Determinants of exclusive breastfeeding for wāhine Māori

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ABSTRACT

AIM: Breastfeeding is a fundamental aspect of tikanga Māori (Māori cultural traditions/practices) requiring protection and promotion. This study identifies determinants of exclusive breastfeeding in wāhine Māori (Māori women).

METHODS: Wāhine Māori enrolled in the *Growing Up in New Zealand* child cohort study participated (n=1060). Exclusive breastfeeding duration was self-reported. Hierarchical regression analyses were framed by a model of Māori health and wellbeing.

RESULTS: Most wāhine Māori initiated breastfeeding (96%), with 12% exclusively breastfeeding for six-or-more months. Wāhine Māori had increased odds of exclusively breastfeeding for six-or-more months if they: thought it best to breastfeed for >6 months (adjusted odds ratio (aOR)=1.94, 95% confidence interval (CI)=1.05-3.78); thought returning to work would not (aOR=2.17, 95% CI=1.17–4.24) or may (aOR=4.25, 95% CI=1.86–9.85) limit breastfeeding; were experienced mothers (aOR=2.55, 95% CI=1.35–5.06); or were undecided about vaccination (aOR=3.16, 95% CI=1.55–6.39). Exclusive breastfeeding for six-or-more months was less likely if mothers experienced depression during pregnancy (aOR=0.47, 95% CI=0.20–0.99) or viewed cultural traditions/practices as "fairly important" (aOR=0.53, 95% CI=0.27–0.99), compared to "very important".

CONCLUSION: Determinants of exclusive breastfeeding in wāhine Māori are knowledge of breastfeeding recommendations, return to work, motherhood experience, connection to Te Ao Māori (Māori worldview) and tikanga Māori, antenatal depression and vaccine indecision. Interventions delivered within a Kaupapa Māori framework will best address breastfeeding inequities in Aotearoa New Zealand.

Māori mothers have the right to breastfeed their infants. This is recognised in the United Nations (UN) Convention on the Rights of the Child,[1] and the right to traditional practices in the UN Declaration on the Rights of Indigenous Peoples[2] and the Treaty of Waitangi.[3] For Māori, tamariki (children) are taonga (treasured), and breastfeeding is tika tūāpapa (a fundamental right). Within Te Ao Māori (Māori worldview), breastfeeding is a fundamental aspect of tikanga Māori (Māori cultural traditions/practices) that needs to be protected and promoted.[4] Breastfeeding for wāhine Māori (Māori women) is a tikanga informed by mātauranga Māori (Māori knowledge) accumulated from generations of whakapapa (Māori genealogy).

Exclusive breastfeeding is beneficial short-term and long-term to both infant and mother.[5] Exclusive breastfeeding for six versus four months protects against gastroenteritis and promotes maternal amenorrhea and weight loss.[6] Breastfeeding also has economic and environmental benefits.[7] The New Zealand Ministry of Health[8] and the World Health Organization (WHO),[9] recommend exclusive breastfeeding for six months. The 2025 Global Nutritional Target is exclusive breastfeeding for 50% of children under six-months-old.[10] Despite this, exclusive breastfeeding rates in high-income countries remain low.[5] In Aotearoa New Zealand, while breastfeeding initiation is almost universal (97%), only 16% of children are exclusively breastfed to age six months.[11]

Determinants of breastfeeding initiation relate to immediate medical and social supports.[12] However, this is not the case for exclusive breastfeeding duration, with various economic, political, historic and cultural factors; social and health professional supports; and individual biopsychosocial factors involved.[5,12] Different factors affect different peoples and hence there are strong recommendations for country- and culture-specific research to inform practice and policy.[6]

One New Zealand qualitative study identified five ways to improve exclusive breastfeeding for Māori: (i) smoking cessation during pregnancy; (ii) breastfeeding guidelines aligned with Māori

beliefs; (iii) guidelines emphasising breastfeeding benefits to mother and child; (iv) education on fertility, bed-sharing and tobacco in regard to breastfeeding; and (v) healthcare provider recognition of the social and cultural circumstances for Māori mothers and whānau (family).[4] In another study with predominantly Māori participants, increased breastfeeding duration was associated with partner and whānau support at one month post-partum, intention to breastfeed and being an older mother.[13] Decreased breastfeeding duration was associated with pacifier use, cigarette smoking, alcohol use, and household deprivation.[13]

To address the limited contemporary data on exclusive breastfeeding for Māori women, this study aimed to identify independent determinants of exclusive breastfeeding for six-or-more months for Māori women enrolled in *Growing Up in New Zealand (GUiNZ)*.[14] In this study, analyses followed a contemporary Māori model of health and wellbeing developed by Māori researchers specifically for the *GUiNZ* Māori cohort. This research will inform future interventions to protect, promote and support Māori in exclusive breastfeeding.

Methods

Study design and setting

We completed this study within New Zealand's contemporary child cohort study, *Growing Up in New Zealand* (*GUiNZ*, www.growingup.co.nz). *GUiNZ* study design and cohort profile are described elsewhere.[14] Approximately 30% of the Māori population of New Zealand reside in the study region, with 9% of Māori women who gave birth in New Zealand during the recruitment period enrolled.[15] The New Zealand Ministry of Health Regional Ethics Committee granted ethical approval and all study participants provided written informed consent.

Study population and sample

GUiNZ recruited 6,822 pregnant women and their 6,853 children.[14] At enrolment, women identified all ethnic groups to which they belonged. This study limited the sample to the 1,060/6,822 (16%) pregnant women who self-identified Māori as one of their stated ethnicities, had singleton births and provided information on exclusive breastfeeding duration at nine-month interview (Figure 1).

