Twelve-month post-injury outcomes for Māori and non-Māori: findings from a New Zealand cohort study

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Māori, the indigenous population of New Zealand, experience a disproportionate amount of the country’s injury burden. It was recently estimated that the loss of health due to injury is twice as great among Māori (12% of Disability Adjusted Life Years [DALYs]) than non-Māori (6% of DALYs).1 Māori aged 15–64 years also have considerably higher rates of hospitalisation for unintentional injury than non-Māori (18 per 1,000 compared to 11 per 1,000).2

Published literature examining injury among indigenous populations has largely focused on hospitalisations and fatalities as outcomes, however, knowledge about other outcomes is just as important. The ongoing pain and/or psychological distress that may result from an injury can hinder an individual’s ability to return to their pre-injury activities and participation in society.3,4 This, in turn, can adversely affect their personal wellbeing as well as that of their family and friends. Such outcomes are not confined to those whose injury results in hospitalisation.5 Injuries not considered life-threatening and that do not result in hospitalisation significantly outnumber more serious injuries and can still result in profound disability.5-8

The Prospective Outcomes of Injury Study (POIS) is a cohort study based on a biopsychosocial health and disability framework.9 It follows New Zealanders recruited from the Accident Compensation Corporation (ACC) entitlement claims register.9 ACC is New Zealand’s universal no-fault injury insurer that provides medical cover and rehabilitation support for residents and visitors who sustain an injury, regardless of injury cause or setting. Injured people are placed on ACC’s entitlement claims register if they are eligible for earnings-related compensation (i.e., they require a week or more away from paid work) or have injuries likely to require rehabilitation services (e.g., transport to medical appointments or home help).

A specific aim of POIS is to provide meaningful and relevant information on injury outcomes for Māori, hence the study was designed to allow dedicated analyses of Māori data.10 POIS includes individuals who sustained a variety of injury types, many of which did not result in hospitalisation,11 and it has collected information that permits investigation of a broader range of injury outcomes than previously examined among Māori and other indigenous populations. Such research is important, given the disproportionate injury burden that indigenous populations experience in terms of hospitalisation and mortality, and the dearth of research examining other important outcomes, particularly among those not hospitalised following injury.12-15

Abstract

Objective: To examine the prevalence of key outcomes among Māori and non-Māori 12 months post-injury, and to estimate the risk of these outcomes for Māori compared to non-Māori.

Methods: The Prospective Outcomes of Injury Study recruited 2,856 New Zealand residents from five regions of New Zealand. This paper examines outcomes at 12 months post-injury for the Māori (n=405) and non-Māori (n=1,875) groups.

Results: High levels of adverse outcomes at 12 months post-injury were observed in both groups. A greater proportion of Māori than non-Māori were experiencing disability, problems with mobility and psychological distress 12 months post-injury. After controlling for pre-injury and injury-related characteristics, Māori were found to be at greater risk of disability, problems with mobility, having trouble performing usual activities, psychological distress and reporting ‘barely/not enough’ household income at 12 months compared to non-Māori.

Conclusion: Explanations for higher risk of these poor outcomes are unclear. Future research to identify potential explanations will include experiences with health services and rehabilitation support following injury, subsequent injury and illness, and major life events post-injury.

Implications: Adequate post-injury care focused on physical and psychological health and financial security is required to reduce the burden experienced by Māori due to injury.

Key words: injury, outcomes, indigenous, disability

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This paper aims to: 1) describe the pre-injury and injury-related characteristics of Māori and non-Māori participants in the POIS 12-month interview; 2) examine the prevalence of key outcomes at 12 months after injury for Māori and non-Māori; and 3) identify the risk of key 12-month outcomes for Māori compared to non-Māori, while accounting for a range of pre-injury and injury-related characteristics.

**Methods**

**Study sample and data collection**

Ethical approval for POIS was granted by the New Zealand Health and Disability Multi-region Ethics Committee (MEC/07/07/093). Details on the study protocols and a description of participants have been previously published.9-11 The following paragraphs provide a brief description.

