

TITLE

Exploring the phenomenon Psychological Insulin Resistance in two Pacific Islands
clients with Type 2 Diabetes Mellitus who are New Zealand residents

by

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ABSTRACT

Diabetes Mellitus (DM) affects 425 million adults world-wide and one in every two people are undiagnosed according to the International Diabetes Federation (IDF). It is a serious and costly disorder which needs timely and adequate treatment, to prevent complications such as blindness, kidney failure, and strokes. There are three main types of diabetes, Type 1 Diabetes Mellitus (T1DM), Type 2 Diabetes Mellitus (T2DM), and Gestational Diabetes Mellitus (GDM). The most common type of DM affecting 90% of the population with diabetes is T2DM, followed by T1DM which affects up to 10%. Insulin therapy is the only effective treatment for people with T1DM and for women with GDM; but is often required for treatment in people with T2DM, when oral medications fail to adequately control their diabetes.

However, a phenomenon termed Psychological Insulin Resistance (PIR) has been recognised as a significant barrier to timely initiation and continuation of insulin therapy. Therefore, since PIR generates substantial barriers to insulin treatment causing significant delays to optimal treatment of DM, it is important to explore and find ways to address this phenomenon. The literature also highlights that PIR is common in people with T2DM and more apparent in ethnic minority groups. Therefore, it was increasingly necessary to study this phenomenon in culturally sensitive conditions. Consequently, this research explored PIR in two Pacific Islands (PI) clients with T2DM, who are New Zealand (NZ) residents.

The study used a qualitative Case Study (CS) methodology to investigate how two PI clients diagnosed with T2DM, responded to the prescription and ongoing use of insulin treatment. A “two-case” CS procedure as described by Robert Yin was used to explore in-depth, how two PI women received and achieved their instructions on the use of insulin therapy. The three methods of data collection used were semi-structured interviews, direct participant observations and relevant information from the participants’ medical notes. The data collection and analysis were guided by seven propositions (Table 1), while the Fonua Health Model (Figure 2) was used as the theoretical framework for cultural and analytic applications.

The findings of this research revealed that the two PI participants experienced the same multifaceted psychosocial issues and physical complications, identified in the literature regarding PIR. The holistic outlook for the current and long-term health status of both participants were unacceptably poor and out of balance, according to the Fonua Health Model. For PI persons with diabetes to have acceptable holistic health status, they need to have life balance according to the Fonua Health Model. However, if they require insulin therapy to effectively control their diabetes and to help minimise the incidence and severity of diabetes complications, they will need extra support from Health Care Professionals (HCP), that are culturally and clinically competent.

Key Words: Type 2 Diabetes mellitus (T2DM), Pacific Islands (PI) people,
Psychological Insulin Resistance (PIR), Case Study (CS) Research

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GLOSSARY AND ABBREVIATIONS

Appt	Appointment
BGL	Blood Glucose Levels
Bpac nz	Best Practice Advocacy Centre New Zealand
“Canary in the mine”	A metaphor indicating an advanced warning of danger
CDHB	Canterbury District Health Board
CNP study	C type Natriuretic Peptide tests for kidney health
CS	Case Study
DC	Diabetes Centre
DM	Diabetes Mellitus
DNA	Did Not Attend
DP	Diabetes Physician
GDM	Gestational Diabetes Mellitus
HbA1c	A blood test to measure the glycosylated haemoglobin levels, indicating long-term glycaemic control
HCP	Health Care Professionals
HRCNZ	Health Research Council New Zealand
IDF	International Diabetes Federation
“Member checking”	Taking information back to PTs, so they can judge the accuracy of the account
MPP	Ministry for Pacific Peoples
MOH	Ministry of Health
NCD	Non-Communicable Diseases
NCNZ	Nursing Council of New Zealand
NZGG	New Zealand Guidelines Group
Pacific, Pacifica, Pacificans, Pasifika, Tagata Pasifika, PI	Pacific Peoples from the indigenous Pacific Islands living in New Zealand
PEN	Package of Essential
PIDNS	Pacific Islands Diabetes Nurse Specialist
PIR	Psychological Insulin Resistance
PT	Participant

RN	Registered Nurse
SOAP	Subjective Objective Assessment Plan
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
UKPDSG	United Kingdom Prospective Diabetes Study Group
WHO	World Health Organisation
WINZ	Work and Income New Zealand

1. INTRODUCTION

1.1 Diabetes Mellitus

Diabetes Mellitus (DM) is a combination of metabolic disorders characterised by chronically raised levels of glucose in the blood, also known as hyperglycaemia (Drury & Gatling, 2005; Holleman, 2014). DM is caused by impaired insulin production by the pancreas, impaired insulin action in the body, or both (DiPiro et al., 2014). “Diabetes is a serious and costly disease which is becoming increasingly common, especially in developing countries and disadvantaged minorities” (WHO, 2018, para. 22). DM now affects 425 million adults globally and one in every two people affected are not aware they have the disease (IDF, 2017). Two-thirds of people with diabetes live in urban areas and two-thirds are of working age (IDF, 2017).

DM leads to serious damage to body systems such as nerves and blood vessels, resulting in eye disease, renal disease, nervous damage, heart attacks and strokes, if left untreated (Drury & Gatling, 2005; WHO, 2017). Treating DM and optimising good blood glucose control, is therefore necessary to minimize the incidences of these complications (DiPiro et al., 2014, Krebs, 2017; UK Prospective Diabetes Study Group [UKPDSG], 1998). According to Holleman (2014), poorly controlled DM is now the leading cause of blindness, renal failure, and other serious complications such as foot ulcers and lower limb amputations. In NZ, the cost of healthcare for Pacific people alone in the Auckland region is around \$93 million a year; \$35 million of that cost is attributed to the high prevalence of diabetes (Ministry of Health [MOH], 2014a).

1.2 Diabetes in indigenous Pacific Islands nations

According to Foliaki and Pearce (2003), earlier studies indicated that diabetes was almost non-existent amongst indigenous PI populations living and practicing traditional lifestyles. However, Pacific people moving to urban areas and adopting urban lifestyles including unhealthy diets and decreasing physical activities, have shown increased risks and incidences of developing diabetes and subsequent complications (Foliaki & Pearce, 2003). A systemic review of the literature from 1990 – 2014 on the prevalence and impact of T2DM in the Pacific nations conducted by Win Tin, Ying Lee, and Colagiuri (2015) also found the same issues with Pacific nations. The review found that diabetes prevalence was common, with up to 40 % of the population being obese and having low levels of physical activity. The rates of obesity and unhealthy lifestyles were the

most common reasons for the rise of the diabetes epidemic in the Pacific nations (Win Tin et al., 2015).

There are other factors that contribute significantly to the accelerating rate of diabetes amongst indigenous Pacific nations, which are also common across countries world-wide (Win Tin et al., 2015). These include people living longer, genetic factors, lower social-economic status and lack of access to good diabetes prevention programmes (Drury & Gatling, 2005; Schaaf & Schaaf, 2005; Win Tin et al., 2015). While genetic susceptibility to acquiring T2DM is clear (DiPiro et al., 2014; Drury & Gatling, 2005), there is also global consensus that unhealthy lifestyle practices have escalated the diabetes epidemic, which has disproportionately impacted the Pacific nations (Win Tin, et al., 2015; Zimmet, Alberti, & Shaw, 2001).

In response to the escalating diabetes epidemic world-wide, the WHO issued a global plan for the prevention and control of Non-Communicable Diseases (NCD) 2013 – 2020 (WHO, 2013). The plan provided directions for member countries and stakeholders to help them coordinate care and actions to meet agreed voluntary targets. One of these targets was to reduce by 25 %, early deaths from NCD such as cancer, diabetes, cardiac and respiratory diseases (WHO, 2013). Samoa, one of the indigenous Pacific nations (Bell, Benfell, Hayes, & Pascoe, 2001) took up the WHO challenge and adapted the Package of Essential (PEN) NCD interventions to help promote healthy lifestyles and to help control NCD for their people (WHO, 2015). The PEN intervention groups found that around 94 % of adults were overweight or obese, and nearly 50 % of Samoan people surveyed in one village had diabetes (WHO, 2015).

There is continual reporting of the high prevalence of diabetes and incidences of severe diabetes complications in the indigenous Pacific nations (AttitudeLive, 2016; Foliaki & Pearce, 2003; The Lancet, 2018; Win Tin et al., 2015). A recent documentary series by Television NZ called AttitudeLive (2016) filmed in the Pacific nation of Samoa, reported that nine of the ten top countries with T2DM are in the Pacific region. One in four adults in Samoa are thought to have diabetes which is the main cause of death and disability in the nation. The doctors at the main hospital Tupua Tamasese Meaole reported that 20% of beds are occupied by people with diabetes (AttitudeLive, 2016). Skin infections, sepsis and amputations were reported to be the leading cause of hospitalisation and result in lengthy hospital stays. Samoa started its renal dialysis

services in 2005 with eleven beds, but now has more than doubled that number. Many more people decline dialysis and prefer to die with dignity at home (AttitudeLive, 2016).

1.3 Diabetes in New Zealand

In NZ, there are approximately 257, 000 people living with diabetes (MOH, 2015b). It is a “serious health challenge” and a “priority long term condition” for this country, and the health systems have been working hard to manage the condition (MOH, 2015b, para.1). Within NZ populations, the incidence of diagnosed diabetes is reported to be three times higher in Maori and PI people (MOH, 2014c). The prevalence of DM is also high amongst people from South East Asia living in NZ (MOH, 2014b). Both T2DM and T1DM are increasingly being diagnosed in children, so the challenge to have good blood glucose control consistently is crucial, to minimise the development and severity of diabetes complications given the longer duration of the disease (MOH, 2014b). Furthermore, PI and Maori children are being diagnosed with T2DM at markedly disproportionate rates, compared to European children (Jeffries et al., 2012; Zimmet, et al., 2001).

There is also a trend in NZ that T2DM is diagnosed ten years earlier in PI people compared to Europeans, and the rates of diabetes complications and mortality are also high in PI populations (Pasifika Futures, 2015; Ryan, Southwick, Teevale & Kenealy, 2011). Dr Orr-Walker, an endocrinologist and current president of the NZ Society for the Study of Diabetes (Orr-Walker, 2017), also confirmed the alarming rise of T2DM in Pacific people. He said, “people from the Pacific Islands have the highest rates of Type 2 diabetes of all ethnic groups in New Zealand, and among the highest rates worldwide” (Orr-Walker, 2011, p. 13). Moreover, indigenous peoples with diabetes are “three-times more likely to need dialysis treatment and less likely to receive a transplant” according to Palmer (2012, p. 2).

1.4 The rise of Type 2 diabetes in Pacific Peoples in New Zealand

The NZ Health Survey 2016/17 found that 69% of Pacific adults were obese, and PI children also had the highest rates of obesity at 29%, compared to other NZ child populations (MOH, 2017). Overall, New Zealanders are reported to be the third heaviest people in the developed world, behind Mexico, and the United States (Orr-Walker, 2011). Being overweight or obese is a key risk factor for many chronic conditions and is a “prime driver” of T2DM (Winnard, 2011, p.13). Obesity is also

closely linked to other serious chronic health conditions such as cardiovascular diseases, arthritis and some cancers (Jowitt, 2014; Winnard, 2011). Obesity is a medical problem and the PI people are the ‘canary in the mine’ for obesity related illnesses in NZ (Orr-Walker, 2011, p. 13).

Consequently, the chances of developing T2DM in PI people are so high that this condition has become common place in NZ Pacific families (Orr-Walker, 2011). The MOH has recognised this and has set down a national plan called ‘Ala Mo’ui, for the improvement of Pacific people’s health outcomes, especially in the areas of NCD including diabetes (MOH, 2014a). According to the MOH (2014a), healthcare for Pacific people alone in the Auckland region cost around \$93 million a year, and \$35 million of that cost is attributed to the high prevalence of diabetes. DM is therefore a high priority area for the MOH, and health outcome equity for PI people is also a government priority (MOH, 2014a). Justifiably, the high cost of diabetes related care in NZ is a significant concern for health care services and the NZ government (MOH, 2014a; Pharmac, 2017; Ryan et al., 2011).

1.5 Research Aim

As already described, T2DM is a progressive disease with serious complications, if it is not treated effectively. Consequently, most patients with T2DM will eventually need to start insulin therapy for optimum diabetes control (DiPiro et al., 2014; Murtagh & Rosenblatt, 2011; Orr-Walker, 2017). Accordingly, the high rates of T2DM amongst PI populations in NZ warrant special attention (MOH, 2014a; Orr-Walker, 2011; Talemaitoga, 2018). It is important that any barriers to treatment of T2DM such as insulin therapy, is investigated and addressed amongst PI people (MOH, 2014a; New Zealand Guidelines Group [NZGG], 2012; Orr-Walker, 2011). To date, there is a paucity of research that has explored PIR in Pacific people living with T2DM and needing to implement insulin therapy (Tapu-Ta’ala, 2011).

According to Ryan et al. (2011), significant inequalities still exist in the NZ healthcare of PI people, compared to the rest of the NZ populations. Therefore, the mainstream approach to PI people’s healthcare needs must change, in order to combat the higher rates of diabetes and higher diabetes mortality rates in PI people (Ryan et al., 2011). This research sought to explore and delve deeper into the experiences of two PI people living with T2DM; and the challenges they face when prescribed insulin treatment.

