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Primary health care in New Zealand: Who has access?

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ABSTRACT

Objective: We examined the demographic, socioeconomic, health behaviour and health determinants of financial barriers to access to general practitioner services, prescription drugs and dental care in New Zealand (NZ).
Methods: Data from SoFIE-health, which is an add-on to the Statistics New Zealand-led Survey of Family, Income and Employment (SoFIE), were analyzed using logistic regression.
Results: Of the total of 18,320 respondents, 2845 (15.5%), 4175 (22.8%), and 1165 (6.4%), reported that they had deferred seeing their doctor/s, dentist and buying a prescription, respectively, at least once during the preceding 12 months, because they could not afford the cost of a visit or prescription. Younger age, female sex, low or middle income tertile, living in a least deprived area, having more individual deprivation characteristics (5+), current smokers, reporting high and very high levels of psychological distress and more than two co-morbid diseases were all independently associated with increased odds of deferring doctors' visits, collecting medications and dental visits.
Conclusions: Financial barriers to needed primary care exist for a substantial subgroup of people in New Zealand. A key policy lever is lowering cost barriers to make primary health care in general and dental care in particular more accessible.

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1. Introduction

On 12 September 1978, the non-binding Alma-Ata Declaration on Primary Health Care was signed, laying the vision of equity and social justice in global health. The Declaration called on governments to "formulate national policies, strategies and plans of action to launch and sustain primary care as part of a comprehensive national health system and in coordination with other sectors" to achieve health for all by 2000 [1]. Since then primary health care has continued to be central to the World Health Organization's (WHO's) strategy to strengthen health systems towards the vision of 'Health for All'. This vision was endorsed and revitalised by the current Director-General of WHO in a

speech to the 61st World health Assembly (WHA) when she emphasised "if we want to reach the health-related Goals, we must return to the values, principles, and approaches of primary health care" [2].

Despite the recognition of the need for well performing health systems based on primary health care, achieving equitable access to primary health care has proved difficult to achieve. There are many financial (e.g., not able to pay the cost of a doctor's visit), structural (e.g., lack of primary care providers), and personal (e.g., language) barriers that may impede an individual's ability to obtain needed medical care [3–6]. Despite general agreement about the importance of seeking and receiving prompt medical attention, relatively little is known about the socioeconomic and health characteristics of those who experience barriers to care. In particular, financial barriers to primary health care that include general practitioner services, prescription drugs and dental care have received inadequate attention. This paper sets out to examine the demographic, socioeconomic, health behaviour and health determinants

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of financial barriers that limit access to primary health care in New Zealand. Access to primary health care is frequently seen as access to a general practitioner; however, this study includes prescription drugs and dental care as well. While identification of these factors is of interest in its own right, it is particularly important in the New Zealand context, mainly because ensuring equitable access to services is one of the seven fundamental principles guiding the 2001 New Zealand Health Strategy [7]. Secondly, the bulk of research in this area has been carried out mainly on American data and it is important to examine this issue outside the US to see whether the pattern established there applies elsewhere [5,8–10].

1.1. New Zealand health system context

New Zealand has a largely tax-funded health system which, in general, looks similar to the British National Health Service, including its foundation of GP based primary health care. Yet New Zealand differs from the British model because primary health care is only approximately 60% funded by government [11]. Because of patient co-payments, the paucity of indigenous (Māori) and Pacific Islanders in the primary health care workforce [12], and the uneven distribution of GPs, significant financial, cultural and geographical barriers to access exist for primary health care in some parts of the country [13–15].

New Zealand's current *Primary Health Care Strategy* [7], founded on the principles of the Alma-Ata Declaration and released in 2001, aims to reduce some of these access barriers. The central feature of the strategy is the groupings of the primary care providers (general practitioners (GPs), primary care nurses and other health professionals such as Māori health providers and health promotion workers) into networks called Primary Health Organisations (PHOs). PHOs are funded on a capitation basis for providing a specified set of treatment and preventive services to their enrolled populations regardless of whether contact is made during the period [16–18]. Two different PHO types (Access and Interim) were developed. 'Access' PHOs were those organisations that had an enrolled population with more than 50% identified as high need as determined by deprivation (those living in the two most socioeconomically deprived deciles) and ethnicity (Māori and Pacific). All other PHOs were 'Interim'. In order to make the biggest difference to those in greatest need, the higher subsidy rates were initially paid to people enrolled in Access PHOs. However the intention of the government was to roll out similar levels of funding to all PHOs and to include both GP services and pharmaceuticals. Higher subsidy rates included all age groups by July 2007. As a result of increased subsidies, the levels of co-payments for primary care have reduced substantially. For those who were previously not subsidised at all, GP charges have fallen from an average of $50 per GP visit to $25 or less, and some services are provided free of charge [19]. However, during the period under study higher subsidy rates were not applicable to those aged between 25 and 64 in Interim PHOs. Moreover, as PHOs receive funding from the government based on their enrolled population, patients are required to be enrolled/registered/with a PHO/GP in order to pay a lower GP consultation fee in both interim and access PHOs. Patients pay more if they are not enrolled/registered with a PHO/GP because the PHOs/GPs do not receive government funding and in turn charge patients a higher co-payment.