POIS participants were recruited between December 2007 and August 2009. Individuals on ACC’s entitlement claims register were eligible if aged 18–64 years (inclusive) and residing in one of five regions of New Zealand; those whose injuries resulted from self-harm or sexual assault were not eligible.11 Eligible residents were mailed a letter inviting them to participate in the study. A total of 4,881 potential participants were contacted, of whom 59% (n=2,856) consented. Participants were first interviewed three months post-injury, on average, primarily by telephone.11

This paper examines outcomes reported at an interview held 12 months post-injury for Māori and non-Māori groups of POIS respondents, a time at which much of the cohort would be expected to have improved, if not recovered. Information on ethnicity was obtained using the 2006 New Zealand Census self-reported ethnicity question.16 The Māori cohort included those who reported Māori ethnicity, regardless of additional ethnicities. All those who did not report Māori ethnicity comprised the non-Māori cohort.

**Study measures**

**Outcome variables**

Nine outcomes were examined 12 months post-injury in the current study: a measure of general health, one disability outcome, five functional outcomes, one psychological outcome and a financial outcome. These are described in further detail in Table 1. Variables were recoded dichotomously so the same regression method could be used for each outcome considered.

**Explanatory variables**

Pre-injury socio-demographic variables included: ethnicity, gender, age at injury, highest educational qualification, working for pay, living arrangement and adequacy of household income (Table 1). Pre-injury health characteristics included: general health, disability, functioning, experience of a depressive-type episode in the previous year and chronic conditions. Injury-related variables included: anatomical injury severity (New Injury Severity Score [NISS]), hospitalisation, perceived threat to life, perceived threat of long-term disability and access to healthcare services (Table 1). Injury type (i.e., body region and nature of

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### Table 1: Description of study measures.

| Variable | Measure | Referenced | Categories | Ref |
|----------|---------|------------|------------|-----|
| Outcome (at 12-months post-injury)* | | | | |
| General health | Single question from the SF-36 | 17 | Good (good/very good/excellent); Not good (fair/poor) | 18 |
| Disability | 12-item WHODAS II | 19 | No (0-9); Yes (≥10) | 5 |
| Functioning (5 dimensions) | EQ-SD | 20 | No problems; Problems (some/ extreme) | 18 |
| Psychological distress | Kessler-6 | 21 | No/low distress (0-12); Distress (≥13) | 18 |
| Adequacy of household income | | 23 | Enough (enough/more than); Barely/ not enough | 18 |

**Explanatory variables**

**Pre-injury socio-demographic**

- Ethnicity: Māori; non-Māori
- Gender: Female, Male
- Age at time of injury (years): 18-24; 25-34; 35-44; 45-54; 55-64
- Highest educational qualification: Post-secondary school; Secondary school; No formal
- Working for pay: Yes (part/full-time); No
- Living arrangement: With family (immediate/extended); With non-family; Alone
- Adequacy of household income: Enough (enough/more than); Barely/ not enough

**Pre-injury health**

- General health: Single question from the SF-36 | Good (good/very good/excellent); Not good (fair/poor) | 18 |
- Disability: 12-item WHODAS II | No (0-9); Yes (10+) | 5 |
- Functioning (5 dimensions): EQ-SD | No problems; Problems (some/ extreme) | 18 |
- Depressive-type episode: DSM-III screening questions (loss of interest in daily activities; depressed mood) | No; Yes | 5 |
- Chronic conditions: | None; One; Two or more | 18 |

**Injury-related**

- Anatomical injury severity: NISS | NISS 1-3; NISS 4-6; NISS >6 | 5 |
- Hospital admission: NMDS | No; Yes | 5 |
- Perceived threat to life: | No; Yes/Maybe | 18 |
- Perceived threat of severe long-term disability: | No; Yes/Maybe | 18 |
- Access to healthcare services: | No trouble; Trouble/Mixed | 18 |

*a* Measured at the 12-month interview.