Information gained from this study can help to inform HCP, so healthcare can be tailored to meet the needs of PI people. Subsequently, any addition to formal knowledge and strategies to help minimize physical and psychosocial complications from diabetes for PI people makes clinical, ethical and economic sense (Health Research Council of New Zealand [HRCNZ], 2014; MOH, 2014a; Pharmac, 2017; Talemaitoga, 2018).

1.6 Research Question and Objectives

This research focussed on exploring the phenomenon of Psychological Insulin Resistance in two Pacific Islands clients with Type 2 Diabetes Mellitus who are New Zealand residents.

Objectives:

1. To explore how the clients coped when first diagnosed with T2DM.
2. To explore how the clients first received the recommendation they needed to start insulin therapy.
3. To explore what motivates or discourages clients from starting, intensifying and continuing with insulin therapy.
4. To explore the influence of family, culture, misconceptions and religious beliefs on the use of insulin therapy.

2. PACIFIC PEOPLES IN NEW ZEALAND

2.1 Te Tiriti o Waitangi

Pacific peoples acknowledge, support, and respect Te Tiriti o Waitangi as the foundation for their relationship with Tangata Whenua and, recognise the Tangata Whenua status of New Zealand Māori and their right to exercise tino rangatiratanga. Pacific peoples also recognise the mandate accorded under citizenship rights and the entitlements that comply with international declarations and other legal instruments regarding the rights of human beings.

(HRCNZ, 2014, p. 2)

In principle, the Pacific people stand with Tangata Whenua and respect the Te Tiriti o Waitangi, and all that it stands for in NZ. The Pacific people also recognise their own citizenship and legal rights as New Zealanders, and their rights to determine what is legally and culturally appropriate for their wellbeing, as NZ citizens and legal residents (HRCNZ, 2014).

2.2 Pacific Islands people in NZ – diverse ethnic groups

According to the Ministry for Pacific Peoples (MPP, 2018), NZ's Pacific populations are diverse and dynamic and are growing at a fast rate. Nearly 50% of the PI population in NZ are under twenty years old, "compared with 27.4% for the total population" (p.1). In the 2013 Census, the PI ethnic group was the fourth largest of the major ethnic groups, "behind European, Maori and Asian ethnic groups" (MPP, 2018, p.1). Samoans remain the largest individual PI ethnic group identified in 2013 making up 48.7% of the PI population, Cook Islands Maori 20.9%, Tongan 20.4%, Niuean 8.1%, Fijians 4.8% (MPP, 2018; Pasifika Futures, 2015). Most PI people live in the North Island (92.9%) and 65.9% live in Auckland, 12.2% live in Wellington, and only 7.1% live in the South Island (Stats NZ, 2014).

People from the PI are collectively known as Pacific Peoples in Aotearoa, NZ (HRCNZ, 2014; Talemaitoga, 2010). Yet these New Zealanders come from more than 40 different island nations, each having their own languages, unique cultures and beliefs (Health Navigator NZ, 2017; Talemaitoga, 2010). These significant differences in beliefs, cultures and languages impact on individual perceptions and usage of healthcare services in NZ (Talemaitoga, 2010; Tiatia, 2008). The term Pacific Peoples

in NZ is also synonymous with the names Pasifika peoples, Tagata Pasifika, Pacificans or Pacific Islanders (MOH, 2014a; Pasifika Futures, 2015; HRCNZ, 2014). As well, the education sector tends to use the term Pacifica, while the younger people get the label BNZ, or born in NZ (Ryan, 2018). In this research, the Pacific Peoples are mainly referred to as Pacific Islands (PI) people.

2.3 Pacific Islands people, Health, Culture, and Languages

The health and wellbeing of PI people in NZ is reported to be poorer when compared to other New Zealanders (Southwick, Kenealy, & Ryan, 2013; Talemaitoga, 2010). They experience unmet needs and variations of quality of care in the health care systems resulting in PI people not accessing and not utilizing healthcare in a timely manner (Southwick et al., 2013). Major barriers to appropriate healthcare for PI people are reported to be cost, transport, language difficulties, as well as family commitments, low health literacy and cultural discomfort when confronted with non-Pacific HCP (Ludeke et al., 2012; Southwick et al., 2013; Tiatia, 2008).

Southwick et al. (2013) and Talemaitoga (2010) emphasized the fact that families, culture and language play an important part in health and PI people's wellbeing. Culture is defined by the Merriam-Webster online dictionary (2019) as the "set of values, conventions or social practices associated with a particular field, activity, or societal characteristic". According to Tiatia (2008) "culture influences an individual's and family's health beliefs, practices, behaviours, and even the outcomes of interventions" (p. 3). It is therefore critical that the healthcare workforce in NZ is culturally skilled, if it is to positively affect health outcomes for PI people (Talemaitoga, 2010). To be culturally competent requires an acknowledgement of one's own culture, before one can understand and adjust, in order to respect the culture of others, especially the culture of people being served (Leavasa, 2018; Tiatia, 2008).

When Pacific cultural competence and cultural safety becomes an integral part of NZ's healthcare, equitable and quality healthcare outcomes for PI people should occur (Tiatia, 2008). Papps and Ramsden (as cited by Tiatia, 2008, p. 4) wrote that "cultural safety is a political idea promoted by Maori nurses, which arose from the colonial context of New Zealand society in response to the poor health status of Maori, and the demands for changes in service delivery". Cultural safety principles seek to change

health practitioners' attitudes by recognising and respecting the unique cultural background of a client, to safely meet their holistic healthcare needs (Tiatia, 2008). Conversely, "unsafe cultural practice occurs when the patient is disempowered, humiliated and alienated on the basis of their cultural identity", discouraging further engagement in quality healthcare (Tiatia, 2008, p. 5).

2.4 Pacific Health Models and Pacific Research

In response, to what has been highlighted about the importance of cultural competence and safety in positively impacting healthcare and outcomes, the researcher looked at different Pacific Health Models. According to the University of Otago Pacific Research Protocols (2011), "Pacific research design, methods and approaches will be informed by a range of Pacific world-views" and "Pacific cultural values and beliefs will underpin Pacific research" (p. 9). Regarding Pacific world views, there are already numerous Pacific Health Models that inform us of how Pacific Peoples view their health and wellbeing (Health Navigator NZ, 2018b; Pulotu-Endemann, 2001; Talemaitoga, 2010; Tu'itahi, 2009).

The following list highlights some of the healthcare models that Pacific academics have used, to try and explain the way Pacific People generally view their own health care (Health Navigator NZ, 2018b, para. 2; Schaaf & Schaaf, 2005).

- Fa'afaletui model – Samoan model (Carmel Peteru & Kiwi Tamasese)
- Fonofale model – pan-Pacific & Samoan (Fuimaono K Pulotu-Endemann)
- Fonua model – pan-Pacific and Tongan (Sione Tu'itahi)
- Pandanus Mat – pan-Pacific
- Ta and Va – Tongan model – ('Okusitino Mahina)
- Te Vaka Atafaga – A Tokelauan assessment model

(Health Navigator NZ, 2018b, para 2; Schaaf & Schaaf, 2005)

2.5 Using a Pacific Health Theoretical Framework

One common theme that runs through the Pacific Health Models is the understanding that PI people view health holistically. This means the four main domains that need to be considered altogether in the definition of health for PI people are the physical, mental, social and spiritual domains (Pulotu-Endemann, 2001; Tu'itahi, 2009).

According to Finau (n.d., p. 2), models explain values by placing them in frameworks and frameworks "provide pathways for action within a cultural and socio-political

context”. This definition by Finau fits the purpose and chosen theoretical framework for this study. To guide the cultural direction of data collection and analysis for the study, the researcher has chosen the Fonua Health Model as the theoretical framework. The relevance and use of the Fonua Health Model will be further discussed in chapter three.

2.6 Research in culturally sensitive settings

As previously highlighted, it is fundamentally important to have a Pacific culturally sensitive and safe approach to researching Pacific people (HRCNZ, 2014; Otsuka, 2006; University of Otago Pacific Research Protocol, 2011). Some researchers of the phenomenon PIR also indicated the obligation of studying this phenomenon in culturally appropriate backgrounds (Bogatean & Hancu, 2004; Jha et al., 2015; Polonsky et al., 2005). Accordingly, the researcher has chosen the principles of the Fonofale pan-Pacific Health Model (Figure 1) to underpin this research. The Fonofale model was created by Fuimaono Karl Pulotu-Endemann (2001), a Samoan-born New Zealander with a background in Nursing (Smith, 2017). The model is a visual illustration of PI people’s beliefs and values, depicting that PI people see their world and health status in a holistic manner (Pulotu-Endemann, 2001; Tu’itahi, 2009).

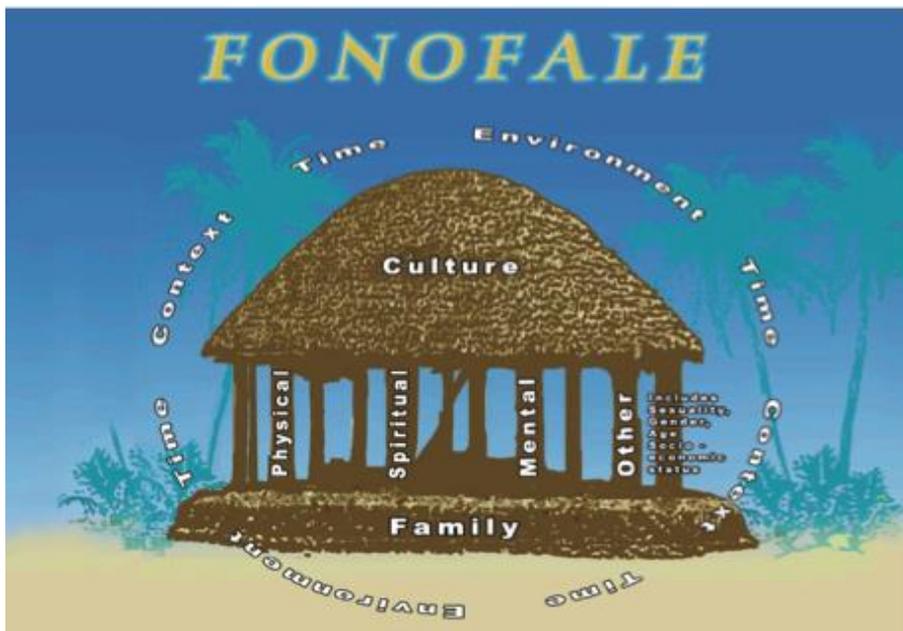


Figure 1. *The Fonofale Health Model by Pulotu-Endemann, F. K. (2001). Reprinted with permission.*

2.7 The Fonofale Health Care Model

The Fonofale model closely resemble the Te Whare Tapa Wha model by Mason Durie, which also embraces the holistic view of health for Maori (MOH, 2017), incorporating

the physical, mental, social and spiritual make-up of the whole person. The foundation is the extended or nuclear family and forms the basis for all PI social groups and organisations (Pulotu-Endemann, 2001), which in turn forms the basis for all PI cultures. The PI cultures as portrayed by the roof of the house (fale) represent beliefs and values of PI people and provides shelter and identity for Pasifika families or individuals (Pulotu-Endemann, 2001; Smith, 2017). The four Pou (posts) connect the families to the cultures and should interact and depend on each other to function in a balanced mode, for the PI person to feel truly well (Pulotu-Endemann, 2001; Tu’itahi, 2009).

2.8 The Researcher

The researcher of this study is from the indigenous PI of Samoa and has worked with Pasifika people in NZ for three decades in the healthcare services. She is a NZ Registered Nurse (RN) and in July 2017 became a RN prescriber in primary care and specialty teams (Nursing Council of New Zealand [NCNZ], 2018). Her specialty area of interest and work is in diabetes and related conditions. She is experienced in Pacific cultures and communities and has an innate understanding of PI peoples’ cultural orientation. Therefore, she is considered professionally qualified and culturally competent to carry out this research, especially concerning one of the most vulnerable populations in NZ (HRCNZ, 2014; Otago Pacific Research Protocols, 2011).

In addition, a Pacific cultural mentor is part of the research advisory team and has provided further clarity, strength and integrity to the cultural safety and cultural appropriateness of this research (HRCNZ, 2014). She was an editor of the program “Pacific Voices XIV” 2017, which showcased research being carried out by PI postgraduate students (Pacific Islands Centre, 2017). She also came from the PI herself, therefore is in a unique position to confirm the cultural appropriateness and safety of the research. There are also two academic nursing supervisors for this research, so the researcher is well guided and fully supervised to ensure the remainder of the study requirements are ethically and clinically sound (University of Otago, 2018).

3. LITERATURE REVIEW

PIR is defined as “psychological opposition towards insulin use” (Brod, Congso, Lessard & Christensen, 2009) affecting “both people with diabetes and their prescribers” (p. 23). PIR is not considered a formal psychological diagnosis (Bogatean & Hancu, 2004; Gherman, et al., 2011) but rather a combination of complex psychosocial issues which create barriers to insulin initiation, dose intensification and continuation of insulin therapy (Allen, Zagavins, Feinberg, & Welch, 2016; Brod et al., 2008; Korytkowski, 2002; Larkin, 2008; Polonsky & Jackson, 2004; Polonsky et al., 2017). However, despite the proven efficacy and life-giving benefits of insulin treatment for people with diabetes, there is often serious delay in initiating insulin therapy in people with T2DM, resulting in significant costs to the patient’s health status and to the health care systems (Allen et al., 2016; Gherman, et al., 2011; Korytkowski, 2002; Orr-Walker, 2017; UKPDS Group, 1998).

