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To cite this article: Sarah-Jane Paine, Donna Cormack, James Stanley & Ricci Harris (2019): Caregiver experiences of racism are associated with adverse health outcomes for their children: a cross-sectional analysis of data from the New Zealand Health Survey, Critical Public Health, DOI: [10.1080/09581596.2019.1626003](https://doi.org/10.1080/09581596.2019.1626003)

To link to this article: <https://doi.org/10.1080/09581596.2019.1626003>



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Caregiver experiences of racism are associated with adverse health outcomes for their children: a cross-sectional analysis of data from the New Zealand Health Survey

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ABSTRACT

The study aimed to investigate the association between caregiver experiences of racial discrimination and physical and emotional health outcomes for their children and to explore potential pathway variables in this relation. We analysed data from two instances of the New Zealand Health Survey that provide nationally representative data for children and adults, with high response rates for each of the major ethnic groupings (Indigenous Māori, Pacific, Asian, and European/Other). Questionnaires from the primary caregiver and their child (5 to 14 years) were linked to create $n = 2,958$ child-primary caregiver dyads in the 2006/07 Survey and $n = 2,632$ dyads in the 2011/12 Survey. Children whose caregivers reported any experience of racial discrimination had poorer mental health, self-esteem, and behaviour scores on the CHQ PF-28 scale, even after adjustment for caregiver sociodemographic variables. Multivariable models identified a worsening in child emotional health as the number of reported racism experiences increased. Caregiver experiences of racism were not associated with medicated asthma in their children. Multivariable models suggest that caregiver psychological distress may be a pathway linking vicarious racism to poorer child emotional health.

ARTICLE HISTORY

Received 23 November 2018
Accepted 20 May 2019

KEYWORDS

Racism; children; Indigenous people; health

Introduction

The persistence of ethnic inequities in child health in New Zealand (NZ, population ~4.7 million) has been described as '... cause for profound national shame' (Duggan, 2011, p. 80). Indigenous Māori children have higher rates of hospitalisations for infectious diseases, respiratory conditions as well as higher infant mortality and Sudden Unexpected Death in Infancy than non-Māori/non-Pacific children (Simpson et al., 2017). Healthcare access also varies, with Māori (34% of whom are aged 0–14 years) and Pacific children (36% aged 0–14 years) more likely to have unfilled prescriptions and have higher unmet need for primary healthcare than children from Asian or European ethnic groups (~20% aged 0–14 years) (Ministry of Health, 2016). NZ also has substantial ethnic inequities in the social determinants of health, with Māori and Pacific children more likely to live in poverty and to experience greater levels of economic adversity (e.g. low income, poor housing, unemployment) than European children (Simpson et al., 2016).

Reducing inequities in the social determinants of health is important for supporting optimal child health and wellbeing. However, achieving health equity for all children requires policy

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 Supplemental data for this article can be accessed [here](#).

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interventions that pay attention to the fundamental causes (Phelan et al., 2010) that underpin the complex relation between race/ethnicity and socioeconomic status (SES), including that children from minoritised racial/ethnic groups have major inequities by SES (Mehta et al., 2013) and experience poorer health outcomes across all levels of SES (Flores, 2010).

Racism is internationally recognised as a basic cause of racial/ethnic health inequities (Pachter & Coll, 2009). Racism is a complex system that involves power, ideologies, prejudice, and practices at both the structural and individual levels (van Dijk, 1993). Racism influences health through various mechanisms including physiological, psychological, and behavioural responses to the chronic stress caused by racism, differential access to and quality of health care received, and via the unfair structuring of the determinants of health and health equity based on race/ethnicity (Krieger, 2000; Williams & Mohammed, 2013).

Racial discrimination and unfair treatment are an emergent and critical health issue for children and young people in NZ (e.g. Crengle et al., 2012; Hobbs et al., 2016; Teevale et al., 2013; Thayer & Kuzawa, 2015). For example, in the NZ Secondary School Youth Survey (n = 9,107 respondents, 19% Māori, Year 9 to Year 13), the prevalence of experiencing 'any ethnic discrimination' was higher amongst Māori (12.9%), Pacific (17.4%), and Asian students (16.7%) compared with NZ European students (5.4%) (Crengle et al., 2012). In that study, students who reported any ethnic discrimination were more likely to report binge drinking in the previous 4 weeks (Odds Ratio, OR = 1.42) and less likely to report feeling safe in their neighbourhood (OR = 0.59) or to say their self-rated health was Good or Excellent (OR = 0.61). Subsequent analysis of that survey showed that Pacific students who reported experiences of unfair treatment by a health professional due to their ethnicity were three times more likely to report unmet need for care than those who did not (Teevale et al., 2013).