*b* Summed score used.

c Measured at the first interview (3-months after injury).

d Participants classified as having a pre-injury depressive-type episode in the year prior to injury if they responded affirmatively to at least one of the two DSM-III screening questions.

e Determined using the National Minimum Dataset (NMDS) of hospital discharges. Participants classified as hospitalised if their discharge record listed an external cause of injury code and they had been admitted to hospital or treated for ≥3 hours at an Emergency Department within 7 days of injury.
injury) was not included as previous analyses of POIS data\(^2,29\) show that these are similarly distributed among Māori participants and the total POIS cohort.

**Statistical analyses**

Chi-square tests were used to compare the distribution of explanatory variables and 12-month outcomes for Māori and non-Māori who participated in the 12-month post-injury interview. The relative risk of each outcome between the two groups was then estimated using modified Poisson regression modelling with robust error variance. Adjusted estimates were obtained by including the pre-injury measure of each outcome and all other covariates in the models (aRR). The outcome measure of psychological distress was not available pre-injury, so experience of a depressive-type episode in the year prior to injury was included. This was assessed by two DSM-III screening questions: loss of interest in daily activities and/or depressed mood. Variables missing data for more than 5% of participants in the Māori or non-Māori groups were to have missing responses categorised as “unknown” but no variable had more than 3.2% of participants’ data missing (median across all variables: 0.4%). Therefore, participants were excluded from analyses where relevant information was not available for them. The time between injury and first interview date was adjusted for in the multivariable models. Analyses were conducted using Stata/SE 12.1.\(^{30}\)

**Results**

A total of 2,282 POIS participants (80%) took part in the 12-month interview. Of these, 405 (18%) reported Māori ethnicity and 1,875 (82%) did not. Information on ethnicity was missing for two participants who were therefore not included in the analyses.

**Pre-injury socio-demographic and health characteristics**

Males comprised 63% of the Māori group and 58% of the non-Māori group (Table 2). Māori participants were significantly younger (median age: 44 years; Inter-quartile Range (Q) to Q3): 30–49 years) than non-Māori (median age: 44 years; Q to Q3: 32–54 years) and less likely to have a post-secondary school qualification prior to their injury. More than 90% in each group were working for pay prior to their injury and more than 80% were living with family. There was slight evidence

| Characteristic | Māori (n = 405) | Non-Māori (n = 1875) | χ² | p-value |
|---------------|-----------------|----------------------|----|---------|
| Gender        |                 |                      |    |         |
| Female        | 151 (37)        | 787 (40)             | 0.08 | 0.83 |
| Male          | 254 (63)        | 1,088 (56)           | 0.08 | 0.83 |
| Age at time of injury (years) |                  |                      |    |         |
| 18-24         | 48 (12)         | 210 (11)             | <0.001 | 0.001 |
| 25-34         | 99 (24)         | 341 (18)             | 0.001 | 0.001 |
| 35-44         | 95 (23)         | 407 (22)             | 0.001 | 0.001 |
| 45-54         | 112 (28)        | 488 (26)             | 0.001 | 0.001 |
| 55-64         | 51 (13)         | 429 (23)             | 0.001 | 0.001 |
| Highest educational qualification |                  |                      |    |         |
| Post-secondary | 206 (52)       | 1,173 (64)           | <0.001 | 0.001 |
| Secondary     | 97 (24)         | 439 (24)             | 0.001 | 0.001 |
| No formal     | 94 (24)         | 235 (13)             | 0.001 | 0.001 |
| Working for pay |                |                      |    |         |
| Yes           | 371 (92)       | 1,719 (92)           | 0.94 | 0.36 |
| No            | 34 (8)         | 155 (8)              | 0.70 | 0.36 |
| Living arrangement |             |                      |    |         |
| With family   | 345 (86)       | 1,533 (82)           | 0.16 | 0.16 |
| Without family | 26 (7)         | 141 (8)              | 0.98 | 0.16 |
| Adequacy of household income |         |                      |    |         |
| Enough        | 243 (60)       | 1,214 (65)           | 0.05 | 0.05 |
| Barely/ not enough | 161 (40)   | 644 (35)             | 0.38 | 0.05 |
| Health        |                 |                      |    |         |
| General health |                |                      |    |         |
| Good          | 369 (91)       | 1,779 (95)           | 0.002 | 0.002 |
| Not good      | 35 (9)         | 91 (5)               | 0.60 | 0.002 |
| Disability (WHODAS) |          |                      |    |         |
| No (0-9)      | 369 (92)       | 1,773 (96)           | 0.001 | 0.001 |
| Yes (≥10)     | 33 (8)         | 80 (4)               | 0.75 | 0.001 |
| Functioning (EQ-5D) |       |                      |    |         |
| Mobility      |                |                      |    |         |
| No problems   | 379 (94)       | 1,760 (94)           | 0.74 | 0.74 |
| Problems      | 26 (6)         | 112 (6)              | 0.74 | 0.74 |
| Self-care     |                |                      |    |         |
| No problems   | 397 (98)       | 1,825 (97)           | 0.49 | 0.49 |
| Problems      | 8 (2)          | 48 (3)               | 0.49 | 0.49 |
| Usual activities |              |                      |    |         |
| No problems   | 338 (95)       | 1,767 (94)           | 0.92 | 0.92 |
| Problems      | 22 (5)         | 104 (6)              | 0.92 | 0.92 |
| Pain or discomfort |          |                      |    |         |
| No problems   | 364 (90)       | 1,669 (89)           | 0.60 | 0.60 |
| Problems      | 40 (10)        | 202 (11)             | 0.60 | 0.60 |
| Anxiety or depression |       |                      |    |         |
| No problems   | 380 (94)       | 1,760 (94)           | 0.959 | 0.959 |
| Problems      | 24 (6)         | 111 (6)              | 0.959 | 0.959 |
| Chronic conditions |         |                      |    |         |
| None          | 197 (50)       | 947 (52)             | 0.63 | 0.63 |
| One           | 107 (27)       | 492 (27)             | 0.63 | 0.63 |
| Two or more   | 92 (23)        | 387 (21)             | 0.63 | 0.63 |
| Depressive-type episode |       |                      |    |         |
| No            | 292 (72)       | 1,457 (78)           | 0.02 | 0.02 |
| Yes           | 112 (28)       | 417 (22)             | 0.02 | 0.02 |