If diabetes is not treated effectively and in a timely manner, it results in serious complications such as heart attacks, strokes, kidney failure and leg amputations (DiPiro et al., 2014; Larkin, 2008; Orr-Walker, 2017). Subsequently, as Pacific people have been cited as having high incidences of T2DM and to develop complications on average ten years earlier than other New Zealanders (MOH, 2014a, 2014b; NZGG, 2012; Talemaitoga, 2018), the researcher has chosen to research one of the common barriers to optimal diabetes treatment. PIR is a common barrier encountered in everyday clinical practice (Larkin, 2008; Polonsky et al., 2017), but is often under-recognised, under-estimated, or overlooked by HCP (Brod et al., 2008; Patel, Stone, Davis, & Khunti, 2011; Polonsky et al., 2017; Tillery, Bradshaw, & Ngando, 2013).

The literature also revealed that PIR is complex and multifactorial (Brod et al., 2008; Gherman et al., 2011; Machinani, Bazargan-Hejazi, & Hsia, 2013; Sahin, Gunisik, Karlidag, Keskin, & Cikim, 2015; Taylor et al., 2017). Therefore, strategies and interventions to help reduce PIR have been the focus of many studies in the past twenty years (Allen et al., 2016; Bogatean & Hancu, 2004; Brod et al., 2008; Funnell, Kruger, & Spencer, 2004; Larkin, 2008; Patel et al., 2011; Sahin et al., 2015). According to Larkin (2008) there is not a one size approach that fits all situations. However, developing therapeutic relationships, addressing patients’ personal fears, exercising

patience and having professionally and culturally competent HCP, are some of the crucial strategies to help reduce PIR (Funnel et al., 2004; Larkin, 2008; Orr-Walker, 2017; Patel et al., 2011; Polonsky et al., 2017; Tapu-Ta'ala, 2011).

As previously discussed, PIR is common in people with T2DM who are needing to implement insulin therapy, as well as common in prescribers who recognize their need to upskill on insulin therapy, or have limited time to follow up patients at general practice (Brod et al., 2008; Gherman et al., 2011; Karter et al., 2010; Krall et al., 2015; Lakkis, Maalouf, Mahmassani, & Hamadeh, 2013; Orr-Walker, 2017). PIR also appear more common in ethnic minority groups, women, and in people with low socio-economic status (Brod et al., 2008; Larkin, 2008; Machinani et al., 2013; Nam, Chesla, Stotts, Pharmd, & Janson, 2010). However, it is beyond the scope of this research to focus on HCP issues, gender or socio-economic status of the participants. The primary focus of this research is to explore, if the participants' ethnicity, cultural backgrounds and beliefs have any significant impact on PIR (Nam et al., 2010; Patel et al., 2011; Talemaitoga, 2018; Tiatia, 2008; Tu'itahi, 2009).

Consequently, the aims of this research were to explore the phenomenon PIR in PI people, using a "two-case" case study methodology (Yin, 2014, p. 63). People from the Pacific indigenous islands who have migrated to Aotearoa, are recognised as minority ethnic groups in Aotearoa, NZ (Bell et al., 2001; MPP, 2018). Significantly, minority ethnic groups are recognized in the literature as more prone to PIR (Bogatean & Hancu, 2004; Jha et al., 2015; Larkin, 2008; Polonsky et al., 2005). Although research on PIR have increased in culturally specific backgrounds over the last decade (Jha et al., 2015; Lakkis et al., 2013; Machinani et al., 2013; Patel et al., 2011; Taylor et al., 2017; Yoshioka, Ishii, Tajima, & Iwamoto, 2014), there is still a need to do more research per country, to determine patient and HCP issues regarding PIR (Lakkis et al., 2013).

Poorly controlled DM over time, ultimately puts people with diabetes at high risk of complications such as heart attacks, kidney failure, blindness, leg amputations and depression (DiPiro et al., 2014; Fu, Qiu, & Radican, 2009; Hendrieckx, Halliday, Beeney, & Speight, 2016; Orr-Walker, 2017). Pasifika populations in NZ are over-represented in poor health outcomes especially with regards to T2DM (MOH, 2014a; Pasifika Futures, 2015; Ryan et al., 2011; Southwick et al., 2012; Talemaitoga, 2018).

T2DM is causing major negative impact on PI individuals, as well as amongst Pacific communities (MOH, 2014a). According to Talemaitoga (2018), “Pacific people have the highest rates of mortality for diabetes” (p. 3). Consequently, the high cost of living with diabetes, as well as the significant early deaths for PI people from diabetes, must be a concern for Pacific families and the NZ health care systems.

Therefore, preventing chronic illnesses and effective management are key to improving health outcomes for Pacific people (MOH, 2014a). Effective management of T2DM in Pacific people often includes insulin treatment (NZGG, 2012; Orr-Walker, 2017). Other important solutions well-known to help reduce health care disparities in Pasifika people, include involvement of consumers and families in their care plans, PI peoples’ ethnic-specific research and effective training of the health care workforce to implement holistic health care (MOH, 2014a; Talemaitoga, 2018). Similarly, increasing numbers in the Pacific health workforce as well as “developing Pacific models of care”, must be the appropriate response to health care inequalities in NZ (MOH, 2014a; Talemaitoga, 2018, p. 4).

This study aimed to research issues pertinent to Pacific people affected by diabetes and requiring insulin treatment. The CS methodology (Yin, 2014) was chosen to explore in-depth, what the participants’ experiences were regarding diabetes and insulin treatment. As well, the use of the Fonua Health Model (Figure 2, p. 14) as the theoretical model aimed to equate the participants’ experiences with their cultural view of health (Tu’itahi, 2009). According to Tu’itahi (2009), Pasifika models or frameworks are based on indigenous Pasifika concepts, beliefs, values, knowledges and practices. Pacific values prioritise love, reciprocity, respect and wisdom. Also central to a Pasifika person’s wellbeing, is their need to always feel connected to their family and cultural roots (MOH, 2014a; Talemaitoga, 2018; Tu’itahi, 2009).

The word “Fonua” is a Tongan word meaning land. Land is central to sustaining life, maintaining health, harmony and well-being, in relations to human beings. Tu’itahi (2009) has likened the whole person to the fonua; and the person as a complete unit consists of five dimensions. These are the physical, mental, spiritual, collective community and environment. These five dimensions are inter-connected and must be cared for similarly to sustain holistic wellbeing. Tu’itahi also identified five levels a PI person is connected to such as close family, village (local), national and the global

community. Health issues pertaining to all these levels must be addressed, for the individual, local, national and global communities to sustain health (Tu’itahi, 2009).

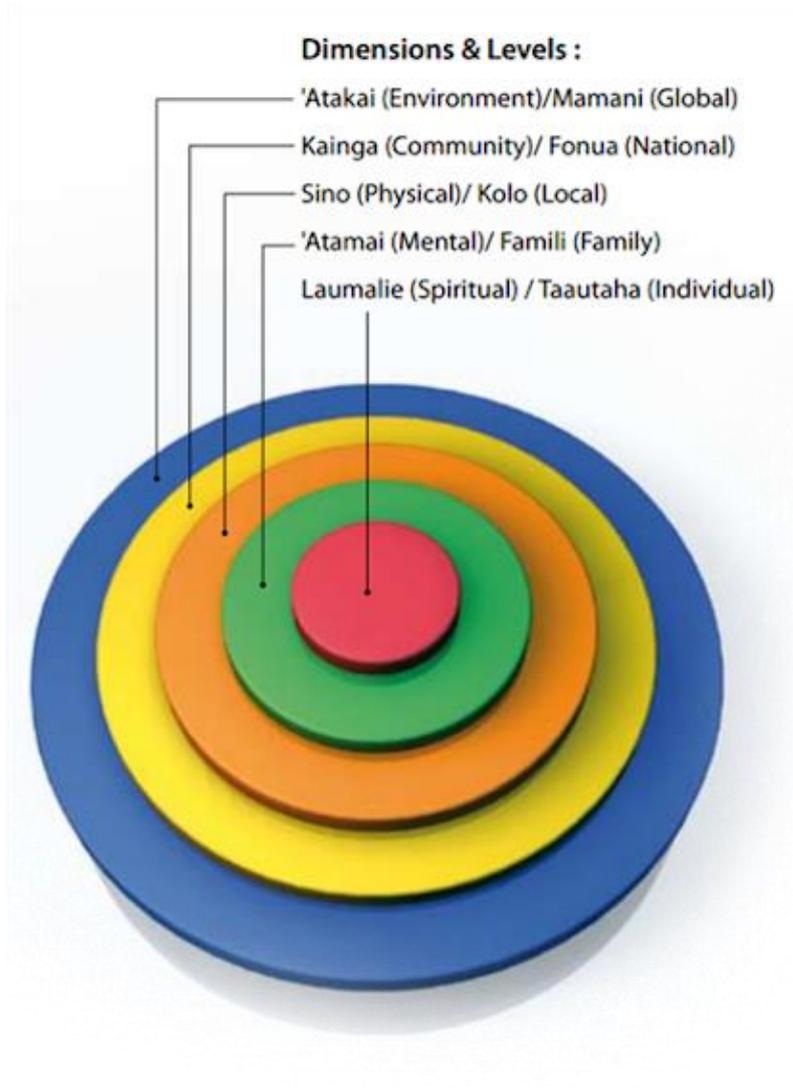


Figure 2. Image of the Fonua Health Model by Tu’itahi, S. (2009). Reprinted with permission.

Religious beliefs or spirituality (centre circle of the Fonua Model) are perhaps the least discussed or examined aspect of a patient’s health care (Egan, 2018; Leavasa, 2018). However, in Pacific people’s cultures, spirituality or belief in a personal God or gods is well recognised as a determinant of health (Leavasa, 2018; Schaaf & Schaaf, 2005; Talemaitoga, 2018; Tiatia, 2008; Tu’itahi, 2009). PI people are very religious (Leavasa, 2018), with 72% reporting they have a religious affiliation at the 2013 census. According to Leavasa (2018) spirituality is deeply significant, because it “navigates an individual” and how they perceive the world (para, 4). Subsequently, strong religious beliefs can become a barrier to good diabetes management, because PI people can hold

God responsible for their health outcomes, instead of actively self-managing their diabetes (Schaaf & Schaaf, 2005). On the other hand, strong religious beliefs can be an asset to good health, when PI people rightly believe they have a spiritual and moral responsibility to actively treat diabetes (Leavasa, 2018; Schaaf & Schaaf, 2005).

The second and third inner circles of the Fonua Model representing the mental and physical domain of a person, are usually the most discussed and cared for in health services. The fourth circle represents the community (Fonua) or the intermediate surrounding of the individual (Tu'itahi, 2009). This would refer to the extended families, church family, schools, and support networks (village), and may include national plans and directives. Therefore, an individual needs to have all these four circles (levels and domains) functioning in harmony, for that individual to live a healthy life. The outer-most sphere of the model represents global influences that can impact an individual's health (Tu'itahi, 2009). Global influences such as natural disasters and spread of infectious diseases (WHO, 2018b) can impact the wellbeing of an individual. Consequently, the state of the global health environment also needs attention, if the PI individual's wellbeing is to be fully protected (Tu'itahi, 2019)

Low health literacy is another chief barrier to good diabetes management and optimum health and wellbeing. It makes a critical contribution to health inequalities for Maori and Pacific populations in NZ (Bpac NZ, 2012; MOH, 2014a). Good health literacy is defined as the ability to obtain, process and use basic health information in order to adequately navigate health care services, and to make informed and beneficial health care decisions (Bpac NZ, 2012; MOH, 2015a). Health literacy enables people to understand prescribing instructions, appointment letters and education brochures (Health Navigator NZ, 2018a, para. 2). Therefore, simplifying and redesigning education materials to provide simple and culturally relevant information, should help PI people's understanding of their conditions and medications (Bpac NZ, 2012; MOH, 2014a; Pharmac, 2017), thus improving adherence to medications, such as insulin (Hendrieckx et al., 2016; Larkin, 2008; Polonsky et al., 2017).

As PIR has proven to be very complex and multifactorial causing significant delays in initiation, titration and continuation of insulin therapy, many studies and critical reviews of the literature have been done on this topic. There are also many strategies and ideas suggested to reduce PIR in people with T2DM. These include first

appreciating and understanding the complexity and multifactorial nature of PIR (Brod et al., 2008; Gherman et al., 2011; Nam et al., 2010; Sahin et al., 2015). It is also important to remember that the attitudes and knowledge base of HCP contribute significantly to PIR (Brod et al., 2008; Jha et al., 2012; Larkin, 2008; Nam & Song, 2004; Polonsky, 2017; Yoshioka et al., 2014). Some of the HCP negative attitudes were reported to be disbelief about the benefits of insulin, doubts about a patient's compliance with treatment, fears of hypoglycaemia and whether the patient will cope with daily management of insulin injections (Brod et al., 2008; Gherman et al., 2011; Polonsky et al., 2017).

