

Equity of Māori access to the orthopaedic rehabilitation service of the Bay of Plenty: a cross-sectional survey

Lachlan Cate, Nigel Giles, Bert van der Werf

ABSTRACT

AIMS: Examine the access to the Bay of Plenty rehabilitation service for Indigenous Māori patients undergoing total knee arthroplasty (TKA). Identify structural aspects of the rehabilitation service which promote or restrict access for Māori.

METHODS: All patients who underwent TKA in publicly funded Bay of Plenty hospitals in 2021 were retrospectively surveyed. Participants were asked to self-report demographic information and to complete a structured record of the duration, type, and location of their pre and post-operative rehabilitation.

RESULTS: Māori patients accessed more rehabilitation (mean = 9.75 total hours) than non-Māori patients (mean = 8.34 total hours). This was in large part driven by a significant home-based component of their rehabilitation (42.9% of Māori respondents received at least some of their rehabilitation at home, compared to 16.4% of non-Māori).

CONCLUSIONS: Once engaged with the orthopaedic service and having undergone TKA, rehabilitation access for Māori is comparable to if not greater than that of non-Māori. This is in large part driven by home-based rehabilitation. Practical facilitators which negate transport and financial barriers are an effective method of promoting access to health services for Māori.

Rehabilitation after total knee arthroplasty (TKA) has manifold benefits. It improves knee range of motion, minimises pain, and betters functional mobility over the short term.^{1,2} The burgeoning emphasis on the interdependence of structured, health professional-led rehabilitation and positive functional TKA outcome is thus unsurprising.^{3,4} In spite of this emphasis, there remain considerable disparities in rehabilitation protocols locally and abroad.^{5,6,7} It has been suggested internationally that access to rehabilitation is unequal between ethnic groups, although the small number of studies which examine this remain incongruent.^{8,1}

To date there has been one Aotearoa New Zealand study into the extent of rehabilitation access after total joint arthroplasty.⁹ Notably, the study elucidated a trend toward poorer rehabilitation access in rural areas. It was proposed that the predominance of hospital outpatient clinic as a rehabilitation setting established geographic and socio-economic barriers to access. The authors thus hypothesised that a diversification of rehabilitation setting and increased opportunities for home and community-based rehabilitation would promote access for minority groups. Conclusions

regarding any difference in rehabilitation access between Māori and non-Māori were not drawn from this sample in which the Māori population was greatly underrepresented compared to population and localised orthopaedic registry data.¹⁰

In 2013, it was documented in a local piece of literature that in the Bay of Plenty of Aotearoa, Māori experience worse arthroplasty outcomes than non-Māori.¹⁰ The aforementioned groundbreaking 2013 study pointed to poorer functional gains after surgical intervention in Māori compared to non-Māori. Rehabilitation after TKA has remained non-protocolised in the Bay of Plenty since this research. Although there otherwise remains a paucity of data pertaining to Māori outcomes after arthroplasty, the need to identify and rectify the influences on any ongoing disparity is pressing.

More broadly, Māori remain alienated from an array of health services in Aotearoa and continue to have worse health outcomes overall.^{11,12} This is a foreseeable consequence of longstanding structural and individualised racism. As the health landscape in Aotearoa continues to rapidly evolve, emerging discourse centres on facilitators to

healthcare access for Māori.^{13,14} A recent literature review proposed five themes that encompassed potential facilitators for Māori accessing health services: practical facilitators, whakawhanaungatanga, whānau, manaakitanga, and cultural safety.¹³ Subsequently, there is active interest in evidencing factors which improve Māori access to continuing care, both within and beyond the orthopaedic realm.

In the Bay of Plenty, rehabilitation regimes after TKA are influenced by surgeons, patients, and rehabilitation providers. They are thus individualised for each patient. This service, being individual as opposed to guideline driven, therefore provides a unique opportunity to assess structural influences on care.