\(a\) Totals do not always add to 405 due to missing data

\(b\) Totals do not always add to 1,875 due to missing data

### Table 2: Pre-injury socio-demographic and health characteristics of 12-month interview participants.

- **Gender**: Female (n = 151) vs. Male (n = 254)
- **Age at time of injury**: 18-24 vs. 25-34 vs. 35-44 vs. 45-54 vs. 55-64
- **Highest educational qualification**: Post-secondary vs. Secondary vs. No formal
- **Working for pay**: Yes vs. No
- **Living arrangement**: With family vs. Without family vs. Alone
- **Adequacy of household income**: Enough vs. Barely/not enough
- **Health**: General health: Good vs. Not good
- **Disability (WHODAS)**: No (0-9) vs. Yes (≥10)
- **Functioning (EQ-5D)**: Mobility: No problems vs. Problems, Self-care: No problems vs. Problems, Usual activities: No problems vs. Problems, Pain or discomfort: No problems vs. Problems, Anxiety or depression: No problems vs. Problems, Chronic conditions: None vs. One vs. Two or more, Depressive-type episode: No vs. Yes

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of a difference between the groups in the adequacy of household income pre-injury, with 60% of Māori and 65% of non-Māori reporting having enough/more than enough household income to meet everyday needs. More than 90% in each group reported their pre-injury general health as ‘good’ (i.e., good, very good or excellent), no (or little) disability based on a WHODAS II score of <10, and no problems with functioning in terms of mobility, self-care, usual activities, pain or discomfort, or anxiety or depression as measured by the EQ-5D (Table 2). About half of both groups had no chronic conditions; just under one-quarter had two or more. A pre-injury depressive-type episode was reported by 28% of the Māori cohort and 22% of the non-Māori cohort. General health, disability, and a depressive-type episode were the only pre-injury health variables for which there were statistically significant differences between the Māori and non-Māori groups.