Other important strategies reported in the literature to help reduce PIR were cultivating good patient and HCP relationships, addressing the patient's personal fears, simplifying insulin regimes, use of modern insulin analogues and pen devices, prescribing shorter needles, and having a patient-centred and culturally competent approach (Brod et al., 2008; Gherman et al., 2011; Krall et al., 2015; Larkin, 2008). Polonsky et al. (2017) also highlighted that while many studies focussed on overcoming barriers to starting insulin, there was less evidence on how to get patients off to a "good start" (p. 1). They emphasized having an "effective insulin conversation" very early on at diagnosis of T2DM or shortly after (Polonsky et al., 2017, p. 2). This helps to introduce the possibility of needing insulin therapy later, if required. They also emphasized timely and ongoing support for people on insulin treatment, to reduce PIR (Larkin, 2008; Polonsky, 2017).

4. METHODOLOGY

4.1 Qualitative Case Study Research

This study used a qualitative Case Study (CS) methodology to investigate how two PI clients diagnosed with T2DM, responded to the prescription of insulin therapy and ongoing use of insulin treatment. CS methodology has been described as a creative and flexible form of qualitative enquiry, creating an alternative to traditional methods of describing a participant's perspective, on a significant life experience (Harrison, Birks, Franklin & Mills, 2017; Zucker, 2009). When selecting cases, the researcher should choose wisely so the selected cases would produce crucial information to maximize learning, in the period selected for the study (Tellis, 1997). CS research has been popular since the 1960s especially with nurses, amongst many other disciplines (Cronin, 2014).

According to Yin (1994) "case study is an empirical enquiry" which focuses "on a contemporary phenomenon within its real-life context" ... and is "suitable for studying complex social phenomena" (p.1). As well, Baxter and Jack (2008, p. 544) agree with Yin (1994) and Zucker (2009) that rigorous qualitative CS research "afford researchers opportunities to explore or describe a phenomenon in context using a variety of data sources". In addition, the "closeness" of CS methodology hopefully produces a deep understanding and "insightful appreciation", of how and why the case (s) behave as they do (Yin, 2012, p. 4). Incidentally, Yin has been acknowledged over the last three decades as the main consultant on CS research and methods (Baxter & Jack, 2008; Cronin, 2014; Hancock & Algozzine, 2017, Tellis, 1997; Yin, 1994; Zucker, 2009).

CS research is often described as a qualitative enquiry but is also described as a bridge across other paradigms, because it sometimes uses quantitative or mixed methods for data collection and analysis (Harrison et al., 2017). CS methods assume that naturally, the context is of great relevance and importance to the phenomenon under investigation (Gerrish & Lacey, 2010). As well, "the insider knowledge of the context" and the ability to access crucial information, is of great importance in choosing the right cases and gathering the relevant data for the study (Gerrish & Lacey, 2010, p. 237; Polit & Beck, 2017). Additionally, CS research is a triangulated research strategy where at least two perspectives or data sources converge, adding confidence to study findings (Cronin, 2014; Yin, 2014).

At the start of this study, different research methodologies such as phenomenology and autoethnography were originally considered. But having examined other qualitative research methods, CS research was considered an appropriate methodology to investigate the phenomenon of PIR in PI people. CS methodology was ultimately chosen because it offered the opportunity to investigate in-depth what the participants' barriers were to insulin therapy, using a variety of data sources (Hancock & Algozzine, 2017; Yin, 2014). PIR is a complex and multifaceted phenomenon mainly affecting people with T2DM, and if not well addressed, it adversely affects a decision that is far too important to overlook (Bogatean & Hancu, 2004; Gherman et al., 2011; Larkin, 2008; Orr-Walker, 2017). As discussed earlier, insulin therapy is beneficial, and its efficacy proven in treating T2DM (NZGG, 2012; Orr-Walker, 2017; UKPDSG 1998).

4.2 Case Study Research Designs

In CS research, five components are crucially important (Yin, 2014, p. 29):

1. a case study's questions;
2. its propositions, if any;
3. its unit(s) of analysis;
4. the logic linking the data to the propositions; and
5. the criteria for interpreting the findings.

4.3 Basic Types of Designs for Case Study Research

According to Yin (2014), there have been no formal designs for CS research as one might find in surveys and experimental studies. However, CS research can be successfully carried out without a formal design. Attending to a potential study design can make the research easier, stronger and more transparent. A single-case design is appropriate in critical, unusual, revelatory, common, or in a longitudinal case (Yin, 2014). "The single case can represent a significant contribution to knowledge and theory building by confirming, challenging or extending the theory" (Yin, 2014, p. 51). Single-case studies are therefore a common design when doing case study research (Yin, 2014).

However, while all designs can be used successfully in CS research, Yin's advice is to preferably use a multiple-case design if given a choice. Even doing a "two-case" case study is better than doing a single-case study (Yin, 2014, p. 63), because the analytical benefits will be more significant than having a single case for the final analysis. But

choosing a multi-case design also poses additional questions. Choosing more than one case has a replication logic corresponding to using more than one experiment. The more the experiments are repeated or replicated, the more robust the original findings become. Likewise, the judgement behind choosing a multiple-case design in CS research is “replication, not sampling logic” (Yin, 2014, p. 57). Accordingly, this research used the “two-case” multiple case methodology.

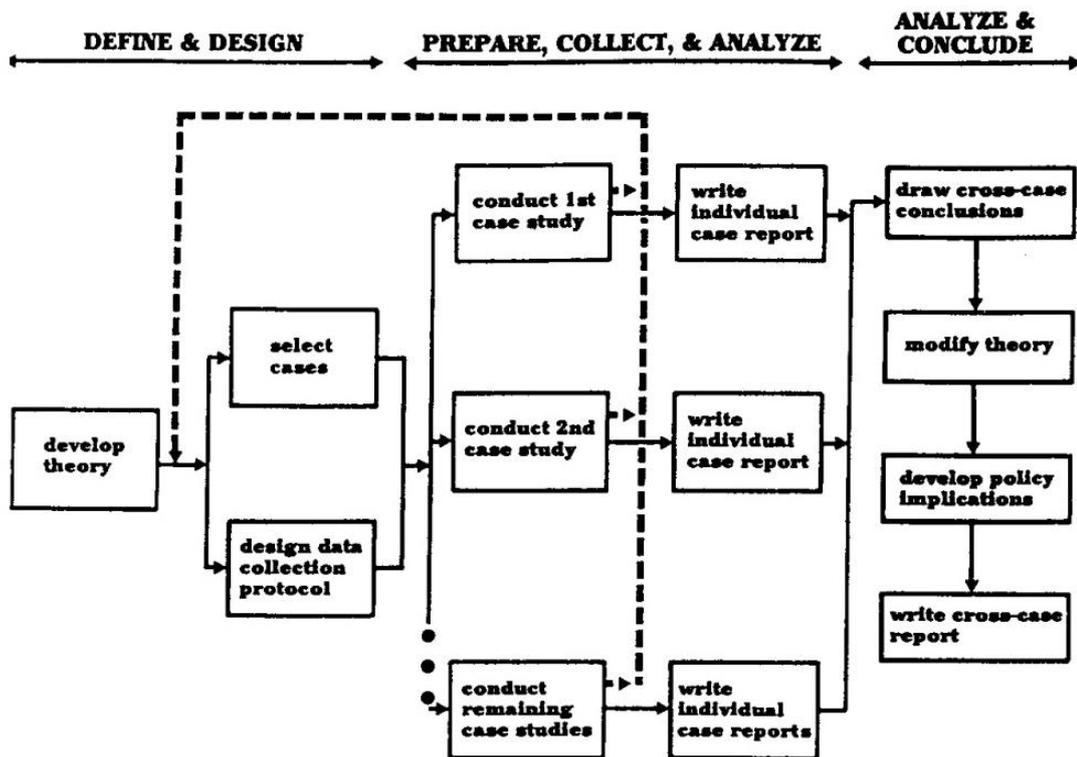


Figure 3. *Multiple-Case Study Procedure by Yin (2014, p. 60)*

4.5 Sampling

In much of the literature on CS methodology, there is no clear or precise explanation of how to undertake sampling for potential participants. Nonetheless, Yin (2014) argues that the terminology sampling or “sampling logic” (p. 59) in CS research is inappropriate as it is not the best design for evaluating the prevalence of a phenomenon. In CS research, investigating the phenomenon under question in its real-life context, would potentially yield a great number of related variables. But sampling logic would imply a “large sample of cases”, prohibiting an in-depth investigation into any given case, therefore opposing the purpose of CS methodology (Yin, 2014, p. 59).

Instead, Yin (2014, p. 59), advocates the use of a “replication logic” in CS sampling. He explains that “each individual case study consists of a “whole” study, in which

convergent evidence is sought regarding the facts and conclusions for the case” (Yin, 2014, p. 59). A single-case study results are then considered to be the information needing repetition, or replication, by other separate cases. In a holistic multiple-case design, each case should be cautiously selected so that it either produces similar results (literal replication) or yields predictable contrasting results (theoretical replication).

According to Yin (2014), the CS researcher may choose two or three “literal replications” when their chosen theory is straightforward. Incidentally, this research has chosen two cases; the second case replicating the processes applied to case one.

However, in the Nursing field, researchers have consistently used the terminology of purposive and critical case sampling when discussing CS research (Coyne, 1997; Houser, 2018; Polit & Beck, 2017). According to Coyne (1997), “all sampling is purposeful in qualitative research” (p. 627), but one of the strategies of purposive sampling is critical case sampling. Nurse researchers also concur that sampling in CS methodology involves the researcher’s pre-understanding of the issue and its context (Gerrish & Lacey, 2010; Polit & Beck, 2017). This is especially useful for nurses and practitioners in health care because of their experiences in practice. The use of CS research is therefore popular with nurses, who wish to conduct in-depth inquiries into issues commonly seen in their clinical practice (Moule, Aveyard, & Goodman, 2017).

Subsequently, after extensive reading and consulting with supervisors and cultural mentors, the researcher made an application to the Ethics committees with a proposed method of selection and recruitment. Two potential participants were to be identified and recruited from the author’s clinical workplace, subject to ethics and locality site approval. The researcher approached the potential participants with the written information letter, as these participants were deemed the most suitable to inform the research. Verbal explanations were also given at the same time which is the culturally appropriate way to approach PI people (HRCNZ, 2014; Tiatia, 2008). In total, five potential participants were offered information letters. The first two potential participants who contacted the researcher for more clarification of the study, agreed to participate and signed the consent forms. Copies of the Information letter (Appendix B, p. 78) and Consent form (Appendix C, p. 81) are attached.

While waiting for the research locality site authorisation to be approved, the researcher did a pilot interview with a willing participant. She was one of the five potential

participants that was approached and given the information letter for the study. There were twenty-seven semi-structured questions altogether (Appendix A, p. 73), organized under the headings of seven propositions (Table 1, pp. 25 & 26). The participant used to test the study questions thought some of the questions were repetitive. It was clarified that the questions were not completely the same and they were designed to delve into the participant's memories regarding their past experiences, relevant to the study objectives. The pilot interview went well and there was a wealth of relevant information gathered as a result. Consequently, the pilot questionnaire became the interview tool for interviewing the study participants, with no alterations made to the original questions.

4.6 Unit (s) of Analysis

Usually, case studies focus on an individual as the case, but the case can also be a small group, a family, or community (Houser, 2018; Yin, 2012, 2014). According to Baxter and Jack (2008) the case is the unit of analysis. Once the case is determined, then binding the case or setting the criteria becomes important to limit the study to a feasible project (Baxter & Jack, 2008). Accordingly, seven propositions (Table 1, pp 25 & 26) set the parameters for the scope of this study. However, the criteria for eligibility to participate in this research were PI ethnicity, clinical diagnosis of T2DM, residency in NZ and the potential participant's medical history fits the context of the study (Baxter & Jack, 2008; Yin, 2014). The context of this study was the prescription of insulin therapy within the last ten years. The number of participants was limited to two (Figure 4), to allow for an in-depth and holistic investigation of the phenomenon under enquiry.

Multiple-Case design: a “two-case” case study (Yin 2014, p. 63).

