

Caregiver experiences of racism and child mental health outcomes: cross-sectional analysis from Aotearoa New Zealand

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ABSTRACT

AIMS: This study aimed to estimate the prevalence of vicarious racism experienced by children (0–14 years) in Aotearoa New Zealand and investigate the association between vicarious racism and diagnosed child mental health conditions.

METHODS: Adult and child 2016/2017 New Zealand Health Survey data were merged to create child–caregiver dyads. Multivariable logistic regression models were used to investigate the association between the caregiver experiences of racism (exposure) and diagnosed child mental health conditions (outcome), adjusting for confounders and exploring potential pathway variables.

RESULTS: Looking at 2,989 dyads, the prevalence of “any” vicarious racism was higher for Māori (28.1%; 95% CI 24.2–31.9), Pacific (23.2%; 95% CI 17.9–28.5) and Asian (29%; 95% CI 23.6–34.5) children compared to European/Other children (12.5%; 95% CI 10.2–14.8). A statistically significant association was identified between >2 reports of vicarious racism and the outcome (OR= 2.53, 95% 1.18–5.43). Adding caregiver psychological distress reduced this association (OR= 1.92, 95% 0.91–4.08).

CONCLUSIONS: Children in Māori, Pacific and Asian ethnicity groupings experience higher exposure to vicarious racism than those in the European/Other grouping. Multiple experiences of vicarious racism are associated with increased odds of diagnosed child mental health conditions in a dose–response distribution.

Alongside personal experiences of racism, racism can be experienced indirectly or vicariously through the experiences of other individuals or groups. Vicarious racism is proposed to impact on children’s perception of the world as being fair and just, thus negatively impacting on their sense of mental wellbeing (mental and socio-emotional health).¹

Direct experiences of racism have been strongly associated with poor child mental health outcomes;² however, the evidence supporting a relationship between vicarious racism and child mental health is less definitive. Associations have been identified between a number of socio-emotional health outcomes and post-birth, caregiver-mediated vicarious racism exposure.¹ However, only a minority of studies examining the association with mental health outcomes have reported significant results.¹

Local research has demonstrated that children who had any exposure to vicarious racism had poorer mental health, and that greater exposure was associated with worsening child emotional wellbeing.³ Caregiver mental health and socio-economic position have been identified as important potential pathway variables for the impact of

vicarious racism.^{1,3,4}

Considering vicarious exposure to racism acknowledges that racism can have a collective, as well as individual, impact. This is particularly relevant for marginalised communities who have experienced a disproportionate amount of collective trauma from processes like colonisation and imperialism. In the context of child health, this conceptualisation stands apart from approaches which silo child health outcomes from the relationships and environments in which children are embedded.

This study aimed to estimate the prevalence of child exposure to vicarious racism in Aotearoa New Zealand and examine the association between this exposure and child mental health outcomes. We hypothesised that exposure to vicarious racism would be associated with having an increased odds of reporting a diagnosed childhood mental health condition.

Methods

Responsiveness to Māori

This research was aligned with Kaupapa Māori theory (KMT) (carried out according to

KMT but undertaken by a non-Māori researcher with supervision from Māori researchers).⁵ A full responsiveness to Māori statement is available as appendix 1. In short, this study was led by senior Māori public health academics with subject matter expertise and sought specifically to improve Māori health. We sought to expose the distribution of power and privilege when examining racial oppression in Aotearoa, and started from the position that Māori children have a right to health and wellbeing, free from the harm of racism.

Study overview

Ethical approval for the study was obtained from The University of Auckland Human Participants Ethics Committee (023851), and access to the New Zealand Health Survey microdata was approved by the Statistics NZ Microdata Access Manager (CURF2020-02).

This quantitative, cross-sectional observational study involved secondary analysis of data collected by Manatū Hauora – Ministry of Health as part of the 2016/2017 New Zealand Health Survey (NZHS). The NZHS includes separate questionnaires for children (0–14 years) and adults (15 years and over), and experience of racism is currently only measured in the adult questionnaire.

This study analysed data collected from a sample population of children aged 0–14 years living in Aotearoa New Zealand who were included in NZHS 2016/2017 and had a primary caregiver who was selected to answer the NZHS adult questionnaire.

