32.4]	65.2 [58.5, 71.9]
30-34.9	7.0 [4.1, 9.9]	26.9 [21.1, 32.8]	66.1 [58.0, 74.1]
35+	5.2 [2.6, 7.9]	22.6 [15.7, 29.6]	72.2 [63.0, 81.3]
	Satisfaction with the Healthcare System		
BMI	**Dissatisfied**	**Neither dissatisfied nor satisfied**	**Satisfied**
<25	32.9 [27.3, 38.4]	45.1 [41.2, 49.0]	22.0 [17.3, 26.6]
25-29.9	29.3 [23.7, 34.9]	45.7 [41.8, 49.6]	25.0 [19.9, 30.1]
30-34.9	35.4 [28.1, 42.7]	44.5 [40.4, 48.6]	20.1 [14.4, 25.8]
35+	30.9 [22.7, 39.2]	45.5 [41.6, 49.4]	23.6 [16.1, 31.0]

Discussion

We found that those with higher BMI reported lower levels of trust in New Zealand doctors but higher levels of satisfaction with their last doctor's visit. There was no relationship between BMI and confidence in the New Zealand healthcare system, confidence in New Zealand doctors' medical skills, confidence in in getting the best treatment available or satisfaction with the New Zealand healthcare system, after adjusting for demographic and socioeconomic characteristics and health status. Most of the findings aligned with what other literature has found regarding the relationship between weight and healthcare trust, confidence, and satisfaction.

Comparison to Current Literature

Satisfaction with last doctor's visit

BMI was positively correlated with satisfaction with treatment received during their last doctor's visit, with the higher BMI groups (BMI of 30-35 and 35+) having the highest odds ratios and thus being more inclined to be satisfied with their doctors. Previous research has generally found no relationship between BMI and patient satisfaction (Fong et al., 2006; Gudzune et al., 2011; Hong et al., 2019; Wee et al., 2002). While the assumption may be that individuals of higher weights would have worse patient satisfaction due to weight stigma, Gudzune et al. (2012) have found that patients of higher weights tended to overestimate how respected they were by their physician, being desensitised to weight stigma due to worse experiences in their everyday lives. Therefore, it may make sense that respondents with higher BMI were more inclined to be satisfied with their doctor, as external experiences of weight stigma and lower expectations may have led them to view their treatment during their last doctor's visit as highly positive.

Trust in Doctors

As we expected, individuals with higher BMI (>30) had lower trust in doctors. However, it was unexpected that the lowest levels of trust were with the BMI 30-35 group rather than the BMI >35 group. This could be another instance of higher-weight individuals being desensitised to weight stigma. Both groups could receive similar treatment from their doctors, but those with a BMI >35 are more used to it or receive worse in their day-to-day lives that they do not view the experience as negatively and thus do not rate their trust in doctors as low. However, with the odds ratios' confidence intervals overlapping between these groups, it could also be the case that we do not have as many observations in the BMI >35 group. In general, though, it makes sense that both groups would rate their trust in doctors negatively. When doctors who do not have the knowledge or resources required fail to address the healthcare needs of patients with higher body weights, it can weaken the patient's trust (Claridge, 2014).

There were no significant differences within the remaining outcomes, and the results did not vary across BMI categories. The outcome' healthcare satisfaction' is in line with the current literature, which generally finds no relationship between BMI and patient satisfaction (Fong et al., 2006; Gudzune et al., 2011; Hong et al., 2019; Wee et al., 2002). For the remaining outcomes (confidence in doctors' skills, healthcare confidence, and confidence in receiving the best treatment), it is difficult to know whether the lack of differences between BMI categories should be expected, as there is little research on the effects of BMI and weight stigma on confidence in healthcare.

New Zealand Literature

Eliason et al. (2015) noted that weight biases will likely be experienced differently in different countries based on the cultural norms that surround them. However, there is very little New Zealand literature in this field of study with which to compare our findings.

Adjusted Versus Unadjusted Models

Some significant differences between BMI categories became non-significant after controlling for third variables. As a result, we can infer that the variables the adjusted model controlled for (gender, age, ethnicity, education, income, deprivation, and health) explained some of the association between BMI and the outcomes examined. This makes sense considering the research around healthcare trust and satisfaction, which highlights racial, gender, and sexual minorities as generally having lower trust in the healthcare system (Croker et al., 2013; Guerrero et al., 2015; Richardson et al., 2012; Zha et al., 2023). Additionally, those with poor health or chronic conditions tend to have less trust in healthcare (Calnan & Sanford, 2004; Croker et al., 2013), and individuals with lower incomes were less confident in the healthcare they would receive (Richardson et al., 2012). It is evident that many demographic variables influence an individual's trust, confidence, and satisfaction in healthcare. It is also important to note that it is difficult to disentangle the relationship between BMI and demographic factors on experiences with healthcare. Although weight bias could be a mediator, it has not been modelled this way.