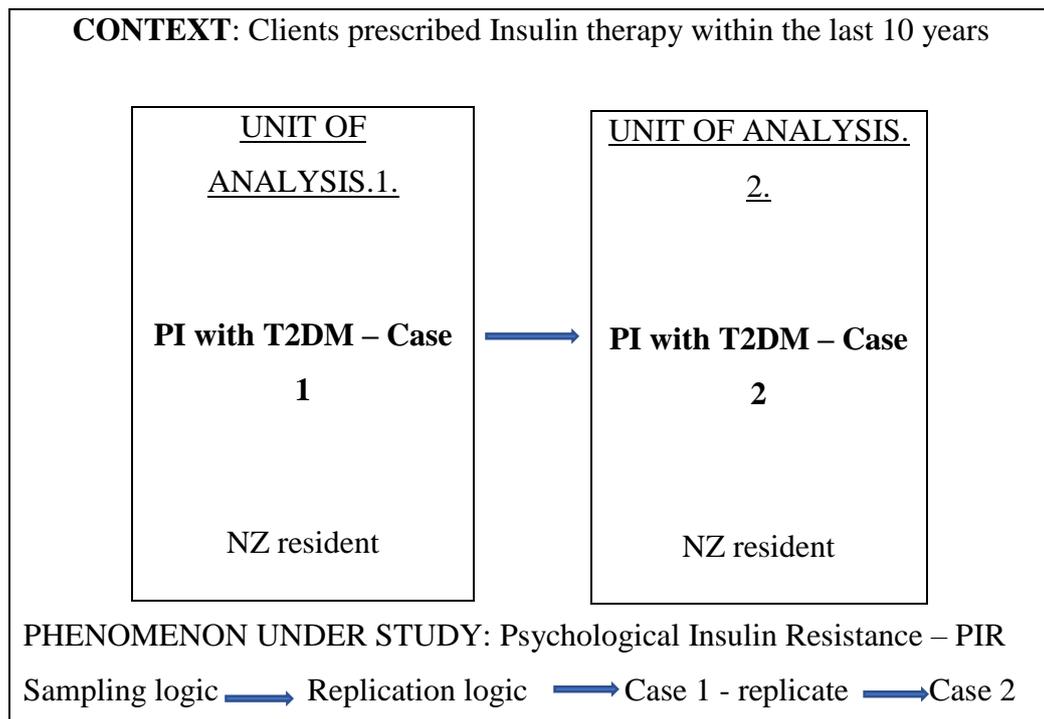


Figure 4. Summary of the Research Design for this study - a "two case" Case Study

4.7 Data Collection

In CS research, six sources of data are commonly used to gather evidence. These are “documentation, archival records, interviews, direct observations, participant observation and physical artefacts” (Yin, 2014, p. 103). The most important strength of CS research is the ability to use multiple sources of evidence, allowing the researcher to address a wider range of historical and contemporary behavioural issues. According to Yin, the greatest advantage presented by using information from multiple sources is the “converging lines of inquiry” (2014, p. 120). This convergence of data from at least two different sources of information, to confirm the consistency of findings is called triangulation (Yin, 2014).

The researcher chose three sources of evidence to collect information about the cases. The sources are semi-structured interviews of the study participants, relevant medical data, and direct observations documented by the researcher while interviewing and interacting with the participants. An interview guide or protocol is necessary to identify appropriate and relevant open-ended questions for the interviews (Hancock & Algozzine, 2017). Next, the researcher needs to consider the best place for the interview to take place. A private, neutral and distraction free place is likely to be the best, and one that is suitable for the participant’s wishes (Hancock & Algozzine, 2017).

The participants were given options of places and times for face to face interviews, and the researcher worked around their availability. The researcher also used follow-up telephone calls to do “member checking” (Hancock & Algozzine, 2017, p. 72), especially with regards to some critical information pertinent to PIR, such as reasons for hesitation to titrate insulin doses.

Recording interviews by handwritten notes is considered adequate and is left to the discretion of the researcher (HRCNZ, 2014; Tellis, 1997), otherwise audiotaping the interviews maybe the best option, subject to the participant’s permission (Hancock & Algozzine, 2017; Yin, 2014). In this study, the interviews were recorded by handwritten notes, and the participants were comfortable with this method. The researcher also found this method appropriate and adequate for both parties, as there was less distraction and concern that any audio recording might not be clear. A household full of school aged children would be considered noisy and distracting, which was the case with two of the interviews. The face to face interviews took place at the participants’ homes and in the community, with an average of forty minutes per interview. As well, there were telephone follow-up interviews (Creswell & Creswell, 2018), a total of five interviews per case. Ethical and legal requirements were observed before the study started, such as ethics approval, participant consent and site locality approval.

CS research takes place in real-world situations, therefore creating various opportunities for qualitative and direct observations (Creswell & Creswell, 2018; Yin, 2014). The observations can be formal or informal ranging from using observational instruments to taking notice of the participant’s physical environment and behaviour during interviews (Yin, 2014). According to Hancock and Algozzine (2017), the researcher must first identify what must be observed, which will help shed light on the topic under study. In this study, the researcher found it useful to observe how the participant was responding to the interview and the questions being asked. The very nature of the topic under investigation indicates an emotional burden or discomfort, which can affect the participant’s state of mind and emotions, which ultimately affects the way they answer the questions (Alberti, 2002; Gebel, 2013; Hendrieckx et al., 2016; MOH, 2015). The researcher is considered culturally and clinically competent to attempt this research, therefore, her observations and record keeping of the data could be judged reliable (Talemaïtoga, 2018; Yin, 2014).

The third source of data collected for this research was medical data from the participants' medical notes. For this study, the researcher requested the participants' medical data that is relevant to the research objectives. The researcher applied to the relevant Ethics committees and sought authorisation from the study locality provider. Following approval from the above authorities and consent signed by the study participants, the researcher accessed the participants' medical data for the purposes of this research. The medical data used for the study, were recorded using the SOAP (Subjective, Objective, Assessment, Plan) format ("Template for Clinical SOAP Note Format", n.d.).

Other characteristics of case studies identified in the literature by Baxter and Jack (2008) are propositions or issues. Propositions may be extracted from the literature or come from personal or professional experience. "Propositions are helpful in any case study" because they are specific to the study and help limit the study to an achievable project (Baxter & Jack, 2008, p. 551). Consequently, a framework of propositions to manage data collection and to guide the study was devised (Table 1, pp. 25 & 26). According to Yin (as cited by Baxter & Jack, 2008, p. 555), returning to propositions later in the analysis phase also keeps the study focussed and organised, and any rival propositions are identified and addressed.

Table 1. *Case Study Propositions***Seven Case Study Propositions**

Potential Propositions	Sources (Literature, Personal, Professional)	Rival Propositions – if any
1.The diagnosis of diabetes is a very distressing time for the client and families.	Professional experience and Literature (Alberti, 2002; Drury & Gatling, 2005; Hendrieckx et al., 2016; MOH, 2015b; Murtagh & Rosenblatt, 2011; Schaaf & Schaaf, 2005).	
2.Patients with diabetes feel worn out and burnt-out with the demands of diabetes management.	Professional experience and Literature (Alberti, 2002; Drury & Gatling, 2005; Gebel, 2013; Giese, 2018; Hendrieckx et al., 2016; Mascott, 2015; MOH, 2015b; Murtagh & Rosenblatt, 2011).	
3.Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR).	Professional experience and Literature (Allen et al., 2016; Brod et al., 2008; Fu et al., 2009; Gherman et al., 2011; Korytkowski, 2002; Larkin, 2008; Polonsky & Jackson, 2004; Polonsky et al., 2005).	
4.After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR).	Professional experience and Literature (Allen et al., 2016; Brod et al., 2008; Fu et al., 2009; Gherman et al., 2011; Korytkowski, 2002; Larkin, 2008; Polonsky & Jackson, 2004; Polonsky et al., 2005).	
5.There are multiple and complex psychosocial factors that all interact together, impacting an important decision to implement insulin therapy (PIR).	Professional experience and Literature (Brod et al., 2008; Gherman et al., 2011; Hendrieckx et al., 2016; Larkin, 2008; Leavasa, 2018; O’Connor, 2016; Patel et al., 2011; Sahin et al., 2015; Talemaitoga, 2018; Taylor et al., 2017; Woudenberg, Lucas, Latour, & Scholte op Reimer, 2012).	
6.PIR is more common in ethnic minority populations and there is an increasing need to study this phenomenon in “culturally sensitive settings”.	Professional experience and Literature (Bogatean & Hancu, 2004, p. 247; Jha et al., 2015; Larkin, 2008; Ludeke et al., 2012; Machinani et al., 2013; Patel et al., 2011; Polonsky & Jackson, 2004; Polonsky et al., 2005; Taylor et al., 2017).	

7. Family, culture, misconceptions and religious beliefs all contribute to PIR	Personal experience and Literature (Bogatean & Hancu, 2004; Drury & Gatling, 2005; Hendrieckx et al., 2016; Leavasa, 2018; Ludeke et al., 2012; MOH, 2014a; NZGG, 2012; O'Connor, 2016; Schaaf & Schaaf, 2005; Talemaitoga, 2010, 2018; Te Karu, Bryant, Harwood, & Arrol, 2018).	
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(Adapted from Baxter & Jack, 2008, p. 551)

As well, Yin (2003) strongly recommended theory development or a framework before data collection to facilitate the collection of data. The role of theory development before data collection is one point of difference that sets case study methodology apart from other qualitative methodologies (Yin, 2003). Not only that, Yin concluded that when a theory is well developed, it is at that same level that generalizations of the findings will occur using analytic generalizations. Accordingly, to keep this research relevant to PI people's holistic health aspirations, ethnicity and culture, the researcher chose the Fonua Health Model (Figure 2) as the theoretical framework for the study (Tu'itahi, 2009). The researcher sought permission from the author of the Fonua Health Model for use in this research, and permission was granted by the author.

4.8 Theoretical framework: Fonua Health Model (Figure 2)

Tu'itahi (2009) explains why Pacific Models are necessary:

- Diverse cultures mean diverse tools in order to be effective; one tool for all is a recipe for disaster
- Pacific peoples see the world through their own eyes and experience
- To provide tools that are culturally appropriate and effective for Pacific peoples in order to improve and maintain their material and spiritual health & wellbeing
- Pacific peoples have a special relationship with the NZ Govt
- Cultural democratic rights –UN 1948
- Indigenous knowledge enriches our basket of knowledge

Tu'itahi (2009)

4.9 Linking Data to Propositions

Analysing the evidence is one of the least developed and most difficult phases of CS research according to Yin (2014). It is therefore necessary to have a general strategy for a start. The researcher can start their “own analysis by “playing” with the data” and search for emerging patterns, impressions or insights (Yin, 2014, p. 132). Data can be placed into arrays, flowcharts, tables or diagrams where they can be matched, manipulated or sorted into frequency of events, occurrences or even rival explanations. These activities will help start a general analytical strategy. Defining original codes and subsequent codes and resulting concepts will also require rich and clear descriptions, of how these connect to the research objectives (Yin, 2014).

Yin also writes about four general analytic strategies that can be used:

- Relying on theoretical propositions
- Working your data from the “ground up”
- Developing a case description
- Examining plausible rival explanations

(Yin, 2014, pp 136 –140)

Yin also presented five analytic techniques that need to be used as part of the general strategies. He cautions that none of these techniques should be treated as easy to use and the researcher will need lots of practice to use one competently. However, he advises the goal is to start modestly and work “thoroughly and introspectively”, aiming to build one’s “own analytic repertoire over time” (Yin, 2014, p. 143). The five analytic techniques are pattern matching, explanation building, time-series analysis, logic models and cross-case synthesis. The first four techniques can be used with single or multiple-case research, but cross-case synthesis can only be used in the analysis of multiple-case studies (Yin, 2014).

In general, this research used the analytic strategy of linking data to the study propositions and used pattern matching as the general analytic technique (Yin, 2014). Another analytic technique used for analysing this study was the cross-case synthesis. The technique is relevant if a case study has more than one case. As advocated by Yin (2014), even having a “two-case” case study will improve the robustness of the findings, and the analysis is likely to be easier (2014, p. 164). The study propositions which guided the participants’ interview questions for this research, have been

specifically devised to focus the study on relevant information, and to limit the scope of the study to feasible boundaries (Yin, 2014; Baxter & Jack, 2008).

Returning data to the study propositions helps to focus the analysis on answering the research question and objectives which led to the study (Yin, 2014). According to Baxter and Jack (2008), this iterative technique of linking the data back to the propositions and its sources increases confidence in the findings, by addressing the propositions and any rival propositions that may arise. One important pitfall to avoid in the analysis stage of CS research, is to analyse data from different sources separately and report them independently (Baxter & Jack, 2008). The CS researcher needs to “ensure that the data are converged in an attempt to understand the overall case” (Baxter & Jack, 2008, p. 555), and not try to understand different parts of the data independently. A key factor in doing CS research “is summarising and interpreting information” simultaneously (Hancock & Algozzine, 2017, p. 63; Zucker, 2009).

4.10 The criteria for interpreting the findings

As previously emphasized, the analysis of this study followed the seven propositions (Table 1) that shaped the interviews, directed field observations and influenced the choice of documents that were studied for the investigations (Yin, 2014; Zucker, 2009). The propositions came from the literature as well as personal, cultural and professional experiences (Baxter & Jack, 2008; Pulotu-Endemann, 2001; Tu’itahi, 2009; Yin, 2014). As Yin stated, there is no fixed prescribed way of analysing data in CS research, but he presented four choices of general analytical strategies and five analytic techniques that could be used by the CS researcher. He even proposed that using coding and frequency of codes methods could be a primitive way of trying to conceptually answer the “how” and “why” questions (Yin, 2014, p. 134).

Therefore, according to Yin (2014) developing rich and full explanations describing one’s CS is still the main responsibility of the researcher and requires analytic reasoning and analysis on the researcher’s part. However, Hancock and Algozzine (2017) proposed some illustrations in quantifying written data into counting words, phrases, themes, characters and concepts. Counting words is useful when determining the frequency a word is used across the collected information. Nevertheless, themes are apparently more useful to count than words (Hancock & Algozzine, 2017). A theme maybe a simple sentence with a subject; and counting the number a person is

mentioned in the data can also be useful in some analyses. Lastly, concepts are derived from counting related words (Hancock & Algozzine, 2017).

Another strategy for analysing CS information is described by Thomas (2014) and Zucker (2009). They agree that methods and analysis happen simultaneously in CS research, and that methods and analysis are iterative processes. After considering the available data and relevant literature pertinent to this study, the researcher chose this process (Thomas, 2014; Zucker, 2009) as a guide to analyse the data gathered for the study. These methods and techniques of analysis closely resemble the ones suggested by Yin (2014), which are linking data to the propositions, and pattern matching. Thomas (2014) described the three stages of methods and analysis which occur simultaneously:

Methods and Analysis

Stage 1- Describing experience - The data collected from multiple sources are mapped; and then categorised using colour codes, taxonomies and chronological ordering.