Dyad formation

In the NZHS, child questionnaires are completed by proxy by the adult primary caregiver in face-to-face interviews, but not all adult primary caregivers are selected for the adult survey. This restricted inclusion in our analysis to children whose questionnaires were completed by their primary caregiver. Confidentialised unit record files (CURF) data that were obtained from children's questionnaires completed by a non-primary caregiver adult were excluded (n=551).

Child questionnaire responses to questions about mental health, adult questionnaire responses to the racism module, and mediating factors such as socio-economic position and adult mental wellbeing were combined to create child–caregiver dyads for data analysis (Figure 1).

A full description of the NZHS variables and how they were translated into study variables are outlined in appendix 2. For the exposure variable, responses other than “yes” or “no” were treated as

missing data, and included responses were used to create binary (“any” experiences of racism ever: yes/no) and categorical (number of “yes” responses) variables for data analysis as in previous studies by the research group.^{3,4} The categorical variable was expressed as: no experiences, one experience, or two or more experiences.⁵

The outcome measure collated responses to questions about children's diagnoses of depression, anxiety disorder, and attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD). The “yes” and “no” responses to these questions were examined by condition and then used to create the composite binary variable “any diagnosed mental health condition”.

Ethnicity

Child ethnic groupings are selected by the caregiver in the NZHS. Ethnicity data were aggregated into Māori, Pacific, Asian and European/Other groupings, and could not be disaggregated for analysis. According to 2006/2007 NZHS data, the European/Other group is predominantly European, with approximately 1% of this group identifying with an ethnicity in the “Other” category;³ it can be considered a comparator or reference population when examining the prevalence of experiences of racism in the other ethnic groups.⁷

Potential pathway variables

The potential pathway variables included in this study were informed by previous studies of vicarious racism and child health using NZHS data.^{3,4} Caregiver socio-economic position was measured using highest educational qualification (none vs secondary school qualifications or higher) and neighbourhood level deprivation (New Zealand Deprivation Index, NZDep 2013, quintile 1=least deprived and quintile 5=most deprived).⁸

Caregiver mental health status was measured using the 10-item Kessler Psychological Distress Scale (K10), which is a screening tool measuring psychological distress.^{9–10} The range for K10 scores is 10–50 points, and this was analysed both as a continuous variable and a categorical variable with a cut-off at 12-points (low=K10 <12 and high=K10 >12).

Figure 2 displays the hypothesised relationship between the exposure, outcome, and potential pathway variables.

Data analysis

Data analysis was performed using StataIC

Figure 1: Illustration of how adult and child datasets are merged to create child-caregiver dyads.

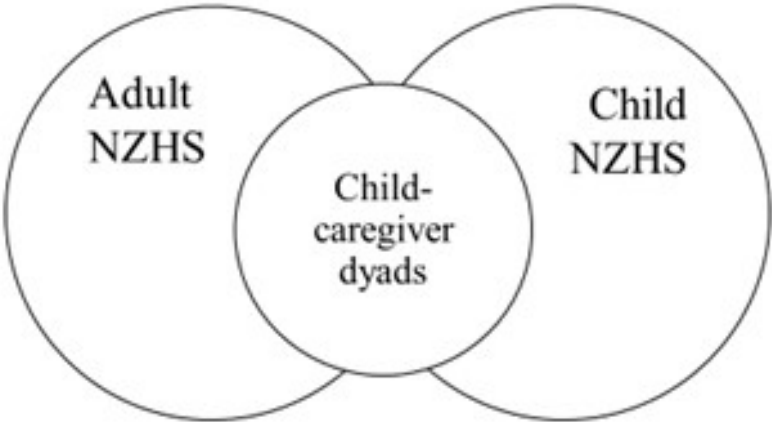


Figure 2: Hypothesised relationship between exposure, outcome, and potential pathway variables.