These studies have focused on documenting the detrimental health effects of direct experiences of racism on child and adolescent health. However, vicarious racism, via parent/caregiver experiences, has specific and independent effects on child health and development, including a higher likelihood of childhood illnesses (Priest et al., 2012), hospitalisation for infectious diseases (Hobbs et al., 2016), socio-emotional difficulties and poorer spatial ability (Kelly et al., 2013), and more behavioural issues (Caughy et al., 2004), including internalising symptoms and lower self-esteem (Espinoza et al., 2016). The health impacts of vicarious racism for Indigenous children are poorly understood (Heard-Garris et al., 2017; Priest et al., 2013). A longitudinal study of Indigenous children in Australia (n = 1,239 aged 5 to 10 years) showed that children of primary carers who experienced 'persistent' racial discrimination had higher odds of reporting sleep difficulties and asthma (Shepherd et al., 2017).

Although international evidence is useful for building a broad conceptual understanding of vicarious racism as a determinant of child health inequities, Indigenous experiences of racism and colonisation differ between countries, which may impact the ways in which caregiver experiences of racial discrimination are understood. In NZ, we have recently shown that children exposed to vicarious racism have higher odds of unmet need for health care, and their caregivers report greater dissatisfaction with their child's medical centre (Paine et al., 2018). Examining the relation and potential pathways between vicarious racism and physical health is important for understanding the multiple ways in which racialised environments impact on child wellbeing in NZ. Drawing on the work of Williams and Mohammed (2013) we understand that interventions targeting intermediate or proximal pathways (i.e. education, income, and wealth) without concomitant action directed at the basic causes of health inequities, including the macro-level forces that create and shape race/ethnicity and SES in society, will not produce sustainable and meaningful changes in child health at a population level (Williams & Mohammed, 2013).

The primary aim of this study was to investigate the independent association between caregiver experiences of racism and measures of child physical health and emotional health. We were also interested in identifying potential pathway variables in the relationship between vicarious racism and child health. While cross-sectional analysis precluded formal mediation analysis, a secondary aim was to provide initial insights into whether socioeconomic position and caregiver distress are plausible factors to explore on the pathway between racism and health.

Methods

We utilised cross-sectional data from two independent instances of the NZ Health Survey (NZHS, 2006/07 and 2011/12) that monitors health status, health behaviours, and health-care utilisation among a nationwide sample of New Zealanders (Ministry of Health, 2008, 2012). The surveys used multi-stage, stratified, probability-proportional-to-size sampling designs (Ministry of Health, 2008, 2012), with increased sampling of Māori, Pacific, and Asian ethnic groups to achieve improved precision of estimates by ethnicity. One adult (≥ 15 years, usually resident at that dwelling) and one child (0–14 years, usually resident at that dwelling at least 50% of the time) were selected from each household. Replicate sampling weights are provided with these data to allow generation of representative national estimates for the total population and for specific population groups.

NZHS questionnaires were completed by selected adults and, for the child survey, by the primary caregiver of that child (i.e. as a proxy respondent). However, due to the sampling design, the adult NZHS respondent in the house was not necessarily the primary caregiver. For example, in 2006/07, only 64.8% of primary caregivers who completed a child's questionnaire had also completed the adult questionnaire. Primary caregivers who completed their child's survey, but were not selected for the adult survey, were not asked to complete the racism module. Consequently, the present analysis was restricted to those children whose primary caregiver was also in the adult survey (hereafter 'child-primary caregiver dyad'). We also restricted the analysis to those children aged 5 to 14 years of age due to the nature of the outcome variables (see description below). The final samples sizes were 2,958 child-primary caregiver dyads for the 2006/07 NZHS and 2,632 dyads for the 2011/12 NZHS.