Stage 2 – Describing meaning – In this stage the researcher consults the literature and links the research questions and methods to the philosophical framework.

Stage 3 – Focus on the analysis – Generalization of case study findings are limited to the case itself or types of cases, but attention to selected details enhances the analysis and increases the clarity of reasoning. Use of an extreme case, the deviant case and the normal case are helpful in making comparison so as to enhance rigour in the study design.

(Thomas, 2014, SlideShare. 24 - 26)

4.11 Analysis

According to Patton (2002), Stake (1995), and Yin (2014), case study analysis can focus on issues or propositions that guided the data collection, designed to answer the research enquiries. Stake (1995) also elaborates that if a case is a person, the CS researcher sometimes becomes a biographer and gets to explore part of a case's life history that is pertinent to the research, "against a thematic set of issues" (p. 96).

However, Moule and Goodman (2014) cautions that rich and detailed descriptions of a case's background history, context of the study, and any sensitive personal data may

present ethical issues. Therefore, care must be exercised to preserve the participant's privacy, especially in healthcare settings (Crowe et al., 2011; Moule & Goodman, 2014; Waters, 2017).

4.12 Linking Data to the Fonua Health Model

In Stage 2 of the methods and analysis process (describing meaning), the researcher linked the analysis summary of the three data sources (Appendix L [p. 125] & Appendix P [p. 158]) to the Fonua Model and explained the relationships. A summary of Stage 2 analysis and links to the Fonua Model is also provided in the result sections of Case 1 (p. 33) and Case 2 (p. 42). The spiritual, mental and physical spheres of the Fonua Model depict the necessity of the three domains to be considered together, when addressing a Pasifika person's immediate health status (Pulotu-Endemann, 2001; Leavasa, 2018; Tu'itahi, 2009). The same spheres also represent the individual, immediate family and local environment (Figure 2, p. 14). Tu'itahi has also rightly placed spirituality in the centre of his health care model; as spirituality influences PI people's daily decision-making, including their wellbeing and major directives in life (Leavasa, 2018; LeVa, 2014; Schaaf & Schaaf, 2005; F. Sopoaga, personal communication, November 12, 2018; Tiatia, 2008).

4.13 Ethics

This study has obtained approval from the University of Otago Human Research Ethics Committee – H17/150 (Appendix D, p. 83), Te Komiti Whakarite (Appendix E, p. 85), Health and Disability Ethics Committee - Out of Scope Letter (Appendix F, p. 86) and CDHB locality (Appendix G, p. 88). Furthermore, a Pacific cultural mentor is part of the research team and her role is to advise and support the cultural appropriateness and cultural safety of the study, for both participants and the researcher (HRCNZ, 2014). A cultural mentor was recommended by the Research Proposal Review Panel to be part of the research team, to strengthen the Pacific cultural underpinnings and cultural integrity of the study processes. Moreover, this is in accordance with the writings of the HRCNZ (2014) which advocates for culturally sensitive approaches, as “means towards achieving social justice for vulnerable populations” (p.11).

4.14 Disseminations of Findings

The results and findings of this study will be presented to the Diabetes Centre staff at one of their monthly journal club meetings. Publication in the Diabetes New Zealand quarterly magazine and the local Diabetes Christchurch monthly newsletter are other

appropriate options to maximise dissemination. The *Kai Tiaki* Nursing magazine may be considered also for submission of an article. Disseminating the findings of this research to the PI community has been recommended, so possible avenues for dissemination are through local Pacific radio programmes and at appropriate PI community group gatherings. The Pacific health workforce will also benefit from hearing the results of this research; therefore, a presentation would be arranged for this group. The researcher is also part of the RN prescriber and local Nurse Practitioner networks, so findings can be presented at their monthly or bimonthly meetings.

5. RESULTS – CASE 1

Biography

Case 1 is a forty-year-old woman who migrated from the PI (Samoa) to NZ when she was sixteen years old. She is a NZ resident and has now lived in NZ for over twenty years. She is separated from her husband so cares for four school aged children by herself. She is currently a stay at home mum, on a Work and Income NZ (WINZ) benefit, so finances are usually tight. She has numerous social agencies supporting her plus a helpful church family. Her general English language and understanding is fair and health literacy is reasonable enough that she can understand appointment letters and transports herself to clinical appointments. She is isolated geographically from close family members, so she often feels alone in caring for her young vivacious school aged children.

Case 1 was diagnosed with T2DM eight years ago at the age of 32 years. She was referred five years ago to the diabetes specialist services from her GP, for dietitian and diabetes nurse educator support. Another GP referral was sent recently to the diabetes specialist services citing the need for extra support, due to highly stressful social and family circumstances. The participant was taking oral hypoglycaemic tablets, as well as cholesterol and blood pressure lowering medications. She was prescribed insulin treatment just over one year ago. Case 1 was purposefully chosen as a potential participant because she fitted the criteria for the research, and she consented to be a participant.

5.1 Medical Data – Please see Appendix I (p. 94)

5.2 Findings – Please see Appendix J (p. 103)

5.3 Analysis - Stage 1- Describing Experience – Please see Appendix K (p. 115). In stage one of the analysis, which was describing experience, three patterns or impressions emerged. These impressions were colour coded and categorized under three headings labelled negative emotions, positive emotions and rival explanations (Table 2).

Table 2. *Analysis - Stage 1- Colour Coding Experience*

STAGE 1	Describing Experience	Three patterns emerged
1.Negative Emotions	2.Positive Emotions	3.Rival Explanations

5.4 Analysis - Stage 2 – Describing meaning – Please see Appendix L (p. 125). In stage 2, describing meaning derived from the converging overall data, was the focus of the analysis (Baxter & Jack, 2008; Yin, 2014). The analysis focussed on the seven propositions (Table 1, p. 25 & 26) pertinent to the phenomenon under study. It was also at this stage, that the researcher linked the experience and meaning of the participant’s experience to the Fonua Health Model. Overall, the Fonua Health Model highlighted that Case 1 had tremendous imbalance in her everyday life, impacting on her health and wellbeing in a significant way. This imbalance is caused by her family and social situation where she cares for four children on her own. The family and social issues severely affected her mental and physical health. It also affected her ability to give her insulin injections as prescribed, because she gets exhausted with family care and forgets to inject her insulin (Hendrieckx et al., 2016; Patel et al., 2011; Tu’itahi, 2009).

5.5 Stage 2 – Summary and Linking to the Fonua Health Model

Table 3. *Application of the Fonua Model to Case 1’s experience*

Propositions	Key words and phrases describing the participant’s experiences	Link to Fonua Model (FM)
1. The diagnosis of diabetes is a very distressing time for the client and families.	Worried, trouble, bad, fear, young age, uncertain, panic, stress, anxious	The mental and emotional wellbeing (second circle of the FM) of the participant were severely affected at the time of diabetes diagnosis. It was necessary that Case 1’s immediate family, her support networks such as the HCP team, and local community (second and fourth circle) worked together to keep her safe, while she navigated her troubled mind and emotions.

<p>2. Patients with diabetes feel worn out and burnt-out with the demands of diabetes management.</p>	<p>WINZ benefit, finances tight.</p> <p>Solo parent to four school aged children. Three boys love rugby and sports.</p> <p>Kids transport to sports and schools – keeps her busy</p> <p>Separated from partner</p> <p>Often forget to take medications and insulin due to exhaustion.</p> <p>Likes being active.</p> <p>Tests BGL occasionally.</p>	<p>The physical domain of Case 1 was certainly affected with the daily demands of diabetes care management (third circle of the FM). However, the positive feelings of physical wellbeing since insulin start was also remarkable, which facilitated a positive attitude towards insulin use. But as the FM indicates, Case 1 also needed much family, social and practical support with regular requirements of diabetes management such as reminding to eat healthy, be active and to take her medications (second, third and fourth levels / circle of FM). The HCP team also provided much of that crucial support.</p>
<p>3. Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR).</p>	<p>Did not find the concept hard. She needed it. She accepted the advice to start insulin, because she felt it was right.</p>	<p>Case 1 found the advice to start insulin therapy was not difficult to accept. She believed it was the right advice. Her body also felt lighter. Her HbA1c test improved. But despite her genuinely positive attitude towards insulin use, she still struggled to give her insulin as prescribed. She missed many injections and needed the HCP team to keep a close vigil on her case. As the FM indicated, the support from close relatives and community plus HCP (second, third and fourth circles of FM) were still much needed to encourage her to continue with insulin therapy.</p>

<p>4. After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR).</p>	<p>Case 1 attempted to titrate insulin doses herself following instructions. She was <i>reluctant</i> to keep increasing the doses though. She accepted the need for insulin therapy, but medical records showed she did stop giving the insulin injections at times.</p>	<p>Continuing with insulin treatment as a lifelong therapy is a hard concept to accept, especially by patients with T2DM. Still, Case 1 had a positive attitude towards insulin use (mental status was stable – second circle of FM). Case 1 also needed her family to give positive advice and encouragement for her to continue with insulin treatment. Her immediate family were supportive (second level / circle of FM). The HCP also supported her significantly to continue with insulin daily (third and fourth circle).</p>
<p>5. There are multiple and complex psychosocial factors that all interact and adversely affecting an important decision to comply with insulin therapy (PIR).</p>	<p>Worried and scared at first of the needle and injecting. But once started insulin, Case 1 felt much better physically, so taking insulin became easier. Being a solo mum to four school aged children made her too busy and too tired, therefore she often forgot to inject her insulin.</p>	<p>The issues for Case 1 were originally fears of the needle and negative messages from the community (emotional and mental health affected – second circle of FM). The persistent issue was forgetting to give her insulin some days, due to a very busy daily routine being a solo mum. According to the FM, having a favourable and balanced environment (second and fourth circles) is also needed, if the person is to live a healthy and stable life.</p>
<p>6. PIR is more common in ethnic minority populations and there is an increasing need to study this phenomenon in “culturally sensitive settings”.</p>	<p>PT first doubted the usefulness of insulin. After first injection her body felt light, aches and pains in her joints subsided. She trusted the HCP’s advice. Nothing will stop her from using insulin. It makes her feel better in her body.</p>	<p>The FM is a pan-Pacific model looking at a Pacific person’s health in a holistic manner, as this is how Pacific people generally view their wellbeing. Health is not just physical well-being, but mind, emotions, spiritual and social wellbeing need to be stable too. Her body responded well to insulin therapy (third circle). Case 1 had tremendous challenges in her social and family environments (second</p>

		and fourth circles of FM) so her projected health outcomes were poor.
7. Family, culture, misconceptions and religious beliefs all contribute to PIR	<p>Husband (though separated), sister and her oldest son are supportive of her giving herself insulin. Case 1 needed that positive encouragement from close family members to continue with insulin therapy, especially in the early stages of insulin start.</p> <p>After starting insulin therapy and PT feeling better in her body, she had no doubt that insulin was good for her.</p> <p>Her religious belief was positive and encouraged her to keep giving her insulin as prescribed, so she could stay well.</p>	<p>In Case 1, religious beliefs, family and good understanding of the benefits of insulin treatment, were positive influences which helped her to continually believe in the usefulness of insulin (first, second, and third circles of the FM). This helped minimize the effects of PIR in her case.</p> <p>Moreover, being of PI ethnicity did not appear to affect her perception of the benefits of insulin for herself.</p> <p>She felt much better in her body (third circle) and she became convinced beyond doubt, that insulin was necessary for her health and wellbeing.</p> <p>Hence, in line with the concepts of the FM, Case 1's spiritual beliefs, a good mental understanding and positive physical effects of insulin, plus positive family messages, worked in harmony to encourage her to continue with insulin treatment.</p>

5.6 Analysis - Stage 3 – Focus of the analysis

The **first proposition** which predicted being diagnosed with diabetes as a very stressful time proved to be true in Case 1. **There was no positive emotion** or good prospect at all at that time (Alberti, 2002; Hendrieckx et al, 2016; MOH, 2015b; Schaaf & Schaaf, 2005). **The second proposition** which expected clients with diabetes to suffer stress and burn-out from daily demands of diabetes care, **also proved to be valid** (Gale, 2014; Gebel, 2013; Giese, 2018; Hendrieckx et al., 2016; MOH, 2015b). Case 1 felt the extra burden of diabetes care due to caring for four school aged children on her own and being on a WINZ benefit. But she also found that having to watch her diet and increasing her physical exercise levels were helping her feel better. **When she saw her weight reducing at times, it also motivated her to keep up being physically active.**

The third proposition states that starting insulin therapy is a difficult concept to accept, especially by people with T2DM. This often results in outright refusal to start insulin treatment, delaying insulin treatment, or after starting insulin the client can refuse or hesitate to titrate insulin doses to optimal doses. This is termed PIR in the literature (Allen et al., 2016; Brod et al., 2008; Korytkowski, 2002; Polonsky et al., 2005). However, Case 1 consistently maintained in the interviews that she accepted the advice immediately when the doctor told her she needed to start insulin treatment. Once she started to inject her insulin as instructed, her body felt light and the aches and pains in her bones disappeared. Her HbA1c test also improved significantly. According to Hendrieckx et al. (2016), having a diagnosis to explain why a client may have felt unwell, is often a welcome relief. **Case 1 also seemed to appreciate the explanation that her HbA1c test had improved significantly since starting insulin treatment.**