Regarding pharmaceutical benefits, as a result of subsidy increases, pharmaceutical charges for patients of all ages enrolled in both Access and Interim PHOs fell from a maximum of $15 per item to $3 for medicines on the pharmaceutical schedule by 1 July 2007 [20]. However, for people enrolled in Interim PHOs a maximum prescription fee of $3 per item was only applicable to those aged between 65 and over during the period under study.

Unlike physician services and medicines, which are heavily subsidised by the government, public funding contributes only 25% of dental care expenditure in New Zealand, and is concentrated in children and adolescents [21]. Public funding to dental care for children up to the age 12 is offered through a school-based dental therapist system. For adolescents to qualify for publicly funded care, they must register with private dentists paid under public contract. Most contracts are based on a capitation fee that covers a defined package of services; however, for some dentists, the contracts for adolescent care remain on a fee-for-service basis. Public subsidisation of adult dental care is extremely limited and targeted at particular groups at hospital-based dental clinics. The majority of the adult population is responsible for the full costs of dental care services [22].

2. Methods

2.1. Data

This research used SoFIE-Health data, which is an add-on to the Statistics New Zealand-led Survey of Family, Income and Employment (SoFIE). SoFIE is a single fixed panel and is the largest longitudinal survey ever run in New Zealand. It is a nationally representative study of 22,000 adults drawn by random sampling of households, interviewed face-to-face. All adults in the original sample will be followed for a maximum duration of 8 years starting from October 2002, even if their household or family circumstances change. It collects information once a year from the same individuals on income levels, sources and changes; and on the major influences on income such as employment and education experiences, household and family status and changes, demographic factors and self-rated health status. Every 2 years (waves 2, 4, 6 and 8) it also collects information on assets and liabilities to monitor net wealth and savings.

The SoFIE-Health add-on is comprised of 20 min of questionnaire time in waves 3 (2004–2005), 5 (2006–2007) and 7 (2008–2009), in the following health-related domains: SF-36 (Short-Form health survey), Kessler-10 (K-10), perceived stress, chronic conditions (heart disease, diabetes, and injury-related disability), tobacco smoking, alcohol consumption, health care utilisation, access and continuity of primary health care, and an individual deprivation score. The health module was administered to the original sample members (OSM).

2.2. Outcome variables

The three main outcomes were financial barriers to each of: doctor visits, collection of prescription items and dental care within the past year. Financial barriers to doctor visits were measured by the following questions: "In the last 12 months, have you put off going to see your doctor when you needed to, because you could not afford the cost of a visit?" "If yes, how many times have you done this in the last 12 months?". Financial barriers to the collection of prescription items were measured by the following: "In the past 12 months, have there been any times when a doctor gave you a prescription, but you didn't collect one or more of these items because you could not afford the cost?" "If yes, how many times have you done this in the last 12 months?". Financial barriers to dentist visits were measured by the following: "In the past 12 months, have you put off going to see a dentist when you needed to, because you could not afford the cost of a visit?"

2.3. Independent variables

Independent variables chosen for analyses were based on our review of the literature and on the behavioural model of health services utilisation [23]. The behavioural model served as a guide in the selection of variables to include in the model of financial barriers to access to primary care.

2.3.1. Affiliation with a primary care provider (PCP)

In this study affiliation with a PCP was measured by asking individuals "do you have a doctor, nurse or medical centre you usually go to, if you need to see a doctor?". We categorised the responses of this measure into two categories that contrasted affiliated with not affiliated.

2.3.2. Age

Age was calculated at the wave 3 interview date and categorised into the following age groups: 15–24, 25–44, 45–64, and 65+.

2.3.3. Ethnicity

This paper uses the 'prioritised' concept of ethnicity. With the 'prioritised' concept, each respondent was assigned to a mutually exclusive ethnic group by means of a prioritisation system commonly used in New Zealand: Māori, if any of the responses to self-identified ethnicity was Māori; Pacific, if any one response was Pacific but not Māori; Asian, if any one response was Asian but not Maor/Pacific; the remainder non-Māori non-Pacific non-Asian (nMnPnA). The nMnPnA category mostly comprises New Zealanders of European descent, but strictly speaking is not an ethnic group.

2.3.4. Marital status

Marital status relates to legal marital status and is categorised into currently married, previously married (separated/divorced/widowed) and never married.