Strengths and Limitations

The biggest strength of this research is that the data was gathered from a nationally representative survey. Responses were received from a diverse range of ethnicities, with oversampling in areas of high Pacific and Asian proportions and sampling Māori at a higher rate than the population rate to ensure that these groups were adequately represented.

There was also variation in the BMI values in the sample population. Most studies regarding weight bias tend to focus on higher BMI groups (Amy et al., 2006; Doolan-Noble et al., 2019; Gudzune et al., 2012; Lee & Pausé, 2016). However, having participants with a range of BMI values allowed for the relationship to be investigated more widely, seeing the effects across an entire spectrum of body sizes. The range of participant BMI values was also distributed similarly to the actual BMI values in the New Zealand adult population[1] (Ministry of Health, 2023). Thus, it is less likely that results were skewed toward the opinions, experiences, and beliefs of one body size over others, and it allows us to compare experiences across BMI groups.

Overall, a variety of demographic factors were present in the sample population, with an array of ages, levels of deprivation, income, and education levels. Care was taken to ensure that this range of demographic variables was controlled for in the data analysis. However, it is worth acknowledging that we could only control for those variables we were aware of and based on the data provided from the survey responses.

A limitation of this study is the small sample size. The low response rate and exclusion of responses that did not include weight or height measurements meant that data was used from only 925 respondents. This may introduce bias if the people who do respond are different to those who do not respond on relevant characteristics. Weighting accounted for bias from non-response to the survey but not non-response to the weight and height items.

[1] The distribution for the adult New Zealand population was: 34.4% with a BMI <25, 32.9% with a BMI of 25–25.9, 19.0% with a BMI of 30–34.9, 7.8% with a BMI of 35–39.9 and 5.9% with a BMI of 40 or above (Ministry of Health, 2023).

A further limitation is the data source (the ISSP survey) being adapted for a different use. The 2021 Health and Healthcare survey was not intended to explore weight bias, and thus, the data provided and the extent to which the relationship was explored were limited to the questions asked in the survey.

This research did not consider how intersectionality may impact a patient's attitudes and beliefs towards the healthcare system. Although demographic variables were controlled for, the intersection between factors introduces further barriers not addressed in this modelling. Doing so was unfeasible in this case, as there was limited data available that would enable this, and it was outside the scope of research for this project. However, it does highlight a potential area for future research. Currently, the potential effect of intersectionality is acknowledged but needs to be directly examined.

Conclusion

Our findings show that despite tending to have greater satisfaction with their previous doctor's appointment, many patients with higher weight do not trust medical professionals. The medical community in Aotearoa New Zealand still has work to do to ensure that everyone is safe and respected in healthcare settings. We found that the relationships between BMI and attitudes towards healthcare were not monotonic, often being the most extreme at BMI between 30 and 34.9. Further research is needed to determine if this is a real effect. Additionally, more research is needed on the intersecting effects of ethnicity (especially minority groups like Middle Eastern, Latin American, and African ethnicities) and body weight, as well as other factors not included in this study, such as LGBTQ+ membership. Ultimately, our research provides a quantitative look at the state medical weight bias in Aotearoa New Zealand.