Key variables

Outcome variables

We selected four child health outcome variables based on international evidence of an association with racism (direct or vicarious), local evidence of ethnic inequities in the outcome amongst children, relevance across the 5 to 14-year age range, and data quality. *Medicated asthma* (data available for 2006/07 and 2011/12) was defined as those children who had ever had a doctor diagnosis of asthma and were on treatment at the time of the survey. Health-related quality of life was measured using the short form of the Child Health Questionnaire Parent Form (CHQ-PF 28, the Health Institute Boston), a validated 28-item questionnaire that measures health-related quality of life for children aged 5 to 14 years (Raat et al., 2005). CHQ-PF data were only available for 2011/12 and provided in the dataset as a score on a 0–100 scale for 10 domains. Three domains were selected a priori for analysis in this study and analysed as continuous variables: *mental health* (high score = child is happy, peaceful, and calm all of the time); *behaviour* (high score = child never exhibits aggressive, immature, delinquent behaviour); and *self-esteem* (high score = child is very satisfied with abilities, looks, family/peer relationships, and life overall).

Exposure variables

Racial discrimination was measured in the adult questionnaire of the 2006/07 and 2011/12 NZHS using five items that ask respondents about their personal experience of an ethnically motivated physical or verbal attack (2 items) and unfair treatment because of ethnicity by a health professional, at work or when seeking work, or when gaining housing (3 items). Response options were: yes, within the past 12 months; yes, more than 12 months ago; no; refused; don't know. The five racial discrimination items were grouped together to create two measures of racial discrimination as reported by primary caregivers: *any racial discrimination ever in a person's lifetime* (yes to any of the five questions in the racism module, regardless of time frame, was treated as exposed); and *level of racial discrimination* (count of yes responses across the five questions in the racism module, regardless of time frame: no reports, 1 report, or 2 + reports (Harris et al., 2006)).

Covariates

Primary caregiver and child *ethnicity* were measured using the 2001 NZ Census ethnicity question, which allows respondents to self-identify with one or more ethnic groups (primary caregivers reported ethnicity for their child) (Ministry of Health, 2004). The Census question provides several ethnic group response options along with an 'Other' category and free-text field to write in ethnicity responses. Participants were classified into major ethnic groupings of Māori, Pacific, Asian, and European/Other for data analysis. The 2011/12 NZHS provided a European/Other grouping that could not be disaggregated; therefore, we used the combined European/Other as a comparator group for both NZHS datasets for consistency. Using 2006/07 NZHS data, this group is predominantly European ethnic groups, with approximately 1% of the European/Other group identifying their ethnicity in the 'Other' category.

Caregiver *gender* (female vs. male) and *age group* (25–44, 45–64, 65–74, ≥75 vs. 15–24 years) were included in all models. For those models where the outcome was medicated asthma, we also controlled for caregiver *smoking status* (current smokers/recent quitters vs. never smoked/long-term quitters) and caregiver *previous asthma diagnosis* (yes vs. no).

Potential pathway variables

Caregiver socioeconomic position was measured using *highest educational qualifications* (none vs. at least secondary school qualifications) and *neighbourhood deprivation* (NZ Deprivation Index 2006 (NZDep06) quintiles: 1 = least deprived and 5 = most deprived (Salmond et al., 2007)). Caregiver mental health was measured using the Kessler Psychological Distress Scale (K10 (Kessler et al., 2002)), a 10-item scale that provides a global measure of *psychological distress* in the previous 4 weeks, which was analysed as a continuous variable in models.

Data analysis

Unadjusted prevalence estimates were calculated for outcomes and exposures, for the total Māori, Pacific and Asian groupings and the mutually exclusive European/Other grouping. The total Māori, Pacific, and Asian groupings include all respondents who identified with the ethnic grouping, whether as their only response or as one of several selections, such that respondents could contribute to prevalence estimates for more than one ethnic grouping. The European/Other grouping includes respondents who only identified with a European or Other group, providing a comparator group in the analysis.

Multivariable regression models were used to investigate the independent association between caregiver experiences of racism and each child health outcome measure (linear for CHQ-PF domains, logistic for medicated asthma), adjusted for caregiver characteristics (ethnicity, gender, age-group). In regression analyses, ethnicity was prioritised using a standard approach as Māori, Pacific, Asian, European/Other so that each participant was included in the analysis under a single broad ethnic grouping (Ministry of Health, 2004).