2.3.5. NZDep2001

NZDep2001 is a census-based small-area index of socioeconomic deprivation [24]. The deprivation index score of dwelling location is derived from NZDep and assigned to the small area of the dwelling. NZDep2001 deprivation scores apply to *areas* rather than individual people. The index scale used here is from 1 to 5, where 1 = the least deprived 20% of areas and 5 = the most deprived 20% of areas.

2.3.6. NZiDep

The NZiDep index is a tool for measuring socioeconomic deprivation for individuals and is based on eight simple questions which take about 2 min to administer [25]. The final deprivation score was coded into the following five ordinal categories[2]:

(1) no deprivation characteristics;
(2) one deprivation characteristic;
(3) two deprivation characteristics;
(4) three or four deprivation characteristics;
(5) five or more deprivation characteristics.

2.3.7. Income

In SoFIE, income is collected from every individual over 15 years at every wave. Household income was derived by totalling adult annual personal income (before tax) from all sources received, consumer price index (CPI) adjusted for the quarter ending December 2001 (the first reference quarter of the study), equivalized for household economies of scale using a NZ-specific equivalization index [26], and categorised into tertiles: low (<$26,109), medium ($26,109–$43,015) and high (≥$43,016). For the analyses in this paper, equivalized household income at wave 1 was used.

2.3.8. Education

The education variable used in this analysis was the highest level of education at wave 3, categorised as no qualification, school qualification, and post-school qualification.

2.4. Health behaviour and health variables

The following health behaviour and health variables are used in this paper.

2.4.1. Smoking

A current smoking status variable was created from responses to questions "Do you smoke cigarettes", and "Have you ever been a regular smoker" and is coded into three categories: current smoker, ex-smoker and never smoker.

2.4.2. General health

The global self-rated health question is asked at every wave of all respondents aged 15+ years. It was taken from the first SF36 question "*in general would you say your*

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[2] Relatively few people have the largest number of deprivation characteristics.

Table 1

Demographic, socioeconomic and health characteristics of study population and of respondents who reported postponing a doctor's visit, buying a prescription and a dentist's visit because of cost: SoFIE-Health, 2004–2005[a].

Characteristics	Total N	Total %	Deferring one or more doctors visit N	Deferring one or more doctors visit %	Deferring buying prescription N	Deferring buying prescription %	Deferring dentists visit N	Deferring dentists visit %
Total	18,320	100.0	2845	15.5	1165	6.4	4175	22.8
Affiliation with a PCP								
Yes	16,735	91.4	2625	15.7	1110	6.6	3820	22.8
No	1515	8.3	215	14.3	55	3.5	350	23.1
Age								
15–24	2775	15.2	565	20.3	215	7.8	575	20.6
25–44	6235	34.0	1405	22.6	605	9.7	2180	35.0
45–64	6135	33.5	730	11.9	295	4.9	1180	19.3
65–74	1740	9.5	95	5.4	35	1.8	165	9.3
75+	1425	7.8	45	3.2	15	0.9	75	5.1
Sex								
Male	8430	46.0	965	11.4	355	4.2	1560	18.5
Female	9890	54.0	1880	19.0	810	8.2	2615	26.4
Marital status								
Never married	5515	30.1	1230	22.3	530	9.7	1510	27.4
Previously married	3220	17.6	610	19.0	270	8.4	810	25.2
Currently married	9575	52.3	990	10.4	365	3.8	1850	19.3
Ethnicity								
NZ/European	14,315	78.1	2065	14.4	720	5.0	3010	21.0
Māori	1975	10.8	465	23.8	270	13.6	655	33.2
Pacific	800	4.4	175	21.7	125	15.4	245	30.7
Asian	925	5.1	90	10.1	30	3.3	180	19.4
Others	310	1.7	45	14.5	20	6.8	90	28.4
Income tertiles								
1 (low)	5515	30.1	1165	21.1	555	10.1	1435	26.0
2	6170	33.7	1065	17.3	425	6.9	1605	26.0
3 (high)	6635	36.2	615	9.3	185	2.8	1140	17.1
NZDep								
NZDepQ1 (least deprived)	3240	17.7	290	8.4	90	2.5	535	15.4
NZDepQ2	3275	17.9	460	12.8	145	4.0	720	20.2
NZDepQ3	2985	16.3	560	16.9	180	5.5	820	24.9
NZDepQ4	3505	19.1	645	16.9	300	7.9	955	24.9
NZDepQ5 (most deprived)	3185	17.4	790	22.5	415	11.8	985	28.0
Missing	540	3.0	95	15.6	40	6.1	150	25.2
NZiDep								
No dep	12,005	65.5	895	6.8	225	1.7	1860	14.2
1 dep	2550	13.9	655	23.4	235	8.4	930	33.4
2 dep	995	5.4	495	44.7	225	20.3	565	51.5
3–4 dep	885	4.8	585	60.2	310	32.1	600	61.7
5+ dep	275	1.5	220	74.5	170	56.8	215	72.8
Education								
No education	4920	28.9	730	16.1	375	8.2	1135	23.1
School	4920	26.9	765	15.5	300	6.1	1135	23.1
Post-school vocational	6270	34.2	1055	16.8	390	6.2	1620	25.8
Degree or higher	2590	14.1	300	11.6	105	3.9	550	21.3
Smoking								
Current	3315	18.1	1030	27.7	510	13.7	1260	34.1
Ex	4410	24.1	630	13.5	245	5.2	1015	21.8
Never	8995	49.1	1185	12.0	415	4.2	1890	19.1
Self-assessed health								
Excellent	5330	29.1	675	11.1	215	3.5	1190	19.5
V. good	5730	31.3	925	14.9	350	5.6	1400	22.5
Good	3880	21.2	800	19.4	360	8.7	1055	25.5
Fair	1375	7.5	315	22.1	175	12.2	400	28.0
Poor	410	2.2	125	29.3	70	16.9	125	29.5
Kessler 10 groups								
Low (10–15)	12,895	70.4	1680	11.9	570	4.1	2805	19.8
Moderate (16–21)	2505	13.7	660	24.2	305	11.2	825	30.5
High (22–29)	880	4.8	340	36.0	180	19.0	375	39.5