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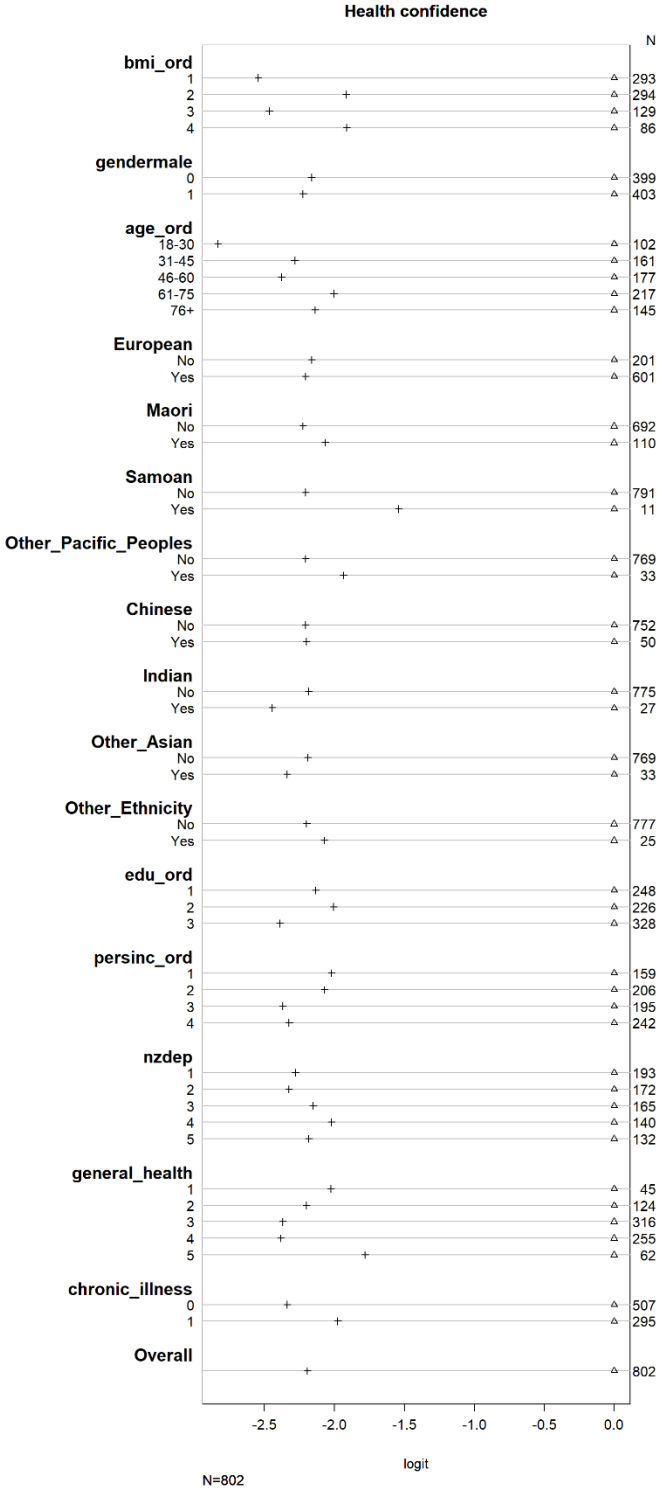
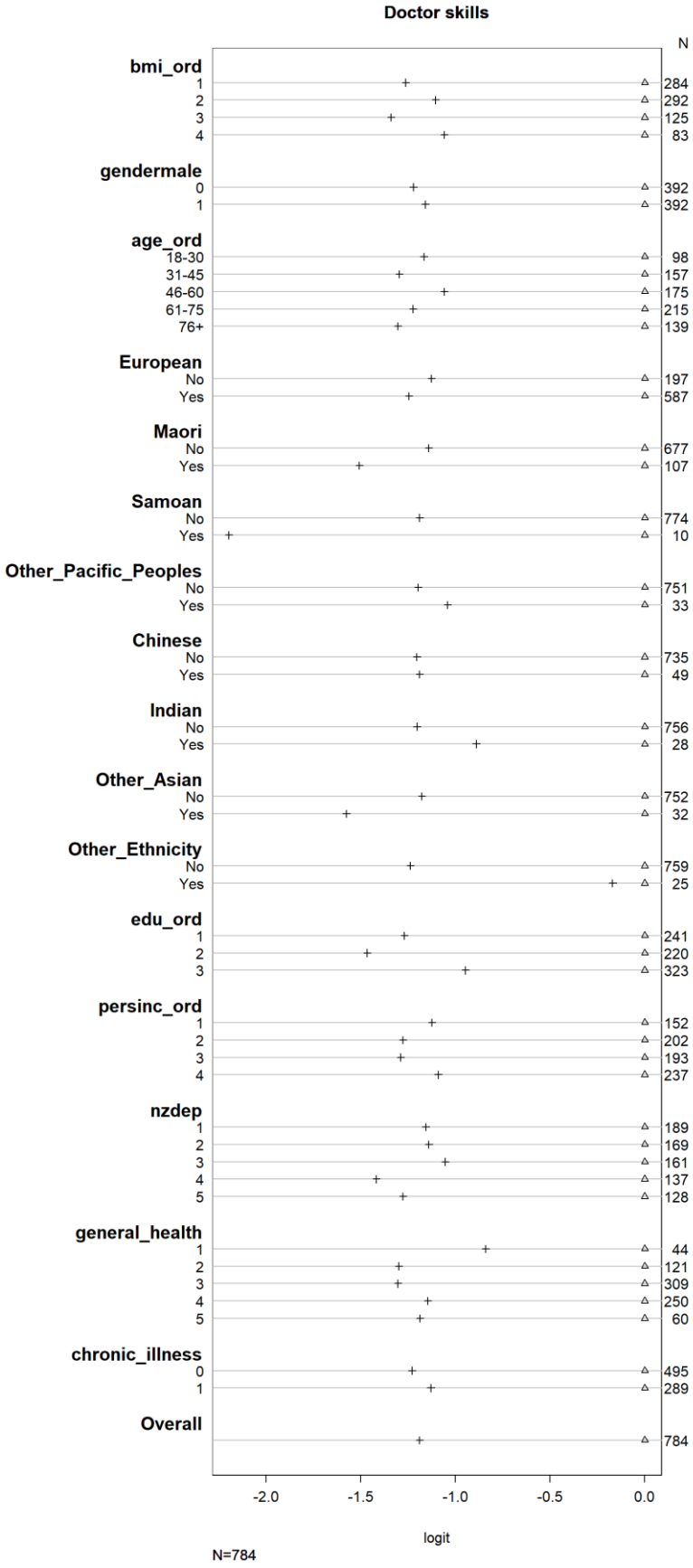
Appendix