Data collection

GUiNZ collected information in six interconnected domains: health and wellbeing; psychosocial and cognitive development; education; family and whānau; culture and identity; and social context, neighbourhood and environment, with a Māori theme running across all domains.[14] The Māori theme and kaitiaki (guardianship) advisory group allow for the examination of factors contributing to the wellbeing of tamariki Māori and their whānau over time.[14]

Data were collected antenatally; perinatally; when the infant was six weeks old and nine months old. Mothers were interviewed face-to-face or via telephone as described.[14] Linkage to birth records occurred via each child's National Health Index (NHI) number, a unique identifier assigned to each person in New Zealand at their first contact with the New Zealand healthcare system.

Exclusive breastfeeding duration

The WHO define exclusive breastfeeding as receiving only breastmilk (including expressed milk) and not any water, milk formula, other liquids, or solid food; but with medicines, vitamins and minerals allowed.[10] Maternal recall overestimates exclusive breastfeeding duration. Therefore, we used maternal recall adjusted for age of first food introduction to describe exclusive breastfeeding duration.[11]

Te Anga o ngā Horopaki Māori: a conceptual framework for considering Māori lived realities

This study framed analyses within a conceptual model of health and wellbeing for contemporary Māori lived realities (circumstances and environments), developed specifically for Māori participants of *GUiNZ.* Te Anga o ngā Horopaki Māori draws on Sir Mason Durie's Te Whare Tapa Whā,[16] and other Māori models of health and wellbeing (Meihana,[17] Te Wheke[18] and Ngā Pou Mana[19]) to inform its design and represent contemporary Māori perspectives of health and wellbeing. Te Whare Tapa Whā conceptualises health holistically as the four sides of a whare (house): taha wairua (spiritual), taha hinengaro (thoughts and feelings), taha tinana (physical) and taha whānau (family and community relationships).[16] In collaboration with Te Puni Kōkiri, the framework was aligned with current Māori policies and health strategies.[20] Te Anga o ngā Horopaki Māori comprises six interconnected domains: Mahi Arataki (Policy and strategy); Te Ao Māori (Cultural identity); Whai rawa (Economic resources and capability); Taiao a hapori (Environment and community); Whanaungatanga (Family and home); and Hauora (Health and wellbeing) (Figure 2; see

Figure 1: Flow diagram describing participant enrolment and study design.