V. High (30+)	290	1.6	140	45.5	100	32.2	140	46.8
Miss, DK, REF	170	0.9	30	11.5	10	4.7	25	11.5
Co-morbidity index								
0	7225	39.4	1070	12.8	345	4.1	1740	21.0
1–2	7715	42.1	1375	16.9	590	7.2	1930	23.7
>2	1790	9.8	405	22.3	235	12.8	495	27.4

Note: SoFIE= Survey of Family, Income and Employment.

[a] All numbers of respondents presented in this paper are random rounded to the nearest multiple of five, with a minimum value of 10, as per Statistics New Zealand protocol.

health is…" with a five-point scale ranging from "excellent" to "poor". We combined the categories excellent/very good/good (good health) and fair/poor (less than good health).

2.4.3. Kessler-10 scale

The Kessler-10 (K-10) is a scale measuring non-specific psychological distress [27,28]. The K-10 consists of 10 questions about non-specific psychological distress and seeks to measure the level of current anxiety and depressive symptoms based on questions about negative emotional states a person may have experienced in the 4 weeks prior to interview. The scores were grouped into four levels according to the criteria developed by Andrews and Slade (2001): low (10–15), moderate (16–21), high (22–29), and very high (30+) [29,30].

2.4.4. Chronic diseases

As part of the health module each respondent was asked "have you ever been told by a doctor that you had": Asthma, High Blood Pressure, High Cholesterol, Heart Disease, Diabetes, Stroke, Migraines, Chronic Depression, Manic Depression or Schizophrenia.

These data were coded into a co-morbidities index: 0, 1–2, >2 co-morbid diseases.

2.5. Statistical analysis

This paper provides cross-sectional analyses of wave 3. The population used in the analyses was 18,320 adults (15 years and above) OSM at wave 3. We first estimated the bivariate association between deferred primary care and other variables—affiliation with a PCP, age, sex, marital status, ethnicity, household equalised income, small-area deprivation, individual deprivation, education, smoking and health (self-assessed health, K-10 and number of chronic conditions). Bivariate analyses were also carried out using cross-sectional weights to reflect the distribution of the New Zealand population. However, as there were no significant differences in the weighted and unweighted results, we decided to carry out all our analyses on unweighted data.

Multiple logistic regression analyses were used to identify the factors independently associated with financial barriers to access to primary health. All variables included in the bivariate analyses were included in the multivariate model. The population used in the regression analyses was 17,070 adults (15 years and above) OSM at wave 3 who have complete information on all the socioeconomic, health behaviour and health characteristics. All counts presented in this paper are random rounded (up or down) to

the nearest multiple of 5, with a minimum value of 10, as per the Statistics New Zealand protocol. All analyses were performed using SAS version 8.2 within the Statistics NZ data lab.

3. Results

Table 1 shows the characteristics of the sample population and bivariate associations between the demographic, socioeconomic, health behaviour and health predictors and the three outcome measures. Of the total of 18,320 respondents, 15.5%, 22.8% and 6.4%, respectively, reported that they had deferred seeing their doctor/s, dentist or collecting a prescription at least once during the preceding 12 months, because they could not afford the cost of a visit or prescription (Table 1). Younger adults aged 15–24 and 25–44, females, never married, Māori and Pacific, those in the lowest income tertiles, people living in the most deprived areas, those with more individual deprivation characteristics (5+), current smokers, those reporting high and very high levels of psychological distress, and more than two co-morbid diseases were all more likely to put off primary care because of cost barriers than their counterparts.