**Injury-related characteristics**

More than 80% of injuries in both groups were of low (NISS = 1–3) to moderate (NISS = 4–6) anatomical severity (Table 3). The median NISS for both Māori and non-Māori was 4 (Q1 to Q3: 1–5). One quarter of Māori and non-Māori were hospitalised as a result of their injury. While less than 15% of each cohort perceived their injury could be a threat to their life, about 40% of each group believed it could result in severe long-term disability. There were no statistically significant differences between the two groups in terms of injury-related characteristics.

**Injury outcomes at 12 months: prevalence and relative risks**

More Māori than non-Māori reported their general health as ‘not good’ (18% and 11%, respectively; p<0.001) at the 12-month interview (Table 4). One-fifth (21%) of Māori participants were classified as having a disability (a WHODAS II score ≥10) compared to 13% of non-Māori (p<0.001), and a significantly greater proportion of Māori than non-Māori were experiencing problems with mobility (29% and 22%, respectively; p=0.007) and psychological distress (9% and 3% respectively; p<0.001). More Māori than non-Māori reported having ‘barely/not enough’ household income to meet their everyday needs (52% and 41% respectively; p<0.001). In both groups, 7% reported problems with self-care, approximately one-third were experiencing problems performing usual activities, around one-half were experiencing problems with pain or discomfort and one-fifth were experiencing anxiety or depression (EQ-5D).

Twice as many respondents in both groups reported their general health as ‘not good’ at the 12-month interview compared to pre-injury. The prevalence of disability approximately trebled. Substantial increases were also observed in the prevalence of problems as measured by all EQ-5D dimensions. Problems increased between three- and seven-fold for Māori (absolute increase: 5%–45%) and two- to five-fold for non-Māori (absolute increase: 4%–40%). Māori were at 44% increased risk of ‘not good’ (i.e., fair or poor) general health at 12 months post-injury compared to non-Māori (Table 5). This remained the case after accounting for pre-injury socio-demographic and health and injury-related characteristics (aRR=1.44, p=0.005). Compared to non-Māori, Māori were also at increased risk of disability (aRR=1.45, p=0.002), and experiencing problems with mobility (aRR=1.31, p=0.003) and usual activities (aRR=1.19, p=0.036) 12 months post-injury.
The similar risk of EQ-5D anxiety or depression observed for Māori and non-Māori was somewhat incongruent with the statistically significant difference in the risk of psychological distress (Kessler-6) observed between the two groups. After controlling for all pre-injury and injury-related characteristics, the risk of experiencing psychological distress at 12 months post-injury for Māori was 2.5 times higher than the risk for non-Māori (aRR=2.54, p<0.001), see Table 5. A statistically significant difference in the risk of barely/not enough household income to meet everyday needs was also observed (aRR=1.18, p=0.003) with Māori more likely to report this at the 12-month interview than non-Māori. The Pearson dispersion statistic indicated no variance in data being higher than expected in any of the models. Estimates obtained from models with and without key variance) in any of the models. Estimates obtained from models with and without key outliers (in terms of deviance residuals) were very similar. There was no evidence of multi-collinearity in any model.

**Discussion**

Notable and high levels of adverse outcomes were observed at 12 months post-injury for both Māori and non-Māori participants. The prevalence of all of these was substantially higher than the pre-injury prevalence.

Māori were at greater risk of experiencing considerable disability, and also increased risk of problems with mobility and psychological distress 12 months post-injury compared to non-Māori. The risk of having difficulties performing usual activities was greater for Māori when adjusting for pre-injury socio-demographic characteristics and health and injury-related characteristics. Māori had 44% greater risk of reporting ‘not good’ (i.e., fair or poor) general health at 12 months, and 18% greater risk of reporting barely/not enough household income to meet their everyday needs, compared to non-Māori.

Our study was able to examine a broad range of outcomes resulting from a variety of injuries that differed in anatomical severity (NISS). It has previously been shown that injuries of lesser anatomical severity (NISS<4) can contribute significantly to the overall injury burden. This perhaps ought to be expected, as NISS severity is an indicator of threat to life rather than threat of disability. A strength of the current study was the inclusion of participants with low-to-moderate anatomical severity NISS scores. A further strength is that participation was not restricted to those who were hospitalised or attended an emergency department because of their injury; the cohort included those referred to ACC by non-hospital healthcare providers (e.g. general practitioners).