We hypothesised that there may be differences in the association between caregiver experiences of racial discrimination and child health by ethnic grouping. Therefore, we tested for multiplicative statistical interaction between each racism variable and caregiver ethnicity for all health outcome indicators. This resulted in 48 interaction tests across the study outcomes, two of which had a p-value <0.01 (Wang et al., 2007). Given that the large number of tests carried out are likely to produce some spurious associations, we concluded that there were no important or consistent interactions. Therefore, only the main effects models are presented to allow for consistent reporting of results across outcomes.

The cross-sectional study design utilised in the NZ Health Survey prevents the use of formal mediation analyses as it is impossible to confirm the timing of variables in the causal pathway. Therefore, this study sought to explore whether caregiver SEP and psychological distress might be potential pathway variables in the relationship between vicarious racism and child health. To do this we built several models adding covariates sequentially as follows: caregiver racism measures

(unadjusted baseline model, M0); caregiver ethnicity, gender, age-group (M1); caregiver SEP measures (M2); caregiver psychological distress, as well as caregiver smoking status and caregiver previous asthma diagnosis where the outcome was child medicated asthma (M3). The complex sample structure of the NZHS was handled in the analysis by accounting for stratification, clusters, and inverse sampling weights (using the child's replicate sampling weights in the NZHS dataset).

As the medicated asthma variable was available for both surveys, we used random-effects meta-analysis to calculate a pooled estimate for each model parameter (i.e. the log odds ratio, and associated standard error), with random-effects weightings based on the inverse variance of the parameter estimates from each survey instance. Results are reported as odds ratios and their 95% confidence intervals from this meta-analysis. The survey datasets were analysed using SAS version 9.4 (SAS Institute, Cary, NC); meta-analysis was conducted in R 3.2 (R Foundation, Vienna, Austria) using the 'meta' package (Schwarzer, 2016).

Results

Sociodemographic characteristics of the child-primary caregiver dyads by survey instance and child ethnicity are presented in Supplementary Table S1. The proportion of participating children was similar across the 5-year age bands. In contrast, caregivers of Māori children were younger than caregivers of children in the European/Other ethnic grouping.

The prevalence of having a caregiver who reported any experience of racism 'ever' in their lifetime was higher amongst Māori children (31.4% in 2006/07 NZHS; 26.6% in 2011/12, see Supplementary Table S2) and children from Asian ethnic groups (28.4% in 2006/07; 24.9% in 2011/12) compared with children in European/Other ethnic groups (13.6% in 2006/07; 8.7% in 2011/12). The prevalence of multiple experiences of racial discrimination (2+ types) was also higher amongst caregivers of Māori and Asian children in both surveys.

With regard to potential pathway variables, Māori and Pacific caregivers were more likely to live in the most deprived neighbourhoods in NZ and to have less than a secondary school qualification, compared to their European/Other counterparts. Mean scores on the K10 scale were higher for Māori and Pacific caregivers (i.e. higher levels of psychological distress) than European/Other caregivers.

Asian children had higher mean scores on the behaviour and self-esteem domains of the CHQ PF 28 (i.e. 'better' behaviour and self-esteem) than did European/Other children. Māori and Pacific children had lower mean scores on the mental health and behaviour domains, and higher mean scores on the self-esteem domain, compared with European/Other children. The prevalence of medicated asthma was higher for Māori than European/Other children although 95% confidence intervals were overlapping.

Vicarious racism and child health-related quality of life (CHQ-PF)

Tables 1 and 2 present the findings from the models examining the association between caregiver experiences of racism and mean scores on the CHQ domains adjusted for caregiver ethnicity, gender and age. The mean difference in domain scores (Table 1) ranged from 1.99 points lower for mental health (adjusted mean difference, 95% CI -3.75, -0.24), to 3.51 points lower for self-esteem (adjusted mean difference, 95% CI -5.68, -1.33), and 3.73 points lower for behaviour (adjusted mean difference, 95% CI -6.14, -1.32). Furthermore, there was evidence to suggest a worsening in all three domain scores as the level of racism increased (Table 2). Using mental health as an example (column 3, Table 2), the estimate for the difference in mean score moves from -1.14 for 1 reported experience of racism to -4.15 for 2+ reported experiences, with the negative values indicating worsening mental health (Table 2, Model 1: caregiver ethnicity, gender, and age-adjusted models).