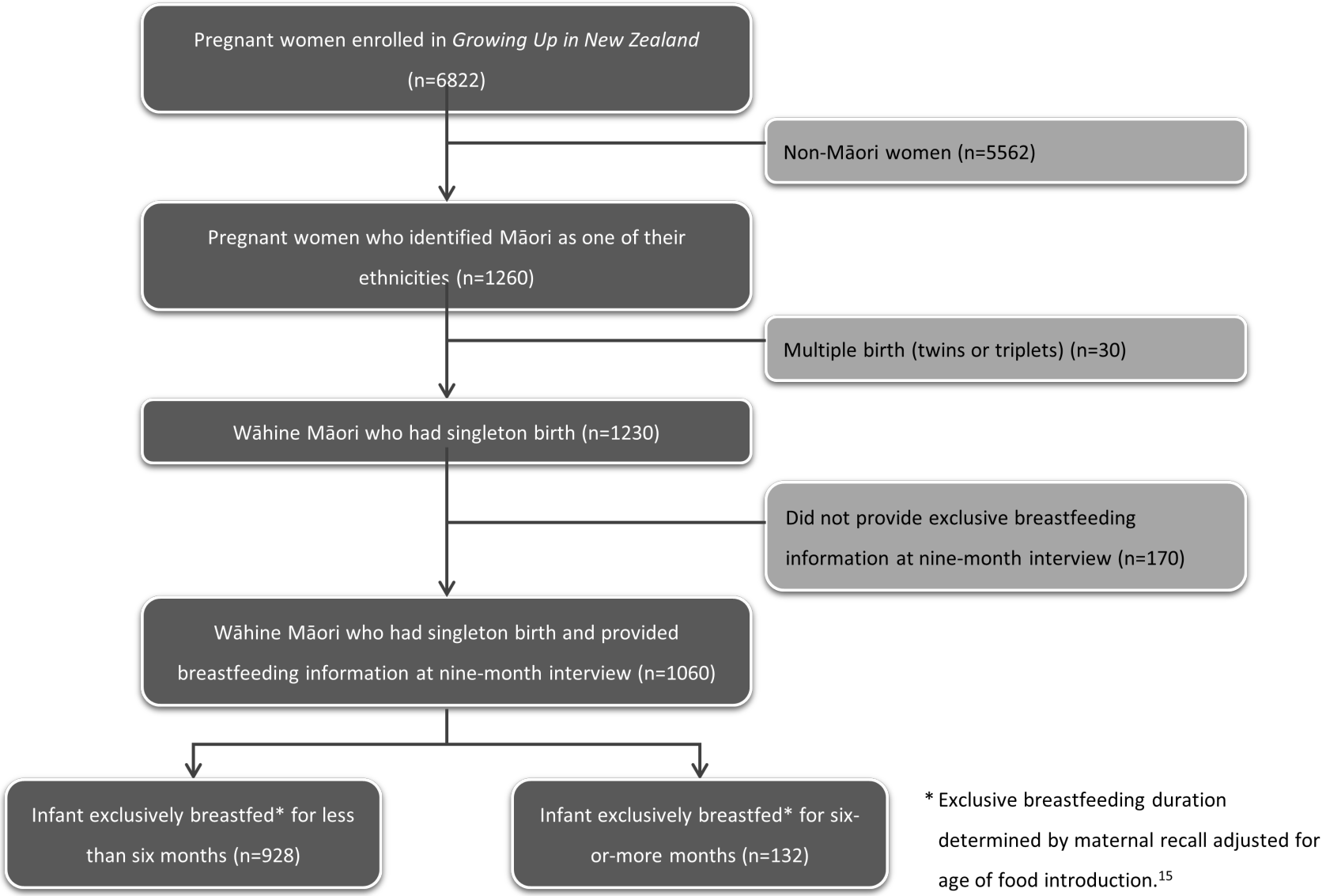
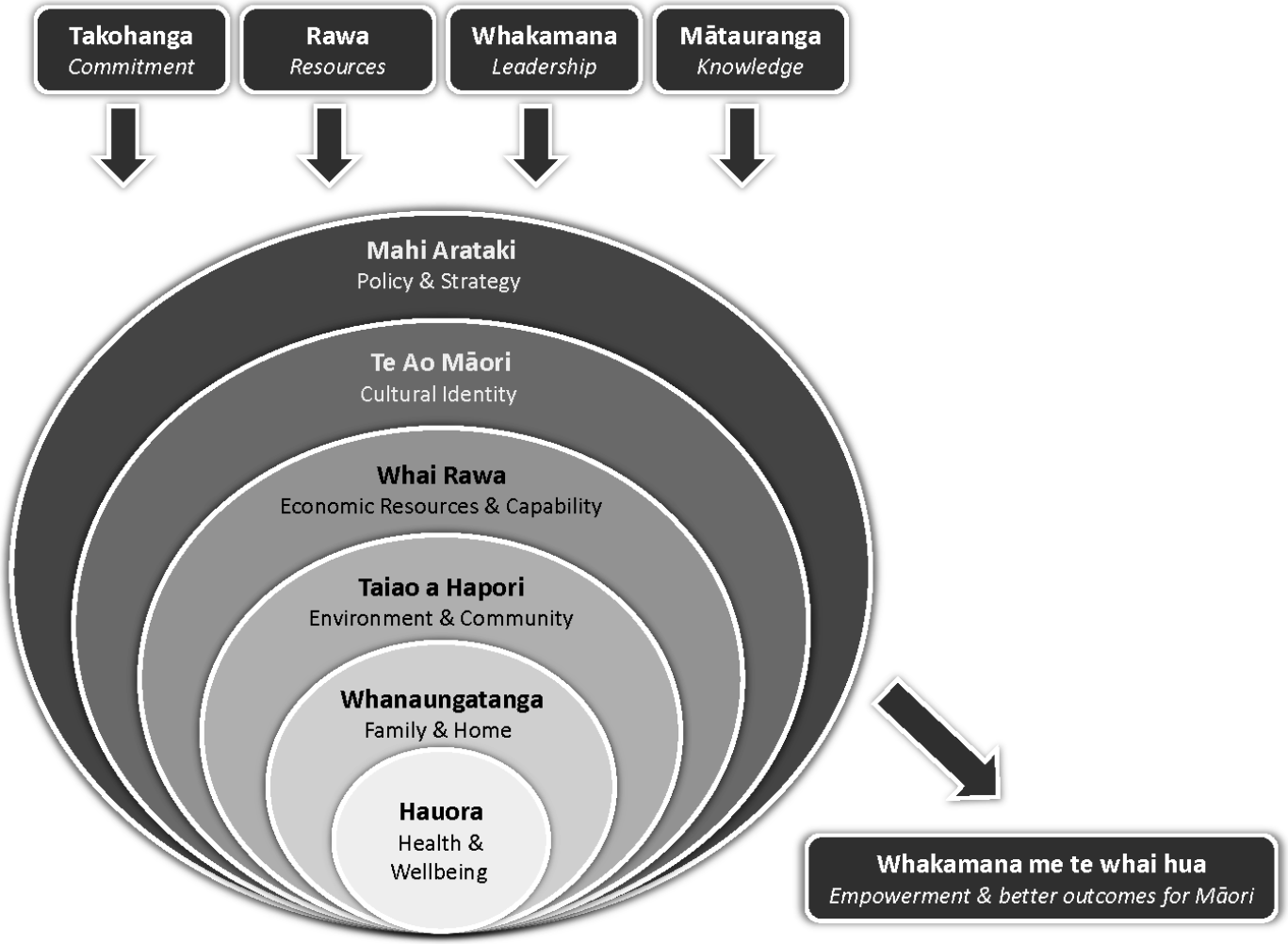


Figure 2: Te Anga o ngā Horopaki Māori: A conceptual framework for considering Māori lived realities. Comprises six interconnected domains: Mahi Arataki (Policy and strategy); Te Ao Māori (Cultural identity); Whai Rawa (Economic resources and capability); Taiao a Hapori (Environment and community); Whanaungatanga (Family and home); and Hauora (Health and wellbeing).



Appendix 1 for a description domains and associated assessment tools and measures). Te Anga o ngā Horopaki Māori allowed us to consider a range of factors related to exclusive breastfeeding within a context aligned with Māori perspectives of health and wellbeing.