Table 2 presents the results of the multiple logistic regressions analyses. After adjusting for socioedemographic, health behaviour and health characteristics of the respondents in multivariate analyses, having an affiliation with a PCP was significantly associated with increased odds of deferring a doctor's visit and buying a prescription, while younger age, female, middle income tertile, living in a least deprived area, having more individual deprivation characteristics (5+), current smokers, reporting high and very high levels of psychological distress and more than two co-morbid diseases were all significantly associated with increased odds of deferring doctors' visits, collecting medications and dental visits. Regarding the association between ethnicity and deferred primary care, Asian and Māori ethnicity were significantly negatively associated with the odds of deferring a doctor's visit, however, Māori and Pacific ethnicity were associated with higher odds of deferring buying a prescription. Contrary to expectation, having a post-school qualification was significantly associated with increased odds of deferring doctors' and dental visits as compared to those having no qualification. Being previously married was significantly associated with increased odds of deferring doctors' visits as compared to the currently married. However, self-assessed health was not significantly associated with either deferring a doctor's visit or a dentist's visit.

Results shown in the last four rows of Table 2 indicate that the set of demographic, socioeconomic, health

Table 2
Odds ratios (OR) and 95% confidence intervals (CI) of postponing a doctor's visit, collecting a prescription and dentist visit because of cost, adjusting for effects of demographic, socioeconomic, health behaviour and health variables (n = 17,070): SoFIE-Health, 2004–2005[a].

Characteristics	Deferring doctors visit		Deferring collecting a prescription		Deferring dentists visit	
	OR (CI)	p-Value	OR (CI)	p-Value	OR (CI)	p-Value
Affiliation with a PCP		0.0156		<0.0001		0.8610
No	1.00		1.00		1.00	
Yes	1.25 (1.04–1.49)		2.04 (1.48–2.80)		0.98 (0.85–1.14)	
Age		<0.0001		<0.0001		<0.0001
15–24	1.00		1.00		1.00	
25–44	0.92 (0.78–1.07)		0.96 (0.77–1.19)		1.81 (1.58–2.08)	
45–64	0.43 (0.36–0.52)		0.48 (0.36–0.62)		0.88 (0.75–1.04)	
65+	0.17 (0.13–0.22)		0.16 (0.10–0.25)		0.34 (0.27–0.42)	
Sex		<0.0001		<0.0001		<0.0001
Male	1.00		1.00		1.00	
Female	1.43 (1.29–1.59)		1.43 (1.21–1.64)		1.34 (1.23–1.45)	
Marital status		0.0055		0.6823		0.2909
Currently married	1.00		1.00		1.00	
Previously married	1.24 (1.08–1.43)		0.99 (0.81–1.22)		1.09 (0.97–1.23)	
Never married	1.14 (1.00–1.31)		1.08 (0.89–1.31)		0.99 (0.89–1.11)	
Ethnicity		<0.0001		<0.0001		0.0223
NZ/European	1.00		1.00		1.00	
Asian	0.60 (0.46–0.77)		0.79 (0.53–1.18)		0.81 (0.67–0.98)	
Māori	0.79 (0.68–0.92)		1.26 (1.04–1.52)		1.11 (0.98–1.26)	
Pacific	0.89 (0.72–1.10)		2.14 (1.66–2.77)		1.14 (0.94–1.37)	
Income tertiles		<0.0001		0.0005		<0.0001
1 (low)	1.23 (1.07–1.41)		1.18 (0.96–1.47)		1.10 (0.98–1.23)	
2	1.47 (1.29–1.66)		1.46 (1.19–1.78)		1.37 (1.25–1.52)	
3 (high)	1.00		1.00		1.00	
NZDep		<0.0001		0.0972		<0.0001
NZDepQ1 (least)	1.00		1.00		1.00	
NZDepQ2	1.40 (1.18–1.67)		1.15 (0.86–1.54)		1.25 (1.09–1.43)	
NZDepQ3	1.54 (1.29–1.83)		1.19 (0.89–1.58)		1.42 (1.24–1.62)	
NZDepQ4	1.29 (1.08–1.53)		1.42 (1.08–1.86)		1.29 (1.12–1.47)	
NZDepQ5 (most)	1.33 (1.11–1.59)		1.32 (1.00–1.75)		1.14 (0.98–1.32)	
NZiDep		<0.0001		<0.0001		<0.0001
0 dep	1.00		1.00		1.00	
1 dep	3.18 (2.81–3.59)		3.21 (2.62–3.94)		2.57 (2.31–2.85)	
2 dep	7.54 (6.46–8.80)		7.53 (6.04–9.40)		5.05 (4.37–5.85)	
3–4 dep	11.61 (9.77–13.81)		11.37 (9.06–14.27)		6.66 (5.65–7.84)	
5+ dep	18.01 (13.26–24.47)		24.47 (17.79–33.66)		8.78 (6.56–11.77)	
Education		0.0086		0.3450		<0.0001
No education	1.00		1.00		1.00	
School	1.02 (0.89–1.18)		0.90 (0.75–1.07)		1.36 (1.21–1.54)	
Post-school	1.18 (1.04–1.35)		0.87 (0.71–1.05)		1.53 (1.37–1.70)	
Smoking		<0.0001		<0.0001		<0.0001
Never	1.00		1.00		1.00	
Current	1.50 (1.33–1.69)		1.52 (1.28–1.81)		1.34 (1.20–1.48)	
Ex	1.21 (1.06–1.37)		1.15 (0.94–1.39)		1.25 (1.13–1.39)	
Self-assessed health (%)		0.138		0.0409		0.1546
Excellent–Good	1.00		1.00		1.00	
Fair–Poor	1.13 (0.96–1.33)		1.24 (1.00–1.53)		1.11 (0.96–1.28)	
Kessler 10 groups		<0.0001		<0.0001		<0.0001
Low (10–15)	1.00		1.00		1.00	
Moderate (16–21)	1.42 (1.26–1.61)		1.56 (1.31–1.85)		1.21 (1.09–1.35)	
High/V. High (22+)	1.60 (1.35–1.89)		1.70 (1.38–2.10)		1.23 (1.10–1.51)	
Co-morbidity index (%)		<0.0001		<0.0001		<0.0001
0	1.00		1.00		1.00	
1–2	1.33 (1.20–1.48)		1.70 (1.44–1.99)		1.19 (1.09–1.30)	
>2	1.79 (1.50–2.14)		2.63 (2.07–3.34)		1.46 (1.26–1.71)	
Initial −2 log-likelihood	14785.482		8106.363		18342.726	