This present study aims firstly to identify disparities between Māori and non-Māori in rehabilitation access after TKA that may be contributing to poor functional gains after surgery. Secondly, it aims to detail the extent to which the structure of rehabilitation service provision affects access for Māori.

Methods

Study design and recruitment strategy

Before conducting research activities, we consulted with the local Māori health agency Te Pare ō Toi to assess how our project could best assist with their ongoing research efforts. A formal protocol was then developed which was endorsed by Manukura – Executive Director Toi Ora on behalf of the 17 iwi of Mai i Ngā Kuri a Whāre i ki Tihirau/Bay of Plenty District Health Board (2902 26072022).

Participants were recruited from local Bay of Plenty surgical databases. All patients undergoing primary elective TKA in the publicly funded Tauranga and Whakatāne Hospitals during 2021 were deemed eligible.

Over a period from December 2021 to January 2022, all eligible patients were given an invitation to complete an anonymous cross-sectional questionnaire regarding the rehabilitation they accessed before and after primary TKA. Questionnaires were available for completion either in person on attendance at outpatient surgical clinic follow-up, by funded return mail, or online, as per the preference of each participant. Return of the survey constituted informed consent for participation in the study. Multiple methods of survey return were offered in order to maximise uptake. Patients who did not return the survey were not followed-up with due

to the anonymous nature of the survey.

Ethnicity was self-reported using a prioritised reporting system in accordance with Manatū Hauora – Ministry of Health guidelines in place at the time of the survey. Other demographic indicators including age and highest level of qualification were collected concomitantly to assess the breadth of the sample. Respondents were asked to complete a structured report concerning the timing of pre- and post-operative rehabilitation. Participants were also asked to report whether this rehabilitation took place in the hospital, their home, or other centres e.g., community practices. Timing and location of rehabilitation was determined by a combination of patient preference and availability of local services. Information regarding rehabilitation access was collected based on patient recall as it is not centrally collected elsewhere.

Statistical analyses

Logarithmically transformed values for “average hours of rehabilitation” were analysed with a linear model with the explanatory variables’ ethnicity, location and type of rehabilitation. The logarithmic transformation was used to meet the analysis’ requirements, homogeneity of variances and normality of the residuals. The full model contains all two-way interactions. The marginal estimates are calculated using the parameter estimates and their (co) variances derived from the model. Marginal means, in the case of the location and ethnicity table, a model with equal weights for each level of type. That way, the differences are shown correctly. Only the data were used where there was a non-missing value for “average hours of rehabilitation”.

All calculations were done with R version 3.¹⁵ The lme4 package was used to calculate the regressions. The assumptions for the analysis were checked with the package DHARMA.

Results

In total there were 145 eligible patients who underwent TKA in a public hospital in the Bay of Plenty in 2021. Seventy-five eligible patients completed and returned the questionnaires (a 51.7% response rate). Sixty-six patients returned the survey via mail, five responded in clinic and four submitted the online survey.

This sample comprised 18.7% Māori and 81.3% non-Māori. This is comparable to the arthroplasty demographic in the Bay of Plenty, which has

previously been reported as 13.8% Māori.¹⁰ (For reference, the Bay of Plenty population is estimated 29.1% Māori and 70.9% non-Māori, as per 2018 national Census data).¹⁶ Forty patients underwent TKA at Tauranga Hospital and 35 at Whakatāne Hospital. The median age of Māori respondents was 63 and that of non-Māori was 74.

On average, Māori (9.75 hours) received more rehabilitation after TKA compared with non-Māori (8.34 hours). Māori were also more likely to have a home component to their rehabilitation than non-Māori (42.9% of Māori, 16.4% of non-Māori). Māori accessed a greater average amount of rehabilitation when their regime included a home component (10.33 hours) than when it did not (8.86 hours).

There was minimal discrepancy in access to rehabilitation between patients who underwent surgery at Tauranga Hospital (8.42 hours per patient) and Whakatāne Hospital (8.88 hours per patient).