Study power and sample size

GUiNZ recruited 6,822 pregnant women and their 6,853 children.[14] This study size provided adequate statistical power to undertake complex analyses of interwoven developmental trajectories over time, in the whole cohort and within subgroups of children identifying as Māori, Pacific and Asian ethnicity.[14] Study power calculations for *GUiNZ* were based upon the study being specifically designed to have adequate explanatory power for the main ethnic groups in New Zealand, with the assumption then that study power for the whole cohort would be adequate. For example, a sample size of 1,000, which was exceeded by each of the four main New Zealand ethnic groups at enrolment (NZ European n=4,237; Māori n=1,246; Pacific n=1,151; Asian n=1,074)[21] has 80% power at the 0.05 level of significance to detect a relative risk of 2.1 for an outcome which is found in 10% of the unexposed population if 10% of the population is exposed, and 80% power at the 0.05 level of significance to detect a difference of approximately 0.4 standard deviations between the exposed and unexposed group, if 5% of the population is exposed.[22] In this study, of the 1,060 wāhine Māori who had singleton births and provided information on exclusive breastfeeding duration at nine-month interview, we had sufficient power to investigate exposures affecting at least 10% of the cohort with an associated increased odds in outcome that is generally considered both statistically and clinically significant.

Data analyses

Te Anga o ngā Horopaki Māori and literature review identified variables potentially associated with exclusive breastfeeding duration. Associations with exclusive breastfeeding duration were determined using the Chi-square test for proportions, and the t-test or Wilcoxon Rank-Sum test for normally and non-normally distributed continuous variables, respectively.

Variables were included in the multivariate model when $P<0.20$, or if they were significant in published studies, or were important in describing each domain within Te Anga o nga Horopaki Māori. We constructed the multivariate model hierarchically: beginning with the domain most distal to the mother and infant (Mahi Arataki) and adding individual variables stepwise towards the most proximal (Hauora) domain (Figure 1). Variables were retained for subsequent analysis steps if $P<0.20$. If no variables in a domain had $P<0.20$ then the variable within each domain with the lowest P value was retained for the remainder

Table 1: Breastfeeding initiation and duration of exclusive breastfeeding in all women identifying as Māori.

Mother's ethnicity*	Total	Breastfeeding initiation			Exclusive breastfeeding duration					
	N (column %) N=6273	Yes n (row%) n=6082	No n (row%) n=191	*P*-value†	≥6 months n (row%) n=1000	<6 months n (row%) n=5032	*P*-value†	mean ± SD months	median (IQR) months	*P*-value‡
Māori	1,117 (17)	1,068 (96)	49 (4)	**0.004**	132 (12)	928 (88)	**<0.001**	3.1 ± 2.0	3 (2–4)	**<0.001**
Non-Māori	5,156 (80)	5,014 (97)	142 (3)		868 (17)	4,104 (83)		3.4 ± 2.1	4 (2–5)	

*Non-Māori includes all women who did not identify Māori as one of their ethnicities.

† Chi-squared test.

‡Wilcoxon Rank-Sum Test.

IQR – interquartile range; SD – standard deviation.

of the analyses. Independent associations with exclusive breastfeeding duration of six-or-more months were determined using multivariable logistic regression, and described using adjusted odds ratios (aOR) and 95% confidence intervals (CI). SAS 9.4 (Cary, NC, USA) was used for all analyses.

Results

Study population and sample

Wāhine Māori comprised 1,260/6,822 (18%) of the *GUiNZ* cohort (Figure 1). This study was limited to the 1060/6822 (16%) wāhine Māori who had singleton births and provided information about breastfeeding when their infant was nine months old.

Breastfeeding in wāhine Māori

Overall, 6,083/6,274 (97%) pregnant women reported breastfeeding their child. Almost all wāhine Māori initiated breastfeeding (1,068/1,117; 96%), as did non-Māori women (5,014/5,156; 97%) although these differences were statistically significant (P=0.004) (Table 1). However, 132/1,060 (12%) wāhine Māori and 868/4,972 (17%) non-Māori breastfeed for six-or-more months (P<0.001) (Table 1). Median (interquartile range [IQR]) exclusive breastfeeding duration was 3 (2–4) months for wāhine Māori and 4 (2–5) months for non-Māori (P<0.001).

Identification of variables for hierarchical logistic regression modelling

Preliminary analyses within Te Anga o ngā Horopaki Māori revealed 32 variables potentially associated with exclusive breastfeeding in wāhine Māori. Each variable was situated within one of the six interconnected Te Anga o ngā Horopaki Māori domains: Mahi Arataki (Appendix 2); Te Ao Māori (Appendix 3); Whai Rawa (Appendix 4); Taiao a Hapori (Appendix 5); Whanaungatanga (Appendix 6); and Hauora (Appendix 7).

Characteristics associated with exclusive breastfeeding in wāhine Māori

Hierarchal logistic regression analyses consisted of sequential steps within Te Anga o ngā Horopaki Māori as described (Methods; Appendix 8). The final model included 17 variables, with at least one variable from each Te Anga o ngā Horopaki Māori domain (Table 2). Based on these analyses, six variables in four Te Anga o ngā Horopaki Māori domains were independently associated with exclusive breastfeeding for six-or-more months.

Within Mahi Arataki, wāhine Māori were more likely to exclusively breastfeed for six-or-more months, if they had thought, antenatally, that it was best to breastfeed for longer than six months (aOR=1.94, 95% CI 1.05–3.78) versus up to six months. Wāhine Māori who thought their breastfeeding duration would not be limited (aOR=2.17, 95% CI 1.17–4.24) or may be limited (aOR=4.25, 95% CI 1.86–9.85) by their return to work were more likely to exclusively breastfeed for six-or-more months, compared with mothers who thought their breastfeeding duration would be limited by their return to work.