−2 log-likelihood by all variables in the model	11116.758	5759.168	15278.527
Δ − 2 log-likelihood	3668.724[***]	2347.195[***]	3064.198[***]
R-square (max-rescaled)	0.33	0.34	0.25

[***] $p < 0.0001$.
[a] SoFIE = Survey of Family, Income and Employment.

behaviour and health factors explained a lower variance in predicting deferring dental visits while a higher variance was explained in predicting deferring a doctor's visit and buying a prescription. For example, all the factors accounted for 33%, 34% and only 25% of the variance in predicting deferring a doctor's visit, buying a prescription and dental visits, respectively.

4. Discussion

The results of this study demonstrate that cost remains a reason for deferring primary care in New Zealand. In this study, a substantial proportion of people reported deferring primary health care during the preceding year because they could not afford the cost of a visit or prescription. Indeed, approximately 16%, 23% and 7%, respectively, reported deferring seeing their doctor, dentist or collecting a prescription because of unaffordability. However, these findings are somewhat different from the results of the latest New Zealand Health Survey 2006/07 (NZHS 2006/07) [31], which found that approximately 1.7% of all adults were unable to see a GP when they wanted to in the previous 12 months due to cost [31]. According to the NZHS 2006/07, approximately 1.4% of all adults did not collect their prescription due to cost the last time they had an uncollected prescription. One possible explanation for the differences in the results may rest on the different timings of the studies. The data for this study were collected in 2004–2005, 3 years after the implementation of the Primary Health Care Strategy. The strategy introduced a hybrid system of financing primary health care consultations – mixing capitated government funding with fee-for-service patient co-payments – and, at the time of wave 3 data collection, government capitation funding was still in the process of being implemented. It is possible that cost barriers to access have further reduced since 2004. There is evidence that utilisation of GPs is higher among low-income and high needs groups both in New Zealand [32] and in European countries. For example, the findings of a study by van Doorslaer et al. [33] found that across European countries the poor tended to be more intensive users of GP services, and the distribution of GP care across income groups was close to that expected when need for care was taken into account.

There is also evidence that the NZ primary care reforms have reduced the cost barriers but have not completely eradicated the access barriers due to cost. It is worth noting the results of the New Zealand arm of a cross-country survey conducted at two different times—one at the same time as SoFIE-Health and another one at an approximately similar time as the NZHS 2006–2007. The international cross-country survey conducted at the same time as SoFIE-Health found that 34% of New Zealanders surveyed said that they went without primary health care – by not visiting

doctors or skipping a medical treatment, test or follow-up, or not filling a prescription – because of cost [34]. However, New Zealand's cost-related access barriers have improved since 2004, with only 25% reporting in 2007 that they went without primary health care, likely reflecting policy initiatives to reduce cost barriers [35]. According to the latest Commonwealth Fund data, 31% of chronically ill adults in New Zealand did not get recommended care, fill a prescription, or see a doctor when sick because of costs [36].