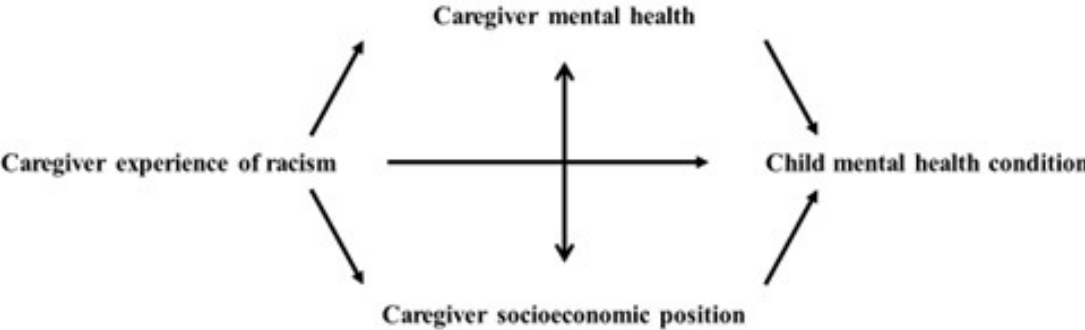


Table 1: Weighted percentage of vicarious racism by child's ethnic grouping (prioritised ethnicity).

	Child ethnic grouping							
	Māori (1,074)		Pacific (395)		Asian (432)		European/Other (1,269)	
	N (unweighted %)	Weighted % (95% CI)	N (unweighted %)	Weighted % (95% CI)	N (unweighted %)	Weighted % (95% CI)	N (unweighted %)	Weighted % (95% CI)
Any racism (ever)	327 (30.5)	28.1 (24.2–31.9)	107 (27.9)	23.2 (17.9–28.5)	125 (28.9)	29 (23.6–34.5)	192 (15.13)	12.5 (10.2–14.8)
Level of exposure								
One experience	222 (20.7)	19.9 (16.4–23.3)	77 (19.5)	17.1 (12.5–21.7)	91 (21.1)	20.3 (15.2–25.5)	160 (12.6)	10.5 (8.4–12.6)
Two or more experiences	105 (9.8)	8.2 (6.4–10.1)	30 (7.6)	6.1 (3.7–8.6)	34 (7.9)	8.7 (5–12.4)	32 (2.5)	2 (1.1–3.0)

CI = confidence interval.

*Māori, Pacific and Asian ethnic groupings are reported as total response and the European/Other grouping is a mutually exclusive comparator.

Table 2: Association between vicarious racism (“any” racism and level of racism exposure) and diagnosed child mental health conditions, models adjusted for caregiver binary gender, age group and ethnic grouping.

		Any diagnosed mental health condition OR (95% CI)
“Any” racism		1.4 (0.9–2.2)
Level of racism	1 report	1.1 (0.7–1.8)
	2+ reports	2.5 (1.2–5.4)*

*Statistically significant (p <0.05).

Table 3: Association between vicarious racism and diagnosed child mental health conditions, with findings presented for: unadjusted models (M0); models additionally adjusted for confounding variables of age, gender, ethnicity (M1); and potential pathway variables (M2 and M3).

		Any diagnosed mental health condition OR (95% CI)
Model for “any” racism		
M0: unadjusted		1.3 (0.8–2.0)
M1: caregiver ethnic grouping, binary gender and age		1.4 (0.9–2.2)
M2: caregiver neighbourhood deprivation, highest educational qualification		1.5 (0.9–2.2)
M3: caregiver psychological distress (continuous variable)		1.1 (0.7–1.8)
Model for level of racism		
M0: unadjusted	1 report	1.1 (0.7–1.7)
	2+ reports	1.9 (0.9–4.1)
M1: caregiver ethnic grouping, binary gender and age	1 report	1.1 (0.7–1.8)
	2+ reports	2.5 (1.2–5.4)*
M2: caregiver neighbourhood deprivation, highest educational qualification	1 report	1.1 (0.7–1.8)
	2+ reports	2.6 (1.2–5.8)*
M3: caregiver psychological distress (continuous variable)	1 report	0.9 (0.5–1.6)
	2+ reports	1.9 (0.9–4.1)

*Statistically significant (p <0.05).

(version 16, StataCorp, College Station, TX) by two study investigators (Chao Li and Rebekah Jaung) and reviewed by all investigators.