Within Te Ao Māori, wāhine Māori who rated maintaining cultural traditions and practices as "fairly important" (aOR=0.53, 95% CI 0.27–0.99) were less likely to exclusively breastfeed their infant for six-or-more months, compared with women who rated these as "very important".

Within whanaungatanga, experienced Māori mothers (aOR=2.55, 95% CI 1.35–5.06), compared to first-time mothers, were more likely to exclusively breastfeed for six-or-more months.

Within Hauora, mothers who experienced depression during pregnancy (aOR=0.47, 95% CI 0.20–0.99) were less likely to exclusively breastfeed their infant for six-or-more months than those without depression symptoms. Mothers who remained undecided about their child's infant immunisations (aOR=3.16, 95% CI 1.55–6.39) were more likely to exclusively breastfeed for six ormore months than mothers who had decided about immunisation.

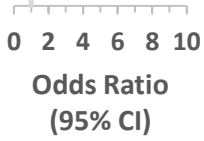
Discussion

In this contemporary cohort of New Zealand mothers, breastfeeding initiation was almost universal with 96% of wāhine Māori and 97% of non-Māori women initiating breastfeeding. Yet exclusive breastfeeding rates remain poor, with 17% of non-Māori and 12% of wāhine Māori exclusively breastfeeding their infants for the recommended six months. Therefore, significant improvement in exclusive breastfeeding rates is needed for New Zealand to achieve the Global Nutrition Target for 2025 of 50% of infants under six months old exclusively breastfeeding.[10]

The New Zealand Ministry of Health and WHO recommend exclusive breastfeeding for six months followed by continued breastfeeding with complementary foods up to two years

Table 2: Multivariate logistic regression analysis of factors associated with duration of exclusive breastfeeding for women of self-identified Māori ethnicity

Domain Variable(s) [‡]	Duration of exclusive breastfeeding ≥ 6 months n=132	 < 6 months n=928	Unadjusted Odds Ratio (95% CI)	 Forest Plot	Adjusted multivariate[†] Odds Ratio (95% CI)	 Forest Plot
Mahi Arataki (Policy and strategy)						
How long mother thinks is best to breastfeed their baby			***		*	
≤ 6 months	18 (6)	271 (94)	1.00		1.00	
> 6 months	96 (15)	550 (85)	**2.63 (1.59-4.57)**		**1.94 (1.05-3.78)**	
Mother's breastfeeding duration will be limited by return to work			**		**	
Yes	19 (7)	243 (93)	1.00		1.00	
No	77 (13)	511 (87)	**1.93 (1.16-3.34)**		**2.17 (1.17-4.24)**	
Maybe	19 (20)	76 (80)	**3.20 (1.60-6.38)**		**4.25 (1.86-9.85)**	
Te Ao Māori (Cultural identity)						
Importance of maintaining cultural traditions and practices			N/S		N/S	
Very important	65 (14)	395 (86)	1.00		1.00	
Fairly important	27 (9)	266 (91)	**0.62 (0.38-0.98)**		**0.53 (0.27-0.99)**	
Somewhat important	22 (11)	171 (89)	0.78 (0.46-1.29)		1.00 (0.51-1.91)	
Not very / Not at all important	17 (16)	87 (84)	1.19 (0.65-2.09)		1.20 (0.55-2.51)	
Have you ever felt you have been treated unfairly when renting or buying a house because of you ethnicity?			N/S			
No	118 (13)	764 (87)	1.00		N/A	
Yes	11 (9)	111 (91)	0.64 (0.32-1.18)		N/A	
Whai Rawa (Economic resources and capability)						
Education			*		N/S	
No secondary education	11 (6)	169 (94)	**0.41 (0.20-0.76)**		0.67 (0.25-1.55)	
Secondary education	42 (14)	260 (86)	1.02 (0.67-1.51)		1.16 (0.67-1.97)	
Tertiary education	79 (14)	497 (86)	1.00		1.00	



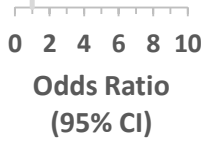


Table 2 (continued): Multivariate logistic regression analysis of factors associated with duration of exclusive breastfeeding for women of self-identified Māori ethnicity