However, the medical notes also reported that Case 1 stopped the insulin injections only days after starting insulin treatment. The Pacific Islands Diabetes Nurse Specialist (PIDNS) was ringing Case 1 at least once a week to remind her to take her insulin and other medications as prescribed. This implied that despite the participant's immediate acceptance of insulin therapy, she still needed a high level of close follow-up from the HCP for her to continue with her insulin treatment. The necessity of close follow-up of clients by the HCP following initiation of insulin therapy is well recognised in the literature (Brod et al., 2008; Funnel et al., 2004; Larkin, 2008; MOH, 2014b; Nam et al., 2009; Polonsky et al., 2017; Talemaitoga, 2018). Case 1 was also required to increase her insulin doses to maximum optimal doses, but as apparent from converging

data sources, Case 1 was hesitant to keep titrating her insulin doses. **So, the third proposition was well proven in Case 1.**

Proposition four followed on from proposition three by suggesting that even after successful initiation of insulin therapy, people with T2DM can hesitate or refuse to titrate insulin doses to achieve optimal BGL. Proposition four also suggests that people with T2DM can even cease to give themselves insulin injections, and this decision can last significantly long periods of time (Allen et al., 2016; Brod et al., 2008; Fu et al., 2009; Gherman et al., 2011). In concordance with the literature, Case 1 appeared to accept the need to start insulin treatment immediately, according to her interviews. The researcher also observed a genuine acceptance by Case 1, that insulin treatment was necessary for her health. However, her medical progress notes recorded that Case 1 was very hesitant to titrate insulin doses as directed by the HCP, and often missed doses of her daily insulin. Hence, while Case 1 appeared to have accepted insulin therapy relatively easy, it was a lot harder to put into consistent practice. **Therefore, proposition four is also shown to be true in her case.**

Proposition five is mainly derived from the literature where studies on PIR have revealed there are many psychosocial factors, which are complex and all intertwined, affecting an important decision to initiate, titrate doses and to continue with insulin therapy (Brod et al., 2008; Gherman et al., 2011; Taylor et al., 2017; Woudenberg et al., 2012). **Case 1 showed some of these classic factors when first prescribed insulin treatment.** She was worried and scared about using the needle for insulin injections. She also heard negative and “bad” things about insulin from PI community people. However, after she started insulin injections, her body felt so much better as already described. This helped her psychologically to accept the need to be on insulin therapy, and to heed the advice from HCP to give her insulin injections as prescribed.

However, other aspects of the definition of PIR are reluctance to titrate insulin doses to optimal dosing, and incidences where clients stop giving the insulin injections altogether (Brod et al., 2008; Karter et al., 2010; Larkin, 2008; Polonsky et al., 2005). Accordingly, even though Case 1 was quick to feel and experience the benefits of insulin treatment in her body and saw her BGL improved, she was still hesitant to keep increasing her insulin doses as advised by the HCP. Her medical progress notes also recorded that at times, she stopped taking her insulin injections believing that her

headaches may have been due to the injections. These aspects of the patients' journey who are prescribed insulin therapy are recognised in the literature as complex psychosocial factors, which influence such important decisions to continue with insulin therapy. **Consequently, proposition five is evident in Case 1.**

The sixth proposition came from the literature and the result of studies conducted in the last two decades, where PIR was being recognised as a significant barrier to good diabetes control, resulting in poor health outcomes (Brod et al., 2008; Fu et al., 2009; Korytkowski, 2002). But recognising that PIR was more common in ethnic minority groups, women and those with lower socio-economic status, only became clearer and researched in the last decade (Bogatean & Hancu, 2004; Jha et al., 2015; Nam et al., 2010; Patel et al., 2011). In Case 1, she first doubted that insulin was going to be helpful for her diabetes, but after the first injection she immediately felt the aches and pains in her body subsided. She also believed the advice and information given by the HCP. Therefore, her ethnicity and cultural beliefs did not appear to affect her decision to accept insulin treatment. **So, proposition six was not shown in Case 1's experience.**

The seventh and last proposition comes from the literature as well as professional and personal experiences. There is consensus that family influence, a client's personal perception, cultural and religious beliefs have significant impacts on their decisions whether to accept insulin therapy, increase doses as necessary and to continue with insulin treatment (Drury & Gatling, 2005; Leavasa, 2018; MOH, 2014a; O'Connor, 2016; Patel et al., 2011; Tiatia, 2008). Case 1 undoubtedly showcased that her close family members' support and encouragement were instrumental in her continuing with insulin therapy. Although Case 1 felt the benefits of insulin therapy in her body, she still needed psychological support and positive reinforcement from her husband (separated) and sister, to keep administering insulin (Hendrieckx et al., 2016; Pulotu-Endemann, 2001; O'Connor, 2016; Tu'itahi, 2009). **Hence, proposition seven is proven.**

As well as positive support from her family, Case 1 also holds positive religious beliefs which has helped her to persevere with insulin treatment. She believes the Bible verses that say faith and works should go hand in hand (King James, n.d.). That means she should show her faith in God by taking her insulin and tablets. Nevertheless, she also knows of families and friends who believe that God will heal them without taking their

medications (Schaaf & Schaaf, 2005). Moreover, it is important to note that the participant's husband heard positive things about insulin while listening to a health talk on a local Samoan radio programme. This gave her husband understanding of how insulin works and enabled him to counsel his wife about the benefits of insulin treatment. These positive messages coming from significant family members and from credible sources in the community, resonate with the principles of the Fonua Health Model (Tu'itahi, 2009).

6. RESULTS – CASE 2

Biography

Case 2 is a 46-year-old woman who migrated from the PI (Tonga) to NZ when she was twenty-six years old. She was married for eleven years before she conceived her first child. She successfully delivered a healthy boy in 2010. She conceived again the following year and she now has two sons. She stays at home to look after her two school aged boys while her husband works full time to support the family. Due to church commitments, the family moved to Christchurch ten months ago. A few months later, she consented to be a participant in this study. Shortly after the completion of the interviews for this research, the participant and her family were required to move again to a different city.

Case 2 was diagnosed with T2DM in 2007 at the age of 35 years. Three years later, she became pregnant for the first time and needed to start insulin treatment immediately to control her BGL. Her medical notes and interviews revealed a massive struggle for her to accept starting insulin therapy, continue with insulin therapy or to titrate her insulin doses to optimal therapeutic doses. For eight years, Case 2 struggled with her diagnosis of diabetes, insulin treatment and associated cares such as BGL testing. When she and her family moved cities later in 2017, she was referred to the specialist diabetes services in her new city. She was chosen as a potential participant because she fitted the criteria for this study. She was given the study information letter and she subsequently consented to be a participant.

6.1 Medical Data – Please see Appendix M (p. 131)

6.2 Findings – Please see Appendix N (p. 135)

6.3 Analysis – Stage 1 – Describing Experience – Please see Appendix O (p. 148)

As in Case 1, the three stages of methods and analysis were applied to Case 2 (replication logic). Stage 1 describes the experiences of the participants by coding and looking for patterns or common themes of the overall data (Hancock & Algozzine, 2017; Yin, 2014). The three patterns identified were the same as in Case 1 which were **negative emotions**, **positive emotions** and **rival explanations**.

6.4 Analysis - Stage 2 - Describing meaning – Please see Appendix P (p. 158)

In stage 2, describing meaning derived from the converging overall data was the focus of the analysis (Baxter & Jack, 2008; Hancock & Algozzine, 2017; Yin, 2014). The analysis focused on seven key issues or propositions (Table 1, p. 25). It was also at this stage, that the researcher linked the experience and meaning of the participant's experience to the Fonua Health Model. Overall, the Fonua Health Model identified that Case 2 had a significant imbalance concerning her holistic health status. Her immediate family and intermediate environment were favourable to her health and wellbeing, but her emotional state concerning living with diabetes and implementing insulin treatment had been in turmoil. Consequently, her physical wellbeing was adversely affected with loss of vision in one eye, due to poorly controlled diabetes for a long time (Hendrieckx et al., 2016; NZGG, 2012). Her religious beliefs were positive towards insulin therapy and she had no issue with how she viewed the global world (Tu'itahi, 2009).

6.5 Stage 2 – Summary and Linking to the Fonua Health Model

Table 4. *Application of the Fonua Model to Case 2's experience*

Propositions	Key words and phrases describing the participant's experience	Link to the Fonua Model (FM)
1. The diagnosis of diabetes is a very distressing time for the client and families.	Did not care Diagnosis may not be right Ignore Denial	Case 2 went through the mental and emotional trauma (second circle of FM – mental domain) of being diagnosed with diabetes. The mental and emotional domain of this PT were in disorder at diagnosis and she went into denial and doubting.
2. Patients with diabetes feel worn out and burnt-out with the demands of diabetes management.	Husband and kids do not like vegetables. Likes being active. Resisted the need for insulin treatment for eight years. Hates needles and having to inject herself, so often stopped insulin injections. Did not mind BGL testing but lost her meter for months and never worried about it.	The mental, emotional and physical domains (second and third circles of FM) of Case 2 were adversely affected with the daily demands of diabetes care management. Her doubts and hatred of needles and injections continued. But her husband and close relatives (second circle – family) were fortunately very supportive and often

		checked with her that she was still taking her medications. So, her family and immediate environment were stable.
3.Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR).	<p>Did not like it, but had no choice</p> <p>She was pregnant and needed to inject insulin to control diabetes.</p> <p>She only did it originally, to help her unborn baby</p>	Case 2 was mentally and emotionally averse to the idea of injecting insulin (second circle of FM – mind and emotions). But the thought of her children made her accepted the injections of insulin while pregnant. She did it for her unborn child when the HCP explained the foetus needed the mother to have tight BGL control to achieve good health outcomes (second circle level of FM– family commitment was important to her).
4.After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR).	<p>Case 2 was prescribed insulin long-term after the birth of her first baby.</p> <p>For eight years she opposed the need to give insulin. Therefore, she stopped insulin injections many times. Consequently, there was no need to titrate the doses, as she was not taking the insulin.</p>	Continuing with insulin treatment as a lifelong therapy is a hard concept to accept, especially by patients with T2DM (second circle / domain of FM – mental and emotional). Case 2 showed all the negative emotions and PIR to titrating insulin doses, and even stopped giving herself insulin injections for long periods of time. Case 2 displayed immense emotional and mental distress at having to use insulin therapy. Thus, she had serious physical diabetes complications, such as vision loss in one eye (third circle / physical of FM affected). According to

		the FM her holistic health outlook was severely out of balance.
5. There are multiple and complex psychosocial factors that all interact and adversely affecting an important decision to comply with insulin therapy (PIR).	She hates the needle. It hurts and bruises the abdomen Get lost insulin The fear of pain, needles and injecting is real. But these factors which obviously affected the consistent use of insulin were never explored in depth by the HCP.	Case 2's main issues were fears of the needle and pain of injecting insulin (second circle of FM – emotions severely affected). Her family environment was favourable with a supportive husband, but Case 2 was struggling with the above fears emotionally and mentally. Unfortunately, there was no record that her previous HCP team explored the real reasons for her severe PIR (third and fourth circles – communities could have been more proactive and supportive).
6. PIR is more common in ethnic minority populations and there is an increasing need to study this phenomenon in culturally sensitive backgrounds.	Case 2 had a good understanding of the effectiveness of insulin. Her BGL came down to better levels with insulin, and she experienced feeling better e.g. more energy and “no need to call the ambulance anymore”. Being a PI does not affect her perspective on the effectiveness of insulin. <i>“I'm a Pacific Islander; if we understand insulin helps, we will use insulin”.</i>	The FM is a pan-Pacific model looking at a Pacific person's health in a holistic manner, because this is how Pacific people generally view their wellbeing. Health is not just physical wellbeing, but mind, emotions, spiritual and social wellbeing need to be stable too. Case 2 had a supportive home and community environment (second, third and fourth levels of FM) as well as a good grasp on the effectiveness of insulin. However, her mental, psychological and emotional resistance to insulin use (second domain of the FM – mental state) has caused her body (third domain -

		physical) to suffer serious complications of diabetes.
7. Family, culture, misconceptions and religious beliefs all contribute to PIR	<p>Family is supportive. Husband and a cousin often check with her that she is still giving her insulin and taking her tablets.</p> <p>She fully understands the benefits of insulin therapy when she does inject her insulin as prescribed.</p> <p>Her religious beliefs are positive and encouraging.</p> <p>Being a PI did not seem to have a negative impact on her decision to accept insulin therapy.</p>	<p>Case 2 had a supportive family, culture, understanding of insulin and spirituality (first, second, third and fourth levels of FM). However, her emotion and mental states concerning insulin treatment (second circle domain – mental status) were still in chaos and she continued to show classic signs of PIR such as ceasing to give her insulin injections for long periods of time.</p>

6.6 Analysis - Stage 3 - Focus of the analysis

Proposition one stated that the diagnosis of diabetes is a very distressing time for the patients and their families (Alberti, 2002; MOH, 2015b; Schaaf & Schaaf, 2005). Yet the psychological impact of diagnosis is often underestimated and overlooked by HCP, therefore is not addressed early enough by the HCP team (Alberti, 2002; Murtagh & Rosenblatt, 2011; Schaaf & Schaaf, 2005). Subsequently, people are in denial of their diagnosis for long periods of time, in addition to fear and depression (Alberti, 2002; Giese, 2018; Hendrieckx et al., 2016; Schaaf & Schaaf, 2005). **Case 2** had serious doubts about her diagnosis of diabetes. She thought the HCP could have it wrong and consequently she denied the diagnosis and ignored subsequent advice to treat her diabetes. **So, in this case proposition one was well proven.**