On sub-analysis of ethnicity and location of rehabilitation, Māori had significantly more average rehabilitation time than non-Māori (p-value 0.002) when receiving treatment exclusively in their own home. Conversely, non-Māori received significantly more rehabilitation

when rehabilitation was carried out only in hospital, as opposed to exclusively in their own home (p-value 0.0001).

Discussion

These new data point to a comparable provision of knee rehabilitation between Māori and non-Māori in the Bay of Plenty. This is incongruous with existing local literature, which highlights outcome inequality for Māori after TKA.¹⁰ It is possible that advances have been made toward equality of outcome as a whole, or that Māori require an even greater provision of rehabilitation to achieve equality of outcome. It is also, of course, likely that drivers of surgical outcome other than rehabilitation, including timeliness of first surgical intervention, are of considerable influence. Of note, the initial research highlighting worse post-operative function for Māori at 1 and 5 years after surgical intervention also evidenced that Māori have worse pre-operative function. It is known that this corresponds to worse functional gain after surgery.¹⁷ Hence it may be that barriers to first access are more profound than those to rehabilitation.

Our data are also incongruous with the overwhelming ethnic disparity in healthcare access in

Table 1: Average total rehabilitation time after TKA in the Bay of Plenty as a function of patient ethnicity, hospital of arthroplasty and patient educational attainment.

	Māori		Non-Māori		Total	
	Number of participants	Average hours of total rehab	Number of participants	Average hours of total rehab	Number of participants	Average hours of total rehab
Tauranga Hospital	4	10.00	36	8.24	40	8.42
Whakatāne Hospital	10	9.33	25	8.70	35	8.88
Tertiary qualification	5	6.40	27	9.56	32	9.06
Secondary qualification	7	13.00	28	6.78	35	8.02
No formal qualification	2	7.00	6	8.00	8	7.75
Total	14	9.75	61	8.34	75	8.61

Table 2: Logarithmically transformed average hours of patient rehabilitation after TKA as a function of patient ethnicity and setting of rehabilitation. Statistically significant differences in rehabilitation time between combined groups of ethnicity and rehabilitation setting are highlighted.

Ethnicity	Location of rehabilitation	Hours of rehabilitation per patient			Logarithmic conversion of rehabilitation time per patient				p values from logarithmic conversions							
		Median	Lower 95	Upper 95	Estimate	Variance	Lower 95	Upper 95	Māori				Non-Māori			
									Home	Hospital	Hospital & home	Other	Home	Hospital	Hospital & home	Other
Māori	Home	25.49	6.14	105.83	3.24	0.50	1.81	4.66	1.000	0.365	0.113	0.490	0.002	0.137	0.083	0.037
	Hospital	14.05	5.07	38.90	2.64	0.26	1.62	3.66	0.365	1.000	0.341	0.253	0.005	0.346	0.230	0.086
	Hospital & home	7.51	2.27	24.82	2.02	0.36	0.82	3.21	0.113	0.341	1.000	0.100	0.079	0.897	0.670	0.364
	Other	41.04	5.64	298.47	3.71	0.98	1.73	5.70	0.490	0.253	0.100	1.000	0.011	0.117	0.076	0.002
Non-Māori	Home	2.07	0.88	4.87	0.73	0.18	-0.13	1.58	0.002	0.005	0.079	0.011	1.000	0.0001	0.095	0.490
	Hospital	8.18	4.63	14.46	2.10	0.08	1.53	2.67	0.137	0.346	0.897	0.117	0.0001	1.000	0.391	0.148
	Hospital & home	5.29	1.70	16.49	1.67	0.32	0.53	2.80	0.083	0.230	0.670	0.076	0.095	0.391	1.000	0.554
	Other	3.33	0.87	12.77	1.20	0.45	-0.14	2.55	0.037	0.086	0.364	0.002	0.490	0.148	0.554	1.000