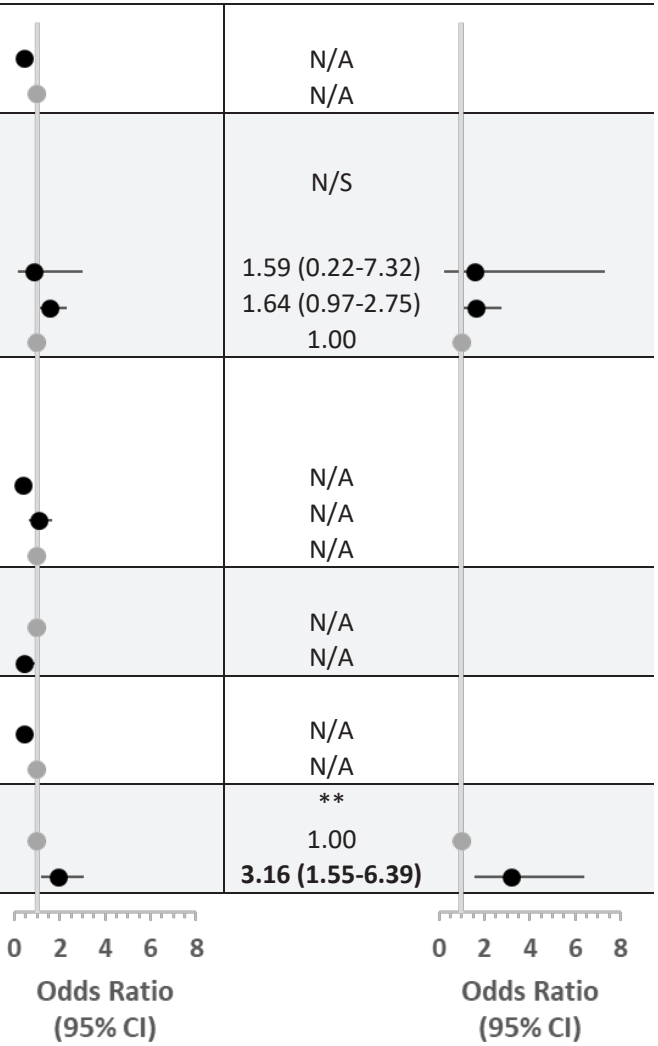
Where child born					**		N/S	
Larger hospital	80	(12)	610	(88)	1.00		1.00	
Smaller hospital	37	(13)	254	(87)	1.11 (0.73-1.67)		0.77 (0.44-1.32)	
Home birth	11	(30)	26	(70)	**3.23 (1.48-6.62)**		2.53 (0.96-6.24)	
Ever attended an antenatal class					*		N/S	
Yes	77	(15)	424	(85)	**1.66 (1.13-2.47)**		1.15 (0.69-1.95)	
No	46	(10)	421	(90)	1.00		1.00	
Taiao a Hapori (Environment and community)								
External support	22.5 ± 5.5		23.2 ± 5.7		0.98 (0.95-1.01)	N/S	1.00 (0.96-1.05)	N/S
Whanaungatanga (Family and home)								
Relationship status					***		N/S	
No relationship or dating	18	(10)	165	(90)	1.18 (0.65-2.09)		2.28 (0.92-5.27)	
Cohabitating	40	(8)	433	(92)	1.00		1.00	
Married	56	(18)	249	(82)	**2.44 (1.58-3.78)**		1.66 (0.97-2.86)	
Household structure					*			
Parent alone or with non-kin	10	(8)	116	(92)	**0.49 (0.23-0.93)**		N/A	
Two Parents	84	(15)	475	(85)	1.00		N/A	
Parent with extended family	38	(10)	336	(90)	**0.64 (0.42-0.96)**		N/A	
Parity					*		**	
First born	39	(10)	367	(90)	1.00		1.00	
Subsequent	93	(14)	561	(86)	**1.56 (1.06-2.34)**		**2.55 (1.35-5.06)**	
People in our family/whanau would provide for each other if there was very little to go around					N/S			
Never / Sometimes	<10	(9)	63	(91)	0.60 (0.23-1.31)		N/A	
Usually	16	(9)	172	(91)	**0.59 (0.33-0.99)**		N/A	
Always	110	(14)	693	(86)	1.00		N/A	
We can easily think of things to do together as a family group					N/S		N/S	
Never / Sometimes	15	(8)	177	(92)	**0.55 (0.29-0.96)**		0.72 (0.30-1.59)	
Usually	52	(14)	332	(86)	1.01 (0.68-1.49)		1.18 (0.70-1.97)	
Always	65	(13)	418	(87)	1.00		1.00	

Table 2 (continued): Multivariate logistic regression analysis of factors associated with duration of exclusive breastfeeding for women of self-identified Māori ethnicity

Physical conflict in last four weeks			*	N/S
No	95 (14)	596 (86)	1.00	1.00
Yes	11 (6)	160 (94)	**0.43 (0.21-0.79)**	0.68 (0.28-1.52)
Verbal conflict scale	17.6 ± 3.4	16.3 ± 4.2	**1.09 (1.03-1.16)**	** 1.03 (0.96-1.10) N/S
Family cohesion score	31.3 ± 3.7	30.6 ± 4.4	1.04 (0.99-1.09)	N/S N/A
Family support	24.7 ± 5.2	24.0 ± 5.4	1.03 (0.99-1.06)	N/S N/A
Hauora (Health and Wellbeing)				
Maternal depression during pregnancy[§]			**	N/S
Yes	105 (14)	665 (86)	**0.34 (0.17-0.64)**	**0.47 (0.20-0.99)**
No	10 (5)	185 (95)	1.00	1.00
Perceived Stress Score	12.8 ± 6.6	15.0 ± 6.9	**0.95 (0.92-0.98)**	** N/A
Planned pregnancy			N/S	
Yes	58 (15)	332 (85)	1.42 (0.98-2.05)	N/A
No	73 (11)	593 (89)	1.00	N/A
Infant Sex			N/S	
Male	60 (11)	485 (89)	1.00	N/A
Female	72 (14)	443 (86)	1.31 (0.91-1.90)	N/A
Average length of vigorous physical activity before pregnancy			N/S	
<30 min	11 (16)	57 (84)	1.00	N/A
30-60 min	48 (13)	312 (87)	0.80 (0.40-1.70)	N/A
>60 min	14 (9)	148 (91)	0.49 (0.21-1.17)	N/A
Days per week of vigorous physical activity since first 3 months of pregnancy			*	N/S
0	83 (11)	665 (89)	1.00	1.00
1 to 3	27 (18)	122 (82)	**1.77 (1.09-2.82)**	1.79 (0.98-3.21)
4 to 7	<10 (8)	61 (92)	0.66 (0.23-1.53)	1.03 (0.29-2.91)
Alcohol during pregnancy			**	N/S
Yes	36 (9)	375 (91)	**0.55 (0.36-0.82)**	0.61 (0.35-1.03)
No	96 (15)	552 (85)	1.00	1.00

Table 2 (continued): Multivariate logistic regression analysis of factors associated with duration of exclusive breastfeeding for women of self-identified Māori ethnicity.