Descriptive summaries of caregiver and child demographic and other characteristics, weighted prevalence of caregiver experiences of racism/vicarious racism and weighted prevalence of child mental health variables were analysed by total response ethnicity. Child-caregiver dyads with missing exposure or outcome data were excluded from further analysis.

Multivariable logistic regression models were generated to examine the association between child mental health outcomes and caregiver experiences of racism/vicarious racism, with adjustment for covariates. The role of potential pathway variables in the relationship between caregiver experiences of racism/vicarious racism and child mental health was then examined by building several models where covariates were added sequentially:

1. Baseline model (M0)
2. Add confounding caregiver characteristics: (age, prioritised ethnicity, binary gender), (M1)
3. Add caregiver SEP measures: highest educational qualification and NZDep13 (M2)
4. Add caregiver psychological distress (M3)

Results of logistic regression were reported as odds ratios (OR) and 95% confidence intervals.

Results

A total of 2,989 child-caregiver dyads were included in the analysis, out of the 4,668 children (64%) and 13,598 adults (22%) who participated in the child and adult 2016/2017 NZHS. Demographic data and characteristics for the children included in the analysis are displayed in appendix table 1.

Vicarious racism

Overall, 19.7% (95% CI 17.9–21.4) of caregivers reported experiencing “any” racism ever. The prevalence of vicarious racism (“any” exposure to racism experienced by caregivers) was higher in Māori (28.1%; 95% CI 24.2–31.9), Pacific (23.2%; 95% CI 17.9–28.5) and Asian (29%; 95% CI 23.6–34.5) children when compared to European/Other children (12.5%; 95% CI 10.2–14.8) (Table 1). This pattern of exposure is more pronounced when looking at multiple experiences of racism, with 2%

(95% CI 1.1–3.0) of caregivers of European/Other children reporting two or more experiences of racism compared with caregivers of Māori (8.2%, 95% CI 6.4–10.1), Pacific (6.1%; 3.7–8.6) and Asian (8.7%, 95% CI 5.0–12.4) children.

Child mental health outcomes

The overall prevalence of any diagnosed mental health condition was 5.4% (95% CI 4.0–6.7).

The outcome variable (any diagnosed mental health condition) is markedly lower in Pacific and Asian groupings, as is condition-specific prevalence (appendix tables 2A and 2B). Looking at missing outcome data by ethnic grouping, there did not appear to be major differences in child or caregiver ethnic grouping associated with missing mental health outcome data (appendix table 3).

Potential pathway variables

Examining caregiver socio-economic position, 11.1% (95% CI 9.0–13.3) of European/Other children had caregivers living in the most deprived neighbourhoods (NZDep13 quintile 5) compared to the Māori 40.5% (95% CI 35.2–45.7), Pacific 56.2% (95% CI 47.4–65.1) and Asian 18.9% (95% CI 14.1–23.7) children. Māori and Pacific children were less likely to have caregivers who reported secondary school qualifications or higher (Māori 66.0%, 95% CI 62.4–69.5; Pacific 76.9%, 95% CI 71.5–82.2) compared with children of the mutually exclusive European/Other group (90.4%, 95% CI 88.3–92.6). Compared to European/Other children (7.8%, 95% CI 5.8–9.8), Māori (10.1%, 95% CI 7.7–12.6) and Pacific (12.0%, 95% CI 8.3–15.9) children were more likely to have caregiver who reported a high K10 score, while Asian children had caregivers who were less likely to have a high score (3.1%, 95% CI 1.0–5.2).

Relationship between child mental health outcomes and caregiver experiences of racism

Table 2 presents multivariable logistic regression models used to examine the association between vicarious racism and child mental health conditions which have been adjusted for caregiver binary gender, age group and ethnic groupings. While we did not find a significant association when looking at the “any” racism exposure variable, the OR point estimates are suggestive of increased risk of diagnosed mental health condition if the children were exposed to “any” vicarious racism via their caregivers (OR=1.4, 95% CI 0.9–2.2).