Aotearoa that results from systemic inequity.^{12,18} Cost, location, and opening times of services greatly impact access and impose a relatively large barrier on Māori.^{19,20} We theorise that the comparable access in the context of this study corresponds, at least in part, to the very high rate at which Māori receive rehabilitation in their own home (42.9% compared to 16.4% among non-Māori). The logarithmically transformed data show that rehabilitation being exclusively carried out in the home has a significantly positive effect for Māori. Hence, we opine that negating location barriers, actively involving whānau, and facilitating autonomy for Māori regarding the structure of their healthcare has an overwhelmingly positive impact on access.

This research adds to the emerging picture regarding the age at which Māori undergo TKA. The median age of Māori respondents in this study was 11 years younger than that of their non-Māori counterparts. This is in line with a 2013 study which evidenced that Māori undergoing total hip and knee arthroplasty in the Bay of Plenty were on average approximately 7 years younger than non-Māori.¹⁰ We hypothesise this ongoing difference evidences a high burden of disease among Māori. This would add further emphasis to the already highlighted importance of equitable care.

On the whole, these data validate continued work promoting equity for Māori, suggesting that emerging strategies and zeitgeists are of great benefit. They evidence that when structurally acceptable access to care is provided for Māori, engagement and continued participation is strong. We note that emerging Indigenous literature points toward a need for cultural critical consciousness, with the obligation for health professionals extending from critique of one's own practice to critique of wider structures as well.^{21,22} It thus is paramount that moving forward we ensure that both our systems and ourselves give all patients a fair, timely pathway to wellbeing.

In addition to equal access for Māori, we found no discrepancy in access between the Western Bay of Plenty population serviced by Tauranga Hospital and the Eastern Bay of Plenty population serviced by Whakatāne Hospital. Of note, however, existing Aotearoa data elucidated a rural deprivation of access to rehabilitation after TKA.⁹ We suggest that home-based rehabilitation is thus likely a strong driver toward equal rehabilitation access for rural patients also. This would be in line with international literature in the realms of cardiac and stroke rehabilitation.^{23,24,25} Said literature demonstrates that home rehabilitation is equally if not more effective and much more

accessible for patients compared to centre-based programmes. The practical facilitation of in-home rehabilitation evidently promotes access for rural communities and is transferable across many realms of the wider health service.

Limitations

This population sample is limited in size, response and generalisability. The geographic localisation of this study controls many factors which would confound a more widespread investigation, but limits the number of patients who are eligible to participate and reduces generalisability. The response rate for this survey risks non-representation.

We note, importantly, that engagement and access go hand-in-hand; it is plausible that non-respondents are also likely to be less engaged with ongoing rehabilitation. It would be prudent for future investigators to recruit proactively during the TKA process to promote response. The surgical process requires ongoing engagement for planning, execution and follow-up, which could be interlinked with research. In addition, this study presents only quantitative data, and the written survey method does not allow whakawhanaungatanga between researchers and patients. We intend this data to be partnered with emerging qualitative data obtained in hui with patients in order to form a holistic picture.

This study was designed to investigate access to rehabilitation services and how this may affect outcomes after TKA, but not to directly assess TKA outcome. Ongoing evaluation of outcomes for Māori after arthroplasty is required to determine the extent to which practical facilitators are driving equal outcomes. We note that whakawhanaungatanga, whānau, manaakitanga, and cultural safety have also been identified as facilitatory factors that are imperative to ensuring health services are accessible and effective for Māori. Validating the effectiveness of interventions in these realms is of ongoing importance.

Conclusion

Access to rehabilitation for Māori undergoing TKA in the Bay of Plenty region is comparable to that of non-Māori. This is in large part driven by home-based rehabilitation. The advantage of an individualised service in which patients and health practitioners can tailor their care to their perspectives and locations is apparent. Moving forward, continued emphasis on equitable holistic care is highly prudent.

COMPETING INTERESTS

Nil.

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