Smoking during pregnancy						**		
Yes	18	(7)	249	(93)		**0.45 (0.26-0.74)**		N/A
No	97	(14)	601	(86)		1.00		N/A
How much of the time do you expect to be directly responsible for your baby, for example, in sole care of him/her, making babysitting arrangements, looking after him/her if they are sick?						N/S		N/S
Not much/Some of the time	<10	(9)	20	(91)		0.85 (0.13-2.99)		1.59 (0.22-7.32)
Most of the time	41	(15)	227	(85)		**1.53 (1.01-2.31)**		1.64 (0.97-2.75)
All of the time	71	(11)	603	(89)		1.00		1.00
We would like to know how you are feeling about being the parent of this baby overall, do you feel that as a parent you will be:						*		
Not very good to an average parent	<10	(5)	140	(95)		**0.38 (0.17-0.77)**		N/A
A better than average parent	28	(14)	179	(86)		1.05 (0.65-1.65)		N/A
A very good parent	79	(13)	529	(87)		1.00		N/A
Mother's intentions for infant feeding						N/S		
Breastfeeding	109	(13)	755	(87)		1.00		N/A
Breast and bottle / Bottle only / Undecided	<10	(6)	94	(94)		**0.44 (0.17-0.95)**		N/A
How long mother would like to breastfeed						***		
Up to 6 months	21	(7)	286	(93)		**0.42 (0.25-0.67)**		N/A
Longer than 6 months	94	(15)	536	(85)		1.00		N/A
Decision regarding immunisation						**		**
Decided	89	(11)	737	(89)		1.00		1.00
Undecided	26	(19)	112	(81)		**1.92 (1.17-3.07)**		**3.16 (1.55-6.39)**



† Adjusted for how long mother thinks is best to breastfeed their baby; mother's breastfeeding duration will be limited by return to work; mother's importance of maintaining cultural traditions and practices; mother's education; where child born; mother ever attended antenatal class; external support; mother's relationship status; parity; we can easily think of things to do together as a family group; physical conflict in last four weeks; verbal conflict scale; maternal depression during.pregnancy; mother's vigorous physical activity since first 3 months of pregnancy; alcohol use during pregnancy; how much of the time mother expects to be directly.responsible for baby; and mother's decision regarding immunisation.

‡See Appendices for description of instruments and associated references. § As defined by an Edinburgh Postnatal Depression Scale score ≥ 1323

CI – confidence interval; N/A – not applicable (variable removed during stepwise hierarchical logistic regression analyses); N/S – not significant; SD – standard deviation, * P<0.05; ** P<0.01; *** P<0.001

old.[8,10] When Māori mothers' breastfeeding beliefs aligned with these recommendations, they were more likely to exclusively breastfeed for six-or-more months. Mothers often decide about breastfeeding prior to or early in pregnancy,[24] and access to high quality breastfeeding information can inform their decision-making.[25] Māori mothers and grandmothers also highlight breastfeeding role models, whānau support, culturally safe healthcare, and wider community acceptance of breastfeeding, all as important for supporting breastfeeding.[25] Whānau are central to breastfeeding decision-making and support.[26] Public health policies that encourage delivery of high quality breastfeeding information to wāhine Māori and whānau in a culturally safe, accessible and effective way are important for promoting and supporting breastfeeding and whānau ora (family health and development).

Analyses within Te Anga o ngā Horopaki Māori model of health revealed six determinants of exclusive breastfeeding for Māori mothers within four model domains. Although the Whai Rawa and Taiao a Hapori domains were unrepresented, the overlapping nature of domains within Te Anga o ngā Horopaki Māori means that variables from other domains (i.e., return to work and maintaining cultural traditions/practices) intersect with these domains.

Mothers' return to work is well recognised as a determinant of exclusive breastfeeding duration,[27] and was identified as a major theme in qualitative analyses of breastfeeding barriers in wāhine Māori.[28] Paid parental leave in New Zealand increased from 13 weeks during the study period to 26 weeks in 2019.[29] The eligibility criteria have also broadened to include more casual workers. It is important to assess if this policy change has had a positive influence on Māori exclusive breastfeeding rates, and whether current policy supports Māori to access paid parental leave.