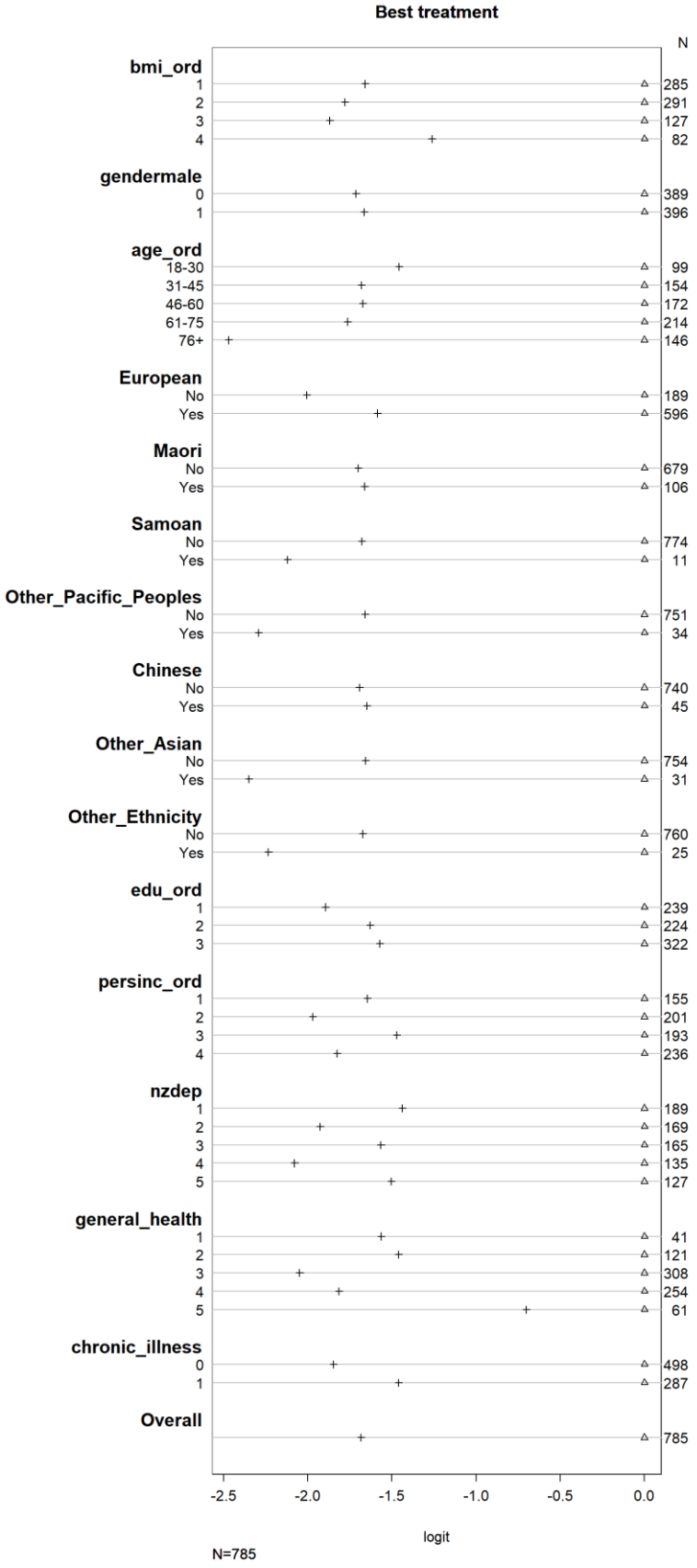
Appendix 1. Graphical proportional odds of ordinal models of confidence in healthcare. These proportions are unweighted, so are not fully valid.



Appendix 2. Graphical proportional odds of ordinal models of confidence in doctors' skills. These proportions are unweighted, so are not fully valid.



Appendix 3. Graphical proportional odds of ordinal models of confidence in receiving the best treatment. These proportions are unweighted, so are not fully valid.



Appendix 4. Graphical proportional odds of ordinal models of satisfaction in the healthcare system. These proportions are unweighted, so are not fully valid.