Proposition two acknowledges that the demands of daily diabetes care can cause severe diabetes distress and burn-out in people living with DM (Alberti, 2002; Gebel, 2013; Hendrieckx et al., 2016; MOH, 2015b). Juggling daily routines of BGL testing, insulin injections, watching one's diet and increasing physical activity, as well as looking after families is a recipe for exhaustion and diabetes burnout. Case 2 liked exercising such as walking and doing housework, so she did not find being active an issue. She liked vegetables but found it difficult to cook for herself as well as for the family because her husband and children did not like vegetables. She accepted that testing her BGL were part of living with diabetes, but she was not worried when she lost her testing meter for months. She was also required to use insulin therapy long-term, but she had difficulty accepting this treatment for life (Hendrieckx et al., 2016). **Therefore, proposition two is proven in Case 2.**

Proposition three states that starting insulin treatment is a difficult prospect for people with T2DM to accept. This often results in outright refusal to start insulin treatment, delaying insulin treatment, or after starting insulin the client can hesitate to titrate insulin doses to optimal doses (Allen et al., 2016; Brod et al., 2008; Larkin, 2008; Polonsky & Jackson, 2004). This concept of PIR was demonstrated clearly in Case 2 and her struggle to accept insulin treatment. She was prescribed insulin therapy eight years ago, but according to her own words and according to the HCP letters, she often stopped her insulin treatment for extended periods of time. **It appeared that her consistently high HbA1c tests, did not influence her decisions to consistently give herself insulin as prescribed.** She also acknowledged in her final interview that she

never increased her insulin doses as instructed, because she was not giving herself insulin anyway. **Proposition three is therefore proven in her case.**

Proposition four followed on from proposition three by suggesting that even after successful initiation of insulin therapy, people with T2DM can hesitate or refuse to titrate insulin doses to achieve optimal BGL. Proposition four also suggests that people with T2DM can even cease to give themselves insulin injections, and this decision to cease insulin therapy can last significantly long periods of time (Allen et al., 2016; Brod et al., 2008; Korytkowski, 2002; Larkin, 2008; Polonsky et al., 2005). As already highlighted, Case 2 refused to titrate insulin doses because she was not injecting insulin in the first place. However, she did not disclose that information to her previous HCP team, so her HCP team kept recording that she was on a certain number of insulin units a day, when in fact she was not giving insulin at all. **All these struggles around insulin treatment proved that Case 2 had significant PIR and proposition four is proved to be clear in her case.**

Proposition five is mainly derived from the literature where studies on PIR revealed there are many psychosocial factors, which are complex and all intertwined, affecting an important decision to initiate, titrate doses and to continue with insulin therapy (Brod et al., 2008; Gherman et al., 2011; Larkin, 2008; Taylor et al., 2017). For Case 2, the factors identified through her interviews, observations and medical data were indeed complex and multifaceted. The most poignant issues for Case 2 were her aversion to using a needle and to inject her abdomen with it. It also appeared by direct observations that the subject of diabetes and insulin treatment was still a highly emotional subject for Case 2 (Gebel 2013; Giese, 2018; Hendrieckx et al., 2016; Mascott, 2015). It took five interviews for Case 2 to reveal the real reason she stopped titrating insulin doses, was because she had stopped her insulin treatment. **Therefore, proposition five is clearly shown in this case.**

The sixth proposition came from the literature and the result of studies conducted in the last two decades, where PIR was becoming well recognised as important and a serious barrier to good diabetes control (Brod et al., 2008; Fu et al., 2009; Hendrieckx et al., 2016; Korytkowski, 2002; Larkin, 2008). But recognising that PIR was more common in ethnic minority groups, women and those living in lower socio-economic conditions only became clearer and researched in the last decade (Bogatean & Hancu, 2004; Jha et

al., 2015; Nam et al., 2010; Patel et al., 2011). Case 2 seemed to have a good understanding of the effectiveness of insulin therapy when administered, because she could see her BGL reducing to better levels when she did test with her glucometer. From her perspective, being a PI person did not affect the way she viewed the usefulness of insulin to treat diabetes. **The researcher found it difficult to determine at this point, if Case 2's ethnicity did influence her strong vulnerability towards PIR.**

The seventh and last proposition comes from the literature as well as professional and personal experiences. There is consensus that family influence, a client's personal perceptions, cultural and religious beliefs have significant impacts on their decisions, whether to accept insulin therapy, increase doses as necessary or to continue with insulin treatment (Leavasa, 2018; MOH, 2014a; O'Connor, 2016; Patel et al., 2011; Tiatia, 2008). Case 2's husband and close relatives appeared supportive of her in general, as well as supportive regarding her health care. Her religious beliefs were positive and encouraged her to use insulin treatment if helpful. Case 2 had no misconceptions regarding the effectiveness of insulin in treating her diabetes.

Thus, all the factors identified in proposition seven are supportive towards Case 2 and the need to implement insulin treatment to effectively treat her diabetes. However, Case 2 had major difficulty accepting insulin initiation, insulin injections and titration of insulin doses. She demonstrated severe PIR resulting in ceasing insulin therapy for long periods of time, and consequently suffered early incidences of diabetes complications. Therefore, her obvious PIR could be a result of unresolved emotional distress, caused by fear of needles and injections (Fu et al., 2009; Gebel, 2013; Giese, 2018; Hendrieckx et al., 2016; Mascott, 2015). **However, despite this case's severe struggles to implement and to continue with insulin treatment, proposition seven is still relevant and shown to be capable of influencing Case 2's decisions regarding insulin treatment.**

7. CROSS-CASE SYNTHESIS

According to Yin (2014), cross-case synthesis is only applicable to multiple-case studies. Yin reiterates that having more than one case strengthens the case study results and makes the findings more robust. He also suggests the creation of word tables which displays data from individual cases, could be helpful in displaying similarities or in making comparisons. A qualitative analysis of the word tables should then enable cross-case conclusions to be drawn from multiple cases. Accordingly, the following table displays the seven propositions used to guide the study. Alongside each proposition is a summary of the cross-case analysis, of the two participants' converging data (Table 3).

7.1 Summary of Cross-Case Analysis - Word Table (Yin, 2014)

Table 5. *Summary of Cross-Case analysis*

Propositions	Case 1 & Case 2 analysis
1. The diagnosis of diabetes is a very distressing time for the client and families.	Case 1 expressed direct feelings of anxiety, fear, panic and worry about the diabetes diagnosis as proposed in the literature. Case 2 responded to the diagnosis by doubting the HCP, went into denial and adopted a 'did not care' attitude. Both cases showed classic signs of doubt, fear, grief, shock and denial in accordance with the proposition and the literature.
2. Patients with diabetes feel worn out and burn-out with the demands of diabetes management.	Case 1 is separated from her partner, so she is responsible solely for parental care to four school aged children. Subsequently, she gets exhausted and often forgets to inject her insulin at night time. Testing her BGL has been sporadic. She tries hard to walk for exercise. She is conscious of the need to eat healthy, but often has takeaways when she is too tired to cook at home. Case 2 likes being active but finds cooking healthy meals a nuisance. She does not mind testing her BGL at home but was not concerned when she lost her meter for months. She stopped taking her insulin many times over the last eight years. Both cases have shown classic signs of emotional diabetes distress and

	<p>burn-out at times. Case 1 was diagnosed with depression and is on medication for this. Her social and family issues, plus diabetes distress has most likely contributed to her depressed mental status.</p>
<p>3.Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR).</p>	<p>Case 1 did not find the concept of insulin treatment hard to accept. She trusted the doctor who prescribed her insulin. She did however feel scared of using a needle and of injecting herself at the start.</p> <p>Case 2, on the other hand, hated the idea of starting insulin treatment. She was pregnant with her first child, and she only agreed to start insulin therapy for the sake of her unborn child. The two cases differed in their responses when they were first prescribed insulin treatment. Case 1 may have had symptoms of high BGL which made it easier for her to accept insulin treatment. But Case 2 exhibited a common response by people with T2DM when prescribed insulin treatment. This is what the literature calls PIR.</p>
<p>4.After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR).</p>	<p>Case 1 accepted the initiation of insulin therapy, but soon after started missing the injections, according to the medical progress notes. She titrated the dose of insulin at times, but when asked by the HCP to increase the dose further to improve her BGL, she was hesitant to do this. Case 2 had difficulty accepting insulin treatment at the start and has struggled over the last eight years to give her insulin consistently. So, she often stopped her insulin treatment for long periods of time. When she was asked to titrate her insulin doses, she admitted she never titrated her doses because she was not giving herself insulin in the first place. Both cases have shown aspects of PIR, but Case 2 especially has confirmed the severity of PIR to a large extent. The consequences of PIR and inadequate treatments of diabetes are the early development of diabetes complications such as blindness. Case 2 unfortunately has lost vision in one eye.</p>

<p>5. There are multiple and complex psychosocial factors that all interact and adversely affecting an important decision to comply with insulin therapy (PIR).</p>	<p>Case 1 was originally afraid of the needle and of injecting herself. But once she started insulin she felt better physically, and it confirmed that her body needed insulin through the injections. Being a solo parent to four school aged children wears her out though and makes her forget to take her insulin before bedtime, some days. Case 2 however has a supportive partner who lives at home. She stays at home as a full-time mum. But her PIR stems from her hatred of needles and injecting herself. Her fear of the injections, pain and bruises on her abdomen appear very real and has stopped her from administering herself insulin for long periods of time. The psychosocial factors contributing to PIR, as above, were revealed when conducting in-depth interviews with Case 2. These factors have not been explored in-depth by the previous HCP as evident in the medical records.</p>
<p>6. PIR is more common in ethnic minority populations and there is an increasing need to study this phenomenon in “culturally sensitive settings”.</p>	<p>Case 1 accepted the doctor’s advice to start insulin therapy immediately. She was naturally afraid of the thought of the needle and of injecting herself, but she felt much better physically after the first injection; which helped her believe in insulin treatment. She said nothing will stop her from taking her insulin because she feels the benefits in her body. Therefore, ethnicity did not seem to impact her perception of the benefits of insulin use. Case 2 however resisted the prescription of insulin from the start. For many years she was reluctant to inject her insulin as prescribed, therefore she was without insulin for long periods of time over the last eight years. But when she gives her insulin consistently as prescribed, she sees her BGL tests improving, and feels better physically. She then becomes perceptive of the benefits of insulin treatment, consequently. In her own words, “I’m a Pacific Islander; if we understand insulin helps us, we will use insulin”. Therefore, her ethnic background did not appear to affect her belief in the benefits of insulin treatment.</p>

<p>7. Family, culture, misconceptions and religious beliefs all contribute to PIR</p>	<p>The families of Case 1 and Case 2 were supportive of them having insulin treatment. Case 1 has a brother in law with diabetes using insulin, so they gave her positive messages regarding insulin use. Her husband also heard positive messages about insulin on a local Samoan radio broadcast. He then encouraged Case 1 to persevere with her insulin treatment. Case 2's husband and a close cousin apparently frequently check on her that she is giving her insulin. So, when these clients use insulin treatment regularly and as directed by their HCP, they became convinced of the benefits of insulin use for themselves. Therefore, they had no misconceptions about the usefulness and effectiveness of insulin therapy to treat their diabetes. Both cases also stated their religious beliefs encourage them to use insulin treatment, if it is beneficial for their health. Regarding their cultural backgrounds, it appeared that being of Pasifika ethnicity did not affect their perceptions, that insulin treatment was effective in treating diabetes.</p>
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8. DISCUSSION

Pacific populations have been singled out in the NZ literature as being at highest risk of developing T2DM, as well as developing complications of diabetes ten years earlier than other New Zealanders (Orr-Walker, 2011; MOH, 2014a; NZGG, 2012; Palmer, 2012). This is true for PI people living in NZ, as well as PI people still living in the Pacific indigenous nations (AttitudeLive, 2016; Talemaitoga, 2018; TVNZ, 2018; Win Tin et al., 2014). The results of this research confirmed what the literature say about the high prevalence of diabetes and seriousness of diabetes complications in Pacific people. Therefore, there is an urgent need to minimise the prevalence of T2DM in the Pacific populations. **As well, there is a critical need to minimise the risks of developing diabetes complications, and to prevent the severity of complications when they do occur (MOH, 2014b; Orr-Walker, 2011; Talemaitoga, 2018; WHO, 2015).**

At the centre of this research was the quest to explore the phenomenon PIR in PI people, who have been prescribed insulin therapy within the last ten years, using a “two-case” CS methodology (Yin, 2014, p. 63). PIR is common in people with T2DM worldwide, but more recent literature has indicated that PIR is even more common in people of ethnic minority groups, women and people from lower-socio economic backgrounds (Brod et al., 2008; Jha et al., 2015; Nam et al., 2010; Patel et al., 2011). The literature also indicated the necessity to research this phenomenon in culturally sensitive backgrounds and consequently using culturally appropriate methods (Bogatean & Hancu, 2004; HRCNZ, 2014; Patel et al., 2011; Tapu-Ta’ala, 2011