Table 3 presents the estimates for the association between caregiver experiences of racism and CHQ domain scores, starting with the unadjusted baseline model (model M0) followed by additional adjustment for age, gender, and ethnicity (M1), socioeconomic position (M2) and caregiver

Table 1. Linear regression estimates for the association between any caregiver experience of racism and difference in mean CHQ-PF 28 domain scores, 2006/07 New Zealand Health Survey.

Exposure variables	Level of variable	CHQ mental health	CHQ behaviour	CHQ self-esteem
		Mean difference (95% CI)	Mean difference (95% CI)	Mean difference (95% CI)
Experience of racism ('ever')	None	Ref	Ref	Ref
	Any	-1.99 (-3.75, -0.24)	-3.73 (-6.14, -1.32)	-3.51 (-5.68, -1.33)
Caregiver ethnicity	Māori	-3.02 (-4.72, -1.31)	-5.07 (-7.27, -2.88)	0.59 (-1.23, 2.42)
	Pacific	-0.25 (-2.54, 2.05)	-2.01 (-4.61, 0.59)	3.29 (1.31, 5.26)
	Asian	3.33 (1.02, 5.64)	6.37 (4.11, 8.63)	5.74 (2.98, 8.51)
	European/Other	Ref	Ref	Ref
Caregiver gender	Male	Ref	Ref	Ref
	Female	0.05 (-1.33, 1.43)	1.33 (-.48, 3.14)	0.94 (-0.70, 2.59)
Caregiver age-group (years)	15-24	Ref	Ref	Ref
	25-34	-1.71 (-4.37, 0.97)	-4.46 (-8.36, -0.56)	-0.98 (-3.88, 1.92)
	35-44	1.45 (-0.94, 3.85)	1.70 (-1.92, 5.33)	0.56 (-2.07, 3.20)
	45-54	1.40 (-1.16, 3.96)	3.45 (-0.31, 7.21)	-0.37 (-3.22, 2.48)
	55-64	1.84 (-2.41, 6.09)	-0.61 (-6.91, 5.70)	2.78 (-1.67, 7.23)
	65-74	-1.78 (-7.98, 4.42)	1.41 (-6.99, 9.80)	-0.01 (-5.93, 5.91)
	≥75	-1.02 (-8.79, 6.76)	-5.33 (-18.29, 7.64)	-5.04 (-13.42, 3.34)

CHQ Domain Scores range from 0 to 100, with low score interpretation for each domain as follows: mental health (child has feelings of anxiety and depression all of the time), behaviour (child often exhibits aggressive, immature, delinquent behaviour), and self-esteem (child is very dissatisfied with abilities, looks, family/peer relationships and life overall).

Table 2. Linear regression estimates for the association between the level of caregiver-reported racism and difference in mean CHQ-PF 28 domain scores, 2006/07 New Zealand Health Survey.

Exposure variables	Level of variable	CHQ mental health	CHQ behaviour	CHQ self-esteem
		Mean difference (95% CI)	Mean difference (95% CI)	Mean difference (95% CI)
Level of racism ('ever')	None	Ref	Ref	Ref
	1 report	-1.14 (-3.23, 0.95)	-3.33 (-6.34, -0.33)	-3.16 (-5.87, -0.46)
	2+ reports	-4.15 (-7.13, -1.17)	-4.71 (-7.87, -1.57)	-4.37 (-7.06, -1.67)
Caregiver ethnicity	Māori	-2.89 (-4.58, -1.20)	-5.04 (-7.22, -2.85)	0.63 (-1.18, 2.44)
	Pacific	-0.18 (-2.46, 2.10)	-1.99 (-4.58, 0.61)	3.32 (1.36, 5.29)
	Asian	3.38 (1.08, 5.69)	6.40 (4.15, 8.66)	5.78 (3.02, 8.54)
	European/Other	Ref	Ref	Ref
Caregiver gender	Male	Ref	Ref	Ref
	Female	-0.02 (-1.40, 1.36)	1.31 (-0.51, 3.13)	0.92 (-0.73, 2.57)
Caregiver age-group (years)	15-24	Ref	Ref	Ref
	25-34	-1.54 (-4.20, 1.12)	-4.35 (-8.21, -0.45)	-0.91 (-3.80, 1.98)
	35-44	1.50 (-0.89, 3.89)	1.76 (-1.84, 5.36)	0.58 (-2.05, 3.20)
	45-54	1.43 (-1.12, 3.98)	3.50 (-0.24, 7.24)	-0.36 (-3.20, 2.48)
	55-64	1.88 (-2.88, 6.04)	-0.55 (-6.83, 5.74)	2.80 (-1.63, 7.23)
	65-74	-1.79 (-7.97, 4.40)	1.44 (-6.94, 9.82)	-0.01 (-5.93, 5.90)
	≥75	-1.01 (-8.79, 6.77)	-5.29 (-18.25, 7.67)	-5.04 (-13.40, 3.32)