Adjusting for a wide range of pre-injury socio-demographic factors, health and injury-related characteristics in estimating the risk of various 12-month outcomes for Māori and non-Māori is another strength. This included controlling for injury severity (measured by NISS) but not injury type. Previous analyses show no differences in the distributions of injury types between Māori participants and the total POIS cohort. This means that the greater risk of disability and problems with functioning observed for Māori compared to non-Māori is not the result of differences in the type of injuries sustained.

One pre-injury health factor (Kessler-6 psychological distress) was unavailable, and therefore could not be adjusted for in the analysis. This means the estimated relative risk of psychological distress for Māori compared to non-Māori at 12-months post-injury needs to be interpreted with caution. The higher risk for Māori at 12-months could be due to a higher risk of psychological distress pre-injury compared to non-Māori. Experiencing a pre-injury depressive-type episode was used instead to control for pre-injury psychological distress, but this does not necessarily overcome the limitation of the absence of pre-injury Kessler-6 as the two measures differ in their assessment of psychological wellbeing. The more comprehensive Kessler-6 also measures symptoms that individuals may not attribute to underlying anxiety or depression, which could explain why a difference in the risk of psychological distress (as measured by Kessler-6) but not of anxiety and depression (as measured by the EQ-SD) was observed between Māori and non-Māori 12 months post-injury.

There are other potential limitations. Pre-injury health information was obtained retrospectively at the three-month interview. This leaves a margin for recall bias to be influencing the results. Participants may have provided an overly positive pre-injury health and disability status. If Māori overestimated their pre-injury health to a greater extent than non-Māori, or vice versa, then this would be biasing our relative risk estimates. There is no rationale for assuming recall would differ between the groups. Recall bias among all POIS participants has been assessed by comparing health status (as measured by the EQ-SD) pre-injury and at five- and 12-months post-injury among those who had recovered from their injury. This showed only small differences in reported health pre- and post-injury suggesting that recall bias is likely to be minor.

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**Table 5: Crude and adjusted risk of outcomes at 12-months post-injury for Māori relative to non-Māori.**

| Outcome (12 months post-injury) | Māori | RR (95% CI) | aRR (95% CI) |
|--------------------------------|-------|-------------|-------------|
| General health                 |       |             |             |
| Not good                       | 1.62*** (1.27-2.06) | 1.44** (1.12-1.85) | |
| Disability                     |       |             |             |
| Yes (WHODAS≥10)                | 1.60*** (1.28-1.99) | 1.45** (1.15-1.84) | |
| Functioning (EQ-SD)            |       |             |             |
| Problems with mobility         | 1.28*** (1.07-1.52) | 1.31** (1.09-1.56) | |
| Problems with self-care        | 1.06 (0.72-1.55) | 1.13 (0.78-1.65) | |
| Problems with usual activities | 1.14 (0.98-1.34) | 1.19 (1.01-1.39) | |
| Pain or discomfort             | 1.08 (0.97-1.19) | 1.09 (0.96-1.20) | |
| Anxiety or depression          | 1.05 (0.86-1.30) | 0.97 (0.78-1.21) | |
| Psychological distress         |       |             |             |
| Kessler-6≥13                   | 2.81*** (1.89-4.16) | 2.54*** (1.70-3.79) | |
| Adequacy of household income   |       |             |             |
| Barely/not enough              | 1.28*** (1.14-1.42) | 1.18** (1.06-1.31) | |

*p<0.05, **p<0.01, ***p<0.001

RR: Reference group in each model is non-Māori participants.

aRR = relative risk.