Wāhine Māori consider breastfeeding the natural, normal and Māori way to feed their pēpē (baby)[30] and a fundamental aspect of tikanga Māori.[4] Wāhine Māori in our study who rated maintaining cultural traditions and practices as "fairly important", compared with very important, were slightly less likely to exclusively breastfeed their infant for six-or-more months, although this finding was not statistically significant. The legacy of colonisation, poverty, and systemic racism limits access to Te Ao Māori to a privileged few. Pākehā (European) colonisation of New Zealand profoundly impacted breastfeeding for Māori.[30] In pre-colonial times, Māori infants were breastfed by their mothers or other lactating women.[31] Western reframing of Indigenous knowledge and beliefs as myths and legends,[3] the Tohunga (traditional healer) Suppression Act (1907–1962) and the general, but erroneous, belief that there was a law preventing wāhine Māori from breastfeeding in public[28] combined to reduce Māori breastfeeding rates. Throughout the 20th century, the medicalisation of birth and the introduction of infant formula undermined the rich breastfeeding knowledge shared between women, particularly wāhine Māori, leading to a significant decline in breastfeeding rates.[32] Contemporary Māori mothers report professional insensitivity and conflicting advice about breastfeeding as contributing to lack of confidence in healthcare providers.[30]

Mothers who experience depression during pregnancy are less likely to initiate breastfeeding, and more likely to cease exclusive breastfeeding before six months.[33] We found that Māori mothers who experienced depression during pregnancy were less likely to exclusively breastfeed for six-or-more months. There is also evidence that early cessation of breastfeeding is a risk factor for maternal anxiety and depression.[34] Together, these findings highlight the importance of routine perinatal depression screening, and of providing culturally safe breastfeeding and mental health support to Māori mothers exhibiting depression symptoms.

Previous studies have identified smoking as a barrier to exclusive breastfeeding for Māori mothers.[4,13] One-third of mothers in our study reported smoking during pregnancy; however, the association between smoking and exclusive breastfeeding was excluded from our final model. When included in the model, there was no significant association between smoking and exclusive breastfeeding (results not shown).

We found that Māori mothers with more than one child were more likely to exclusively breastfeed for six-or-more months than first time mothers, similar to findings for the whole *GUiNZ* cohort and other studies.[11,35] Thus, first time Māori mothers may benefit from additional breastfeeding support from whānau, community and healthcare providers.

According to WHO, vaccine hesitancy is one of the top ten threats to global health. Hesitancy is due to a combination of a lack of confidence in the vaccine or healthcare provider; complacency towards the disease or the vaccine; and conve-

nience or vaccine access.[36] Historically, there are multiple reasons for wāhine Māori to distrust infant nutrition recommendations from New Zealand healthcare providers. The message that breastfeeding strengthens the immune system may contribute to complacency with respect to immunisation.[37] Wāhine Māori report breastfeeding as tikanga Māori,[30] whereas immunisations are not reported in the same light.[38] Finances, time, geography, and cultural access, whereby vaccines are not promoted in line with tikanga Māori, are all important barriers to immunisation.[39] Addressing present and historic distrust of the health system and creating an environment where immunisation supports Māori perspectives of health and wellbeing may improve both breastfeeding and immunisation rates.

Antenatal recruitment with adequate explanatory power for analyses within the Māori cohort is a strength of our study.[14] Breastfeeding and food introduction were one of a number of domains about which study participants were questioned, therefore reducing the likelihood of reporting bias. A limitation of our study was maternal recall bias of exclusive breastfeeding; however, we minimised this by adjusting for the age of food introduction.[11] This study supports the use of Māori models of health in the quantitative analysis of exclusive breastfeeding, but acknowledges the limitations with exclusion of whānau responses.

Breastfeeding interventions aim to protect, promote, and support breastfeeding.[40] Protection is the most effective intervention in reducing inequities, occurs at a population level and involves legislation, regulations and policy. Policy directed at protecting breastfeeding in the workplace and public spaces must acknowledge historical wrongs Māori have faced, and must be centred on breastfeeding as tikanga Māori. To reduce inequities, legislation must include adequate enforcement of these policies, rather than relying on guidelines, and monitoring of breastfeeding must be representative of Māori. Recent improvements to parental leave provisions go some way to reducing inequities;[29] however not all mothers are eligible. Universal paid parental leave would provide breastfeeding protection.

Breastfeeding promotion should commence prior to or early in pregnancy and include mothers, whānau, health professionals and society as a whole.[40] Policy changes that provide kaupapa Māori pregnancy, childbirth and infant healthcare; increase Māori participation in midwifery and well-child care; and include whānau in healthcare decision-making are essential to improving outcomes for wāhine Māori and their pēpē.

Improving Māori health outcomes and honouring the principles of Te Tiriti o Waitangi are central components of current New Zealand health system reform.[41] The establishment of national entities, Te Mana Hauora Māori (Māori Health Authority) and Hauora Aotearoa (Health New Zealand), will change the way the health system understands and responds to Māori health needs, drive the provision of kaupapa Māori services and develop policy and strategy to improve health outcomes for Māori. Iwi–Māori Partnership Boards will be the primary source of whānau voice, will have decision-making roles at the local level, and will work with the national entities to determine local priorities and healthcare delivery. A whole of system approach to healthcare reform must address structural racism and empower tangata whenua and tauiwi (non-Māori) to fully engage in promoting health equity for Māori.

Conclusion

While most Māori mothers initiate breastfeeding, only a small proportion continue exclusive breastfeeding until their infant is aged six months. Determinants of exclusive breastfeeding in wāhine Māori are knowledge of breastfeeding recommendations, return to work, motherhood experience, connection to Māori cultural traditions/practices, antenatal depression, and vaccine indecision. Proposed New Zealand health system reforms aim to honour Te Tiriti o Waitangi principles and address the legacy of colonisation, poverty, and systemic racism on Hauora Māori. These reforms should allow the development of breastfeeding policy and interventions that acknowledge and redress the damage that breastfeeding policies have historically had on Māori. Interventions delivered within a kaupapa Māori framework will best address breastfeeding inequities in New Zealand. Health equity for Māori has the potential to improve health outcomes for all New Zealanders.

Appendices:
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COMPETING INTERESTS
Nil.

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