For the level of racism exposure (Table 2),

while there was no association for a single report, again the OR point estimate is suggestive of an increased risk. With two or more reports of vicarious racism the model was statistically significant (OR 2.5, 95% CI 1.2–5.4), indicating a higher risk of their child having a mental health condition with this level of vicarious racism exposure. Viewed together, these point estimates are suggestive of a dose–response.

Table 3 summarises the findings from a series of logistic regression models used to explore whether the association between vicarious racism and child diagnosed mental health conditions operate via two potential pathway variables: caregiver socio-economic position (M2) or caregiver psychological distress (M3).

Inclusion of the potential pathway variable of SEP for the “any” racism exposure variable had minimal impact on the OR point estimate between M1 (OR=1.4, 95% 0.9–2.2) and M2 (OR=1.5, 95% 0.9–2.2). Additional adjustment for caregiver psychological distress (M3) had a larger attenuating effect on the OR point estimate (from OR=1.5 [95% CI 0.9–2.2] to OR=1.1 [95% CI 0.7–1.8]). This suggests that caregiver psychological distress is also a contributing factor to child mental health outcomes, resulting in a lower OR point estimate for our model.

Inclusion of the potential pathway variable of socio-economic position had minimal impact on the association between 2+ reports of vicarious racism and child mental health outcomes (M2; OR= 2.6, 95% 1.2–5.8). However, adjusting for caregiver psychological distress had a larger attenuating effect on this association (M3; OR= 1.9, 95% 0.9–4.1).

An independent association was not identified between “any” vicarious racism and child diagnosed mental health conditions; however, our modelling sequence demonstrated some consistent effects related to the potential pathway variables. The series of models from M1 to M3 for both “any” and level of racism exposure (Table 3) illustrate the contribution of the different caregiver variables to the association between caregiver experiences of racism and child mental health, with the addition of caregiver socio-economic position (M2) having a negligible effect on M1 and psychological distress leading to a drop in the odds ratio (M3). This observation adds to our understanding of caregiver psychological distress as a potential pathway variable, in terms of the direction and magnitude of impact that it may have on the relationship between vicarious racism and child mental health outcomes.

Discussion

Using data from the most recent NZHS, which included the racism module (2016/2017), we have demonstrated an association between two or more caregiver experiences of racism and increased odds of diagnosed mental health outcomes in children. This association was reduced by caregiver psychological distress, suggesting that the latter may be a potential pathway variable through which caregiver experiences of racism impacts child mental health.

This work builds on existing analyses that have identified associations between vicarious racism and child health-related quality of life, mental health, behaviour and self-esteem scales,³ and healthcare utilisation.⁴ Previous quantitative studies investigating the association between vicarious racism and child health outcomes using earlier NZHS data have identified that children from Māori, Pacific and Asian groupings are exposed to much higher levels and a greater frequency of vicarious racism when compared to children in the European/Other grouping.^{3,4} Our analysis also supports the pattern of exposure to vicarious racism by child’s ethnicity grouping that has been identified in earlier studies and indicates that the prevalence of vicarious racism has not decreased, and “any” experience of racism may have increased slightly since the last time racism was measured in the NZHS in 2011/2012.

Our analysis found that caregivers of Māori children were four times more likely to report two or more experiences of racism than caregivers of children in the Other/European grouping, which suggests that Māori children may disproportionately experience the health consequences of vicarious racism. Pacific and Asian children are also more likely to experience the detrimental effects of vicarious racism than their Other/European counterparts. These findings add to the limited but growing pool of evidence highlighting the impact of vicarious racism on wellbeing, in addition to the harm of direct racism.

Our findings that suggest caregiver mental health as a potential pathway variable are consistent with previous analyses of NZHS data looking at the impact of vicarious racism on child health. Caregiver psychological distress reduced the association between vicarious racism and unmet need for healthcare,⁴ and reduced child health-related quality of life.³ Similar observations were made in an American context, whereby parental mental health, but not socio-economic position,

mediated the effect of caregiver-reported racism on child mental health outcomes.^{11,12} Caregiver mental health has also been identified as a contributing factor for child mental health outcomes outside of the framework of vicarious racism,^{13–15} which supports our conceptualisation of caregiver psychological distress as a potential pathway variable.