The incidence of not visiting a dentist due to cost is much greater than not visiting a physician or collecting a prescription, mainly because, unlike GP's visits which are largely government funded, individuals predominantly fund their own dental care. In another five cross-country survey (UK, USA, Canada, Australia and New Zealand), the most frequently reported cost problem (19–37%) for deferred primary care was getting dental care [37]. New Zealand adults were the most likely (37%) and UK adults were the least likely (19%) to say that they needed dental care but did not see a dentist because of costs in the past year [37]. The US (35%), Australia (33%) and Canada (26%) were between the two extremes. The findings of this survey were correlated closely with countries' insurance systems and cost-sharing. Except for the UK, all these countries do not include dental care in the basic public program. The relatively high access to dental care in the UK reflects comprehensive dental funding.

Although cost affected many subgroups, females, those in middle income tertile, those with more individual deprivation characteristics (5+) and those reporting the worst health status in terms of high levels of psychological distress and having more than two co-morbid diseases were the most likely to have deferred needed primary care due to financial barriers. The finding that women were at elevated risk of deferring primary care corresponds with previous research [8,38,39]. Although women are more likely to utilise health services than men for a number of reasons, including women's higher rates of chronic illness, longer life span and reproductive health needs [40–43], they are also more likely to defer receiving primary health care because they have fewer resources than men to pay out-of-pocket costs for medicines and other health care services [39,44]. Other research has shown that women were more likely than men to report that taking care of others had caused them to delay seeking health care for themselves [38]. Thus, they are also more likely to face non-financial barriers to care as well.

Individual deprivation, which is a measure of poverty, and belonging to middle income tertile were highly associated with delayed care. Other studies have documented the impact of cost on obtaining needed medical care or delayed care in general populations [5,8,45]. In this study more than half of those having 5 or more individual deprivation characteristics were deferring primary care services because of

cost. While cost is certainly the major barrier to primary care for those with high levels of individual deprivation, other barriers to care such as inconvenient location, longer waiting period, transportation problems or long distance, cultural and language barriers, or lack of other resources to seek care (e.g., availability of a child care facility) also weigh more heavily on the poor. Since SoFIE-Health asked only about financial barriers to accessibility, our analyses probably underestimate the number of people unable to obtain needed primary care.

We found that respondents who reported high or very high psychological stress and two or more co-morbid conditions were more likely to defer primary care due to cost than were those who reported low psychological stress or no co-morbid conditions, even after controlling for confounders. This disparity is alarming, because for those who are in poor health, timely access to health care is particularly important for preventing further deterioration in health status. Diamant et al. reported that persons in the poorest health were at greatest risk of having unmet needs for health care due to the activities of daily life, such as spending their money for food, shelter, or clothing [8]. Given the critical importance of prescription medications for chronic conditions, the extent to which deferring buying medications mediates worse outcomes among chronically ill adults who also experience more individual deprivation characteristics needs to be explicitly studied.

This study also found that after adjusting for other factors, respondents with an affiliation with a PCP were consistently more likely to defer a visit to a doctor or buying a prescription and those with a post-school qualification were consistently more likely to defer a visit to a doctor or dentist. Although it is beyond the scope of this study, one explanation for this result may rest on the perception that a GP consultation will often result in a medicine being prescribed and a cost incurred (in addition to the cost of the consultation itself), thus deterring prospective patients affiliated with a PCP and those with post-school education (as they are more aware of the perceived cost) from seeking timely primary care.

4.1. Limitations of study

Although this research raises several important findings related to cost barriers to access to primary health care using national survey data, there are several limitations to this study. First, this study reports cross-sectional analyses which prohibit drawing causal conclusions. Follow-up data (wave 5) will allow conclusions regarding the direction of effects, allowing causal inferences to be drawn more confidently. Second, the age of the data is a particular concern because the nature of charging for primary health care has changed since the time of the survey, possibly making the survey results less relevant to the current situation in New Zealand. However, as the focus of the study is on associations between the demographics and other determinants and the influence of cost on access, the current state of affairs in New Zealand is less an issue. Having said that, we acknowledge that comparing this dataset with the next waves of SoFIE-health data (waves 5 and 7) might explain whether the primary health care reforms in New Zealand

have impacted on removing financial barriers. Third, delays in receiving primary health care were measured on self-reported data not confirmed by a physician/administrator; our estimates may be subject to recall bias. As a result of recall bias, respondents may have under or overestimated the services they postponed. Errors of this type can lead to biased results in comparison with other samples. Fourth, although we have adjusted for many confounding variables, it is possible that the differences we found in deferred primary care could be the result of other factors associated with unmet primary care that we did not measure.