CHQ Domain Scores range from 0 to 100, with low score interpretation for each domain as follows: mental health (child has feelings of anxiety and depression all of the time), behaviour (child often exhibits aggressive, immature, delinquent behaviour), and self-esteem (child is very dissatisfied with abilities, looks, family/peer relationships, and life overall).

psychological distress (M3). Adjustment for caregiver neighbourhood deprivation score and highest educational qualification had negligible effect on the mean difference in child mental health scores by exposure to racism (M0 mean difference = -2.46 to M2a mean difference = -2.05), whereas further adjustment for caregiver psychological distress had a considerable impact on the estimate of child mental health score difference amongst those whose caregivers were exposed to racism (M3 mean difference = -0.55). Similarly, adjustment for caregiver psychological distress had a stronger attenuating effect on the difference in mean CHQ mental health score between children whose caregivers reported multiple experiences of racism compared with children whose

Table 3. Linear regression estimates for difference in mean CHQ-PF 28 domain scores with findings presented for unadjusted models (M0) to models that are adjusted for potential confounders and pathway variables (M3).

	CHQ mental health		CHQ behaviour		CHQ self-esteem	
	Mean difference (95% CI)		Mean difference (95% CI)		Mean difference (95% CI)	
<i>Model for any racial discrimination ('ever')</i>						
M0: unadjusted	-2.46	(-4.16, -0.75)	-4.68	(-6.93, -2.42)	-3.16	(-5.18, -1.14)
M1: + ethnicity, gender and age	-1.99	(-3.75, -0.24)	-3.73	(-6.14, -1.32)	-3.51	(-5.68, -1.33)
M2: + neighbourhood deprivation, highest educational qualification	-2.05	(-3.80, -0.30)	-3.78	(-6.13, -1.43)	-3.64	(-5.79, -1.49)
M3: + psychological distress	-0.55	(-2.31, 1.21)	-2.35	(-4.67, -0.03)	-2.53	(-4.67, -0.38)
<i>Model for level of racial discrimination</i>						
M0: unadjusted	-1.32	(-3.36, 0.72)	-3.72	(-6.57, -0.87)	-2.80	(-5.40, -0.20)
M1: + ethnicity, gender and age	-5.15	(-8.13, -2.17)	-6.92	(-10.20, -3.64)	-4.02	(-6.70, -1.35)
M2: + neighbourhood deprivation, highest educational qualification	-1.14	(-3.23, 0.95)	-3.33	(-6.34, -0.33)	-3.16	(-5.87, -0.46)
M3: + psychological distress	-4.15	(-7.13, -1.17)	-4.71	(-7.87, -1.57)	-4.37	(-7.06, -1.67)
<i>Level</i>						
1 report	-1.24	(-3.35, 0.86)	-3.48	(-6.44, -0.52)	-3.37	(-6.05, -0.69)
2+ reports	-4.06	(-6.96, -1.17)	-4.50	(-7.64, -1.36)	-4.32	(-7.00, -1.63)
1 report	-0.11	(-2.20, 1.98)	-2.39	(-5.23, 0.45)	-2.52	(-5.15, 0.12)
2+ reports	-1.71	(-4.70, 1.28)	-2.23	(-5.48, 1.01)	-2.55	(-5.19, 0.10)

+ indicates adding new adjustment covariates to the preceding model. All covariates are caregiver variables. CHQ Domain Scores range from 0 to 100, with low score interpretation for each domain as follows: mental health (child has feelings of anxiety and depression all of the time), behaviour (child often exhibits aggressive, immature, delinquent behaviour), and self-esteem (child is very dissatisfied with abilities, looks, family/peer relationships and life overall). Scores on the Kessler Psychological Distress Scale (K10) range from 10 to 50, with high scores indicating higher levels of psychological distress.

caregivers had never experienced racism (2+ reports of racism: M0 mean difference = -5.15 to M3 mean difference = -1.71). A similar pattern was evident across all CHQ domains (Table 3).