A key strength of this study is that it utilises a nationally representative dataset to demonstrate an association between high exposure to vicarious racism and the prevalence of diagnosed mental health conditions in children. It generates estimates of the prevalence of children's experience of vicarious racism for the major ethnic groupings in Aotearoa New Zealand, using methodology which is consistent with the existing evidence base for this population. Our analysis also includes multiple measures of socio-economic position, which is a way of acknowledging the ways in which institutional racism structures resources and opportunities by ethnicity in Aotearoa New Zealand, as another form of racism that may be associated with our study outcome. This study also adds new knowledge to the growing body of local and global literature on the impact of vicarious racism on child health,^{1–16} highlighting anti-racism work as a priority for health.

This study also contains some important limitations. Firstly, the cross-sectional design of the NZHS limits our ability to comment on causal relationships based on our findings or conduct formal mediation analyses.

The use of diagnosed mental health conditions as an outcome is highly likely to underestimate the true prevalence of these conditions, particularly in Indigenous and minoritised ethnic communities. Diagnosis of mental health conditions is dependent on access to healthcare, the ability of health workers to provide appropriate and high-quality services, and cultural and institutional norms that are privileged by health services.^{17–19} Furthermore, the difference in rates of diagnosis are thought to be due to underdiagnosis of children from minoritised ethnic groups rather than overdiagnosis of children from the dominant ethnic group,²⁰ and appear to continue throughout adult mental healthcare services.²¹

The incidence of mental health conditions is also influenced by the differential exposure to deprivation and hardship that children of different ethnicities experience as a result of historical trauma, coloniality and systemic racism.²² Longitudinal data from Aotearoa New Zealand observed differences in the incidence of mental health

conditions and in internalising and externalising behaviours between Māori and non-Māori adolescents, and identified relationships between these outcomes and childhood deprivation and family adversity.²³

The use of dyads of linked child and adult NZHS data is another limitation that contributes to reduced study power and may introduce bias. As the racism module is only included in the adult questionnaire of the NZHS, our study population was restricted to children who had a primary caregiver who was also a participant in the adult survey. This may introduce selection bias, as children who are part of larger households with more adults are less likely to have a primary caregiver selected to take part in the survey. Aggregate ethnic groupings such as Asian and Pacific are also of limited utility when examining the phenomenology of racism, which is experienced and enacted in highly contextual and specific ways.

NZDep is an area-level measure of relative socio-economic deprivation that has limitations when applied to individuals. It has also been critiqued for lacking in political analysis and for upholding hegemonic conceptualisations of deprivation.²⁴ This is particularly relevant to our analysis of the impact of racism. There are still important benefits of including an area-based measure of deprivation, since we conceptualise and understand differences in NZDep by ethnicity to reflect processes of structural racism.²⁵ Our model also included caregiver education qualification as an individual measure of socio-economic status.

Measuring vicarious racism using only the limited range of self-reported caregiver experiences of racism that the NZHS includes is likely to underestimate the true extent of exposure. As the NZHS is cross-sectional, these self-reported measures may be subject to recall bias, will not measure racism which is not recognised by respondents, and responses may be influenced by factors such as social desirability, which is most likely to operate in a way that discourages the reporting of racist experiences.²⁶

Previous racism in health research using NZHS data observed that there were differences in how racism was experienced according to binary gender categories, with men being more likely to experience personal (verbal and physical attacks), and women more frequently experiencing unfair treatment by a health professional.⁷ Given that between 60–80% of caregivers included in our analysis were women, there is likely to be a

significant difference in the lived experiences captured in this dataset compared to one that is gender-balanced and utilises a more robust gender data collection methodology.

Conclusion

This study adds to the expanding body of knowledge about the impact of vicarious racism on the health and wellbeing of children in Aotearoa New Zealand and internationally. Our analysis indicates that a third of Māori, Pacific and Asian children in Aotearoa New Zealand have experienced vicarious racism, that there is an association between greater exposure to vicarious racism and the odds of having a diagnosed mental health condition, and that there may be a dose–response association with multiple exposures. Specifically, caregivers of Māori children were four times more likely to report two or more experiences of racism than caregivers of children in the Other/European grouping. This pattern of vicarious racism remains unchanged

across multiple instances of the NZHS and suggests a status quo that is an infringement of the rights of Māori children as Indigenous people to be free from discrimination and of the rights of all children to optimal health and wellbeing.

