Primary Care Electrocardiograph (ECG) Audit

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Introduction

Cardiovascular disease continues to be the leading cause of death in New Zealand. Taranaki has a higher than national average rate of cardiovascular disease, and cardiovascular disease is the leading cause of patients admitted through ED. (Ministry of Health, 2015).

Electrocardiography (ECG) is a basic and essential part of the diagnosis and management of cardiac disease. Nationally there is a huge demand, and this is met by the local General Practices without any funding from the government. However, per service fees are charged ranging from Practice to Practice varying between $45 - $95, yet ECG tests are required for **ALL** Secondary Care Cardiac referrals creating an inequity in service delivery.

In 2021, Fast Pace Solutions was successful in obtaining a Ministry of Health Telehealth Initiative funding to provide diagnostic testing directly to Primary Care. This led to high level diagnostic equipment being placed or made available at Ōpunake Medical Centre.

Ōpunake Medical Centre is Rural General Practice located in Ōpunake, 50 minutes south of New Plymouth. The practice has 3950 enrolled patients. Ōpunake Medical Centre is a Very Low Cost Access practice, which reflects the high need and complexity of its patients.

In Ōpunake Medical Centre there is a cost to the patient to have an ECG carried out. Some patients opt not to have an ECG or travel to New Plymouth for a funded ECG through the hospital with a significant delay of many months to having the test completed.

Aim

This pilot was run to look at the outcomes when pre-emptive, high quality diagnostic testing was made readily available to a rural community.

Hypothesis

The hypothesis was that this will lead to more, and earlier, diagnoses of significant cardiac complications or conditions amongst those with chronic medical conditions or at higher risk whilst improving equity and health outcomes in a rural community.

Method

The patients were enrolled in Ōpunake Medical Centre. They required a GP referral with an indication that fit the criteria of the study as seen in Table 1.

Indication
Medication monitoring
Chronic Condition monitoring
Symptoms ie palpitations, chest pain, shortness of breath, fatigue, dizziness, syncope
Hyperkalaemia
Abnormal examination ie pulse, heart sounds

Table 1. Indication for ECG referral

The service was provided by the staff at the Ōpunake Medical Centre. The ECG was sent electronically, via a Cloud based programme, to Fast Pace Solutions to be reviewed and finalised by the Cardiologist, who was able to give clinical advice back to the referrer. Ōpunake Medical Centre was then responsible for informing the patient and performing ongoing clinical assessment and intervention.

Background information was retrieved from the patient's file on Medtech through the Ōpunake Medical Centre. The information regarding the ECGs was sourced through Fast Pace Solutions.

Findings

The pilot was carried out over 2 years, starting in 2021. The pilot, as shown in table 2, included 159 patients, 90 Males and 69 Females. There was a large age spread, however the majority of patients were between 50 and 79 yrs. There were 97 patients who identified as NZ European and 54 who identified as Māori. All patients were in a Deprivation index area >6.

Gender	Male	90 (57%)
	Female	69 (43%)
	Total	159 (100%)
Age	10 - 19 yrs	6 (4%)
	20 - 29 yrs	12 (7%)
	30 - 39 yrs	16 (10%)
	40 - 49 yrs	19 (12%)
	50 - 59 yrs	27 (17%)
	60 - 69 yrs	35 (22%)
	70 - 79 yrs	27 (17%)
	80 - 89 yrs	13 (8%)
	90 - 99 yrs	4 (3%)
	Total	159 (100%)
Ethnicity	Maori	54 (34%)
	NZ European	97 (61%)
	Samoan	2 (1%)
	Other European	3 (2%)
	Other Asian	3 (2%)
	Total	159 (100%)
No. of Long Term Medical Conditions	0-3	63 (40%)
	4 - 7	66 (41%)
	8 - 11	27 (17%)
	12 or more	3 (2%)
	Total	159 (100%)

Table 2. Demographics of Patients in Pilot

Outlined in Table 3., the most common indication for an ECG was symptoms, most notably chest pain or palpitations. Monitoring of chronic conditions was the second most common indication. Overall, 11% of patients had a new diagnosis made, namely Atrial Fibrillation, Ischaemic Heart Disease or 'Other', which included sinus bradycardia, sinus tachycardia or other arrythmia. Management was altered in 8% of patients who had an ECG.

Indication for ECG	Medication monitoring	5 (3%)
	Chronic Condition monitoring	58 (36%)
	Symptoms	79 (50%)
	Hyperkalaemia	3 (2%)
	Abnormal examination	14 (9%)
	Total	159 (100%)
New Diagnosis Made?	No	141 (89%)
	Yes – Atrial Fibrillation	7 (4%)
	Yes – Ischaemic Heart Disease	2 (1%)
	Yes - other	9 (6%)
	Total	159 (100%)
Management altered?	No	145 (92%)
	Yes - Medication Altered	5 (3%)
	Yes - Referred to hospital	7 (4%)
	Yes - Referred for further testing	2 (1%)
	Total	159 (100%)

Table 3. Indication for and Findings of ECGs ordered.

Table 4. shows the indication for referral for those patients who had an abnormal ECG. The indication was spread evenly between chronic condition monitoring, an abnormal examination and symptoms.

Indication	
Chronic Condition Monitoring	6
Abnormal exam	6
Symptoms	6
Total	18

Table 4. Indication for referral for those patients who had an abnormal ECG

Discussion

ECGs are integral for investigation for many presentations to General Practice and are often essential for any ongoing referrals to secondary care, despite the ECG finding. Having a baseline ECG on file is also useful for comparison for those who may present in the future with abnormal symptoms or examination, even more so in those who are at higher risk. Having access to a funded and timely ECG service is hugely valuable for any GP practice, and more so in rural communities where there are more barriers to access this service.

Given that ECGs are a common investigation, General Practitioners review ECGs every day in primary care. However, they receive very little feedback about the correct interpretation of these and in Taranaki there is no formalised link for specialist help with interpreting ECGs. The Ōpunake GP's found that access to a specialist reviewed ECGs, which this audit offered, to be very beneficial for both their own learning and management of their patients.

Conclusions

In approximately 10% of patients, their management was altered due to the ECG and for one third of those patients the indication was for asymptomatic chronic condition/s monitoring. These patients would not have been picked up had the audit not been carried out.

This audit shows that placing a funded and specialist reviewed ECG service into rural communities leads to more, and likely earlier diagnoses of significant cardiac conditions and more importantly leads to changes in patient's health management. The service was a valuable resource for the Ōpunake Medical Centre clinicians.

During the pilot the ECGs' were carried out within the medical facility removing the requirement to travel to the Secondary Care Facility. Normally referral to the Secondary Service would require 1 return trip (49 km one way) which saved over 15,582 kilometres of travel which equates to 99 minutes (1 hours 30 minutes) of travel time per patient ; a total travel time of 15,741 minutes (262.35 hours).

Using a calculation for a medium petrol vehicle (1.4L – 2.0L) This would be expected to save in excess of 2927.08 $kgCO_2e$ *

*https://blocicarbon.com/vehicle-calculator/

References

Ministry of Health (2015) Mortality and Demographic data 2013 (provisional). Wellington: Ministry of Health. https://www.health.govt.nz/