aRR = adjusted relative risk. Adjusted for gender, age at injury, highest qualification, pre-injury work status, pre-injury living arrangement, adequacy of household income pre-injury, chronic conditions, NISS, hospital admission, perceived threat to life, perceived threat of disability, trouble accessing health services, time from injury to 12-month interview and the outcome of interest pre-injury (except psychological distress – depressive episode in year prior to injury used, determined via DSM-IV-R screening questions).
Loss-to-follow-up, or non-participation at 12-months, could also be biasing our results. Non-participation at 12 months was 28% among Māori and 18% among non-Māori (20% among the total cohort).22 Predictors of non-participation in the 12-month interview have been identified23 and some of these factors are associated with functional and disability outcomes post-injury.1,18 It is therefore likely that non-participation at 12 months is biasing our prevalence estimates of 12-month injury outcomes. We have undertaken a preliminary investigation into bias from non-participation at 12 months for Māori and non-Māori participants. No statistically significant differences between three- and 12-month participants were found in the distribution of any of our study variables, or for three-month injury outcomes (i.e., general health, disability, EQ-SD, psychological distress). This was the case for Māori and non-Māori participants as well as the total cohort. We also found that differences between participants and non-participants at 12 months in the distribution of our study variables and three-month outcomes were largely the same among Māori participants, non-Māori participants and the total cohort. These preliminary findings indicate that any non-participation bias among Māori relative to non-Māori, for the variables examined in this paper, is likely to be minimal, and any impact on the relative risk estimates presented here is also likely to be minor.

Previously, we examined the outcomes of disability, problems with functioning, psychological distress and fair/poor general health at three months post-injury for the Māori POIS group.29 Prevalences ranged from 12% (psychological distress) to 70% (experiencing pain or discomfort). This current study shows the proportion of Māori experiencing these outcomes had reduced at 12 months post-injury (absolute reduction range: 3–28%; relative reduction range: 21–71%) but not to the same extent as among non-Māori. For example, more than 40% of non-Māori were classified as having had a disability at three months, 8% experienced psychological distress and 21% reported their general health as fair/poor. Results in this current paper show disability prevalence among the non-Māori group reduced by 28% (relative reduction: 68%) between three and 12 months, psychological distress by 5% (relative reduction: 63%) and fair/poor general health by 10% (relative reduction: 48%). These decreases were greater than those observed for Māori: disability (absolute reduction: 28%; relative reduction: 57%), psychological distress (absolute reduction: 3%; relative reduction: 25%) and fair/poor health (absolute reduction: 8%; relative reduction: 31%).

Further research is required to understand why the prevalence of poor outcomes had not reduced as much for Māori as for non-Māori 12 months after injury. The current study found no difference between the groups with regards to injury severity, hospitalisation and trouble accessing health services, while previous analyses from POIS indicate no differences in the types of injuries sustained.22,29 Preliminary assessment also indicates that the potential for non-participation bias between the groups does not differ substantially. Future research will specifically investigate participants’ experiences of health and rehabilitation services following injury to determine the extent to which participants felt their needs were met. The 2011/12 New Zealand Health Survey, for example, found that Māori aged 15 years and over were more likely to experience an unmet need for primary healthcare in the previous year than the population as a whole (39% compared to 27%),33 a factor that could contribute to less favourable injury outcomes for Māori than for non-Māori. It may also be that Māori tend to receive less rehabilitation support than non-Māori.

The higher prevalence of certain adverse outcomes for Māori at 12 months post-injury may be underlying a greater risk of reporting fair/poor health at this time point compared to non-Māori. However, it remains unclear – after accounting for differences in socio-demographic factors, pre-injury health and injury-related characteristics – why Māori are at higher risk of disability, experiencing problems with mobility and usual activities, and psychological distress than non-Māori. As suggested above, this could be a result of differences in how well health and rehabilitation services are meeting the needs of Māori compared to non-Māori following injury. The impact of post-injury events (e.g., major life event, subsequent injury and/or illness) on these outcomes will also be explored.

To the best of our knowledge, this paper is the first to examine the risk of a range of injury outcomes among Māori compared to non-Māori who sustained an array of injuries that differed in anatomical severity. Our findings indicate that policymakers, along with health and rehabilitation service providers, need to focus particularly on the physical and psychological well-being of Māori post-injury and ensure Māori are aware of their financial entitlements and receive adequate financial support while injured. Additional research is necessary to identify, and explore in more detail, reasons for the increased risk of these injury outcomes among Māori compared to non-Māori, providing information that will inform interventions to improve post-injury outcomes for Māori.

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