These results, in tandem with existing research about the impact of vicarious racism on child health and racism as a determinant of health, should be received with concern about the damaging effects of racism, coloniality and white supremacy on health and wellbeing, and provide strong motivation for health system and whole-of-society action. In Aotearoa New Zealand, this requires us to not only discard white supremacy as a dominant ideology and eliminate racism, but to support the transformation of our society into one that honours Te Tiriti o Waitangi, breaks down the restrictions to Māori autonomy and wellbeing caused by the historical and ongoing harm of colonisation, and enables Māori children to flourish on a land where their rights as Indigenous people are upheld.

COMPETING INTERESTS

Nil.

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Appendices

Appendix 1: responsiveness to Māori.

This research was aligned with Kaupapa Māori theory (KMT) (carried out according to KMT but undertaken by a non-Māori researcher).¹ This was actualised in the following ways:

- Located in the context of tinu rangatiratanga, with Māori at the centre. Although the primary investigator was non-Māori, this research was carried out within a Māori research group and with guidance from senior Māori supervisors.
- Sought to specifically improve Māori health. This research project sought to identify the impact of racism on the mental health of Māori children.
- Took a right to health rather than a health needs approach. This research acknowledged that Māori have a right to health and that health inequity represents a breach of those rights.
- Took a strength-based rather than deficit-analysis approach. This research examined the impact of racism—a structural determinant of health—on mental health outcomes, acknowledging that negative health outcomes are not due to failures at an individual level.
- Exposed privilege. Racism disadvantages Māori and people of colour and privileges Pākehā. This research project sought to examine the extent of this inequity within the limits of the study question.
- Centred Māori as the norm. This research acknowledged Māori cultural models and conceptualisations of health, which incorporate mental and spiritual wellbeing, collective and generational wellbeing, and relationships with the natural and spiritual environment.

Appendix 1 references

1. Reid P, Paine S-J, Curtis E, et al. Achieving health equity in Aotearoa: strengthening responsiveness to Māori in health research. *N Z Med J*. 2017 Nov 10;130(1465):96-103.

Appendix 2: New Zealand Health Survey variables.

Exposure variables

In the NZHS 2016/17 adult questionnaire, experiences of racism were measured with the following questions:¹

- Have you ever been a victim of an ethnically motivated attack (verbal or physical abuse to you or your property) in New Zealand?
- Have you ever been treated unfairly (each of the three items below) because of your ethnicity in New Zealand (for example, kept waiting or treated differently)?
 - by a health professional (that is, a doctor, nurse, dentist, etc.)
 - at work or been refused a job
 - unfairly when renting or buying housing.

The range of possible responses were: “Yes”, “No”, “Don’t know”, “Refused” and “Not applicable”. Responses which were “Don’t know”, “Refused” or “Not applicable” were categorised as missing in this present study. These questions were used to create binary (“*any*” experiences of racism ever: yes/no) and categorical (number of “yes” responses) variables for data analysis, as in previous studies by the research group.^{2,3} The categorical variable was expressed as: No experiences, One experience, or Two or more experiences.⁴

Outcome variables

The main outcome measure of interest was any child-diagnosed mental health condition. This was categorised through responses to the following questions that were part of the child questionnaire:⁵

- Have you ever been told by a doctor that [Name] has depression/?
- Have you ever been told by a doctor that [Name] has an anxiety disorder/? This includes panic

attack, phobia, post-traumatic stress disorder and obsessive-compulsive disorder.

- Have you ever been told by a doctor that [Name] has attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD)?

Possible response to these questions were: “Yes”, “No”, “Don’t know” and “Refused”, of which only one could be selected for each question. “Don’t know” and “Refused” responses were treated as missing. The responses to these questions were examined by condition and then used to create the composite binary variable “*any diagnosed mental health condition*”.