Vicarious racism and child medicated asthma

There were no significant associations between medicated asthma for children and either measure of vicarious racism in multivariable logistic regression models adjusted for caregiver ethnicity, gender or age-group (Supplementary Tables S3 and S4). Similarly, sequential adjustment for caregiver socioeconomic position (Model M2, Supplementary Table S5), smoking status and prior asthma diagnosis and caregiver psychological distress had negligible impacts on these associations (Model M3, Supplementary Table S5).

Discussion

We investigated the association between caregiver experiences of racism and measures of child health-related quality of life and child asthma using data from two instances of the NZ Health Survey. We present new evidence to show that children whose caregivers reported any experience of racism had lower scores on mental health, behaviour, and self-esteem scales than children whose caregivers did not report experience of racism, even after adjusting for major confounders. Finally, caregiver psychological distress may be a potential pathway variable from vicarious racism to children's health-related quality of life as it attenuated this relationship.

Direct experiences of racism are strongly associated with poor mental health in children and young people. However, the relation between vicarious racism and mental health outcomes remains unclear. For example, a longitudinal study of indigenous Australian children (5 to 10 years) found that child or primary carer experiences of racism, discrimination, or prejudice were associated with poor mental health as measured on the Strengths and Difficulties questionnaire but that family experiences were not (Shepherd et al., 2017). In another Australian study (school students aged 8 to 15 years), Priest et al., (2017) reported no association between vicarious racism (students observing racism directed towards other students) on later depressive symptoms or loneliness, beyond the effect of direct experience of racism. Differences in measurement of both exposures and outcomes limit our ability to make direct comparisons between studies; however, it is possible that primacy of the child-caregiver relationship in early childhood underpins the transmission of the negative mental health consequences of vicarious racism for younger children, as compared with peer-group experiences of racism that may impact on mental and emotional wellbeing of older children.

Recent studies have reported associations between experiences of racism, asthma incidence (Coogan et al., 2014) and poor asthma outcomes (Carlson et al., 2017; Thakur et al., 2017). Parent experiences of discrimination were correlated with children's functional impairment in a small sample of children with asthma ($n = 163$, aged 7 to 15 years); however, the authors did not present confounder-adjusted estimates (Koinis-Mitchell et al., 2010). We did not observe a clear relation between caregiver experiences of racism and the likelihood of their child having medicated asthma in either unadjusted or adjusted models, although the point estimates were in the expected direction. Whilst the reasons for this cannot be determined, it is possible that this might be driven by differences in study measures. For example, whereas we have reported on vicarious racism and reports of having doctor-diagnosed asthma with concurrent treatment, other studies have focussed on personally experienced racism, reported asthma ever in the child's lifetime (Shepherd et al., 2017) and phenotypic measures of asthma (Thakur et al., 2017). It is also possible that our definition of medicated asthma may have limited our ability to detect any potential association since it requires the children and their family to have access to healthcare, which we have shown is impacted by vicarious racism (Paine et al., 2018). Thus, more research is needed to determine

whether and how experiences of racial discrimination might be implicated in the maintenance of ethnic/racial inequities in asthma morbidity and mortality.

Although we were unable to undertake formal mediation analysis in this study, the findings are important as they suggest that the association between vicarious racism and each of the health-related quality of life measures may be operating via a higher level of psychological distress in those caregivers who reported racism experiences compared with those who did not. Confirmation of the mediating effects of caregiver psychological distress requires longitudinal study designs so that the timing of exposures, mediators, and health outcomes can be carefully considered. For example, Bécaries et al., (2015) used path analyses to show that the indirect effects of maternal and family experiences of racial discrimination on child socioemotional development operated primarily via a worsening of maternal mental health (Bécaries et al., 2015). Although more evidence is required, our findings highlight the value of capturing a family's broader experience of racism as a determinant of child wellbeing.