Despite these limitations, the results presented here are important in several ways. This study uses a large, original, national survey on financial barriers to primary health care. Although the results presented here were not weighted to the NZ population they should be generalisable to the majority of the population. Few previous studies have considered cost as a factor in delaying supplementary health care services such as prescriptions drugs and dental care. Overall, the findings from this study have several implications for the provision of equitable primary health care services in countries where out-of-pocket costs differ for subgroups of the population.

4.2. Implications

This study has clearly demonstrated that financial barriers exist for a substantial subgroup of people. Primary care in New Zealand is not free but based on co-payments which mean that health care is not equally accessible to all. Though the new Primary Health Care Strategy, which is based on the Alma-Ata Declaration's vision of primary health care, aimed at reducing average co-payments through increases in subsidies, a fee of up to $25 or more for a GP visit still exists which makes access to primary care unaffordable for those with fewer financial resources [19]. A key policy lever is lowering cost barriers to make primary health care in general and dental care in particular more accessible. One strategy to improve access is to provide primary health care free or to make co-payments sufficiently low that people are able to seek timely primary health care unimpeded by cost barriers. Though it is unrealistic to assume that providing free primary care services will lead to the removal of barriers to access, research, particularly from the RAND insurance experiment in the US, has shown that lowering the cost of care is likely to lead to increased use of needed services [46].

The findings of this study also have clinical and financial implications. Given that there are higher rates of cost barriers among those with higher psychological stress and two or more co-morbid conditions, it is likely that for many people cost barriers could have serious clinical effects. While access to healthcare does not guarantee health, timely receipt of healthcare has been shown to make a difference in health outcomes [47]. For those who are sick, access to general practitioner/dentist or medications is particularly important for preventing further deterioration in health status. Prior research has also found that medication non-adherence or delayed medical care may result in poor clinical outcomes, such as subsequent decline in health status, higher rates of problems among those with

chronic illness, increased rates of complications, a poorer prognosis, and longer hospital stays [5,48–52].

Financial implications of deferred care are based on the premise that the treatment of certain problems by a general practitioner is more cost-effective than treatment of the same problems in an emergency department in a publically funded health care system. It is likely that deferred treatment leads to greater severity of disease and more emergency visits and longer hospital stays. As patients in New Zealand are required to be enrolled/registered with a PHO/GP in order to pay a lower GP consultation fee, there is a possibility that those not enrolled/registered may be going straight to hospital emergency departments which are free. Moreover, even those who are enrolled/affiliated with a PHO/GP but have deferred primary care because of cost may also be seeking care in hospital emergency departments. While we do not have data to explore this possibility, in an ecological study from the US, Bindman and colleagues found that communities where people perceived access to medical care to be poor had higher rates of hospitalisation for chronic diseases, after controlling for disease prevalence, patient and physician characteristics [53]. It follows that rather than saving money, such 'preventable hospitalisations' may increase costs to the publicly funded health care system [54,55]. If financial barriers in receiving primary health care are related to increased use of emergency departments in hospitals for non-emergency or minor problems, then one strategy to reduce the cost to the health care system is to improve access to primary health care by removing the cost-related barriers to access.

One of the most striking findings of this study is that the access barrier for oral care was much higher than that for doctor's visits or buying prescriptions. However, there is overwhelming evidence that adverse oral health may have a profound impact on general health, quality of life and economic well-being [56,57]. Failure to provide medically necessary dental care undermines the effectiveness and efficiency of general medical care [58]. In 2007, the World Health Assembly adopted a resolution which called for an action plan for the promotion of integrated disease prevention in oral health as part of the control of noncommunicable diseases (NCDs) within the framework of enhanced primary care. The resolution also calls for increased budgetary provisions for oral health care [59]. Integration of oral health into strategies for promoting general health will enhance both oral and general health. While improving oral health is one of the health objectives of the New Zealand Health Strategy [60], providing accessible and affordable oral health services does not feature prominently in the current Primary Health Care Strategy [7]. This study emphasizes that oral health care is primary care and we need a health care system that meets the principles of primary health care. It is encouraging to note, nonetheless, that government has started the process of integrating oral health with general health programmes with the publication of a strategic vision for oral health in New Zealand [61].

While the Primary Health Care Strategy was implemented to ensure equitable access to services, such access is being compromised by the inability to pay the cost of visits to doctors and dentists and the price of prescription drugs. Special efforts are needed to remove financial barriers to access in order to ensure affordable and equitable primary health care services. This is an important issue given the vision of equity and social justice embedded in the Alma-Ata Declaration and the articulation of this vision in the current Primary Health Care Strategy in New Zealand.

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