Appendix 2 references

1. Manatū Hauora – Ministry of Health. Content Guide 2016/17: New Zealand Health Survey (Adult Questionnaire) [Internet]. Wellington: Manatū Hauora – Ministry of Health; 2017 [cited Jul 2020]. Available from: <https://www.health.govt.nz/publication/content-guide-2016-17-new-zealand-health-survey>.
2. Paine SJ, Cormack D, Stanley J, Harris R. 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. *Crit Public Health*. 2019 Jun;30(5):509-520. doi: 10.1080/09581596.2019.1626003.
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5. Manatū Hauora – Ministry of Health. Content Guide 2016/17: New Zealand Health Survey (Child Questionnaire) [Internet]. Wellington: Manatū Hauora – Ministry of Health; 2017 [cited Jul 2020]. Available from: <https://www.health.govt.nz/publication/content-guide-2016-17-new-zealand-health-survey>.

Appendix Table 1: Socio-demographic profile of children included in child–caregiver dyads.

		N (total = 2,989)	Unweighted %
Age group			
	Group 1 (0–4 years)	1,139	38.1
	Group 2 (5–9 years)	960	32.1
	Group 3 (10–14 years)	890	29.8
Binary gender	Female	1,492	49.2
Ethnic grouping*			
	Māori	1,074	35.9
	Pacific	395	13.2
	Asian	432	14.5
	European/Other	1,270	42.5
Caregiver area deprivation (NZDep13 Index**)			
	Quintile 1	363	12.1
	Quintile 2	442	14.8
	Quintile 3	570	19.1
	Quintile 4	686	23
	Quintile 5	928	31.1

*Māori, Pacific, and Asian ethnic groupings are reported as total response, and the European/Other grouping is a mutually exclusive comparator.

**NZDep13 = New Zealand Deprivation index (Quintile 1 = least deprived, 5 = most deprived).

Appendix Table 2A and 2B: Prevalence of child mental health outcomes by total ethnic grouping.

Table 2A: Prevalence of any diagnosed mental health conditions.

2A	Any diagnosed mental health condition (any condition)	
	Yes (146)	Weighted % (95% CI)
Child ethnic grouping*		
Māori	173	7.6 (5.2–10.0)
Pacific	35	2.7 (0–0.6.1)
Asian	83	0.8 (0.1–1.6)
European/Other	232	5.9 (3.9–8.0)

Table 2B: Prevalence of depression, anxiety, and ADD/ADHD.

2B	Any diagnosed mental health condition (condition-specific)			
	Yes	Unweighted %	Weighted % (95% CI)	
Depression				
	21	0.7	0.5 (0.2–0.8)	
	Māori	10	1.1	0.7 (0.1–1.3)
	Pacific	0	0	0
	Asian	0	0	0
	European/Other	11	1.1	0.6 (0.1–1.1)
Anxiety				
	89	3.0	3.2 (2.2–4.3)	
	Māori	42	4.6	4.5 (2.5–6.6)
	Pacific	3	0.9	1.8 (0.0–0.1)
	Asian	3	0.9	0.3 (0.0–0.7)
	European/Other	45	4.3	0.4 (0.2–0.5)
ADD/ADHD				
	78	2.6	2.7 (1.9–3.6)	
	Māori	40	4.4	4.5 (3.0–5.9)
	Pacific	4	1.2	1.0 (0.0–2.1)
	Asian	4	1.2	0.6 (0.0–1.3)
	European/Other	33	3.2	2.9 (1.5–4.3)

*Māori, Pacific and Asian ethnic groupings are reported as total response, and the European/Other grouping is a mutually exclusive comparator.

CI = confidence interval.

ADD/ADHD = Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder.

Appendix Table 3: Proportion of child–caregiver dyads with missing outcome data by child and adult prioritised ethnic grouping.

	N (Total = 523)	Unweighted %
Child ethnic grouping*		
Māori	173	16.1
Pacific	35	13.8
Asian	83	21.2
European/Other	232	18.3
Adult ethnic grouping*		
Māori	134	15.8
Pacific	36	14.1
Asian	76	20.1
European/Other	277	18.4

*Māori, Pacific, and Asian ethnic groupings are reported as total response, and the European/Other grouping is a mutually exclusive comparator.