The present study makes an important contribution by showing that increased reporting of experience of racism among caregivers is strongly associated with worsening CHQ-PF scores. This finding is novel and should be considered in the context of the patterning of experiences of racism across society. Caregivers of Māori children were up to four times more likely to report multiple experiences of racism – suggesting that Māori children will be more likely to suffer the health consequences of vicarious racism. This is an important breach of the indigenous rights of Māori children to be free from discrimination (United Nations General Assembly, 2007) and highlights a serious threat to the rights of a child to optimal health and wellbeing (United Nations General Assembly, 1990).

Our study has some important limitations. The racism module is only included in the adult questionnaire of the NZHS; therefore our analysis was restricted to those children (5–14 years) whose primary caregiver was also in the adult survey, limiting the available sample size. While the selection of an adult within a household follows a random process, children living in larger households with more adults (15+ years) are less likely to have a caregiver selected to the adult questionnaire. This may lead to a selection bias when analysing child-caregiver dyads that could underestimate the 'total' population prevalence of vicarious racism if living in larger households is related to increased experience of racism. For example, families with at least one Pacific, Māori, and Asian person are more likely to live in larger households (Superu (Social Policy Evaluation and Research Unit), 2015) and more likely to experience racism. Ethnically stratified estimates, however, are less likely to be affected by this selection bias, if exposure to racism is the same in selected and non-selected adult caregivers. In addition, associations between child vicarious racism and health measures may be unaffected, assuming the racism-health association does not differ between dyads selected and those not. The NZHS is based on a self-reported interview, with (adult) exposures and (child) outcomes reported by the caregiver respondent. Self-report bias is an important limitation of this research, and we reiterate the need for studies that collect objectively measured indicators of child health in the future. However, we also note that the use of self-reported questionnaires has provided information about experiences of vicarious racism for a large and representative sample of NZ and enabled modelling of important confounders and potential pathway variables in our analysis.

The racism measures in the NZHS ask about individual-level experiences of racism for specific types (i.e. verbal and physical attack) and settings (i.e. health, employment, and housing). It is likely that the estimates of racial discrimination in our study are underestimates as they only capture experience of racism at the level of individuals in limited domains, and they do not capture the experience of multiple forms of discrimination within domains or over time. In New Zealand, research has found that Māori, Pacific, and Asian ethnic groups have a higher likelihood of experiencing multiple forms of discrimination (Cormack et al., 2018). However, the measures do provide useful information about caregiver exposure in a number of key settings, which is important for intervening (Krieger, 2012). A further limitation may relate to the likelihood of

reporting racial discrimination for ethnic groups due to social desirability bias and person-group discrepancy in reporting racism (Krieger, 2012).

The estimation of prevalence of exposures and outcomes for New Zealand's major ethnic groupings is an important strength. The use of a European/Other ethnic group as the comparator in our models may have led to an underestimation of the association between racism and child health. However, we believe that this will be small since this composite group largely consists of those from European ethnic groups.

To improve the precision of estimates, we set out to identify variables for analysis that were available across both survey instances to enable pooling of data, and which were also applicable across the entire age-range (5–14 years). Only one variable, medicated asthma, met both criteria and thus most of our analyses were conducted using individual surveys. Our categorisation of the racism variables to an all-inclusive timeframe ('ever') may also limit our understanding of the impact of racism on child health.

Governments and professional organisations, including academic institutions and medical colleges, emphasise quality adult-child relationships as critical to the protection of children from the harm caused by environmental stressors. However, interventions developed from this position view children as being 'at-risk' and in doing so problematise parents and their capacity to protect their children, especially for parents who are themselves disadvantaged. We challenge this perspective and instead argue for greater recognition of racism as a pervasive system that erodes the wellbeing and autonomy of children and their families via the unfair structuring of power, opportunities, and exposure to health-damaging environmental stressors. The Framework presented by Williams and Mohammed (2013) suggests that eliminating child health inequities will require implementation and evaluation of anti-racism interventions that support families both within the health system and wider society. The patterning of racial discrimination suggests that development of interventions must prioritise Indigenous children.

Acknowledgements

We would like to acknowledge the participants in all surveys used in this paper, and Statistics New Zealand and the Ministry of Health for assisting with data access. Thanks also to Ruruhira Rameka for administrative support and our external advisors for their advice on the wider project.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This research was funded by the New Zealand Ministry of Health

Data availability statement

Access to the data used in this study was provided by Statistics New Zealand under conditions designed to keep individual information secure in accordance with the requirements of the Statistics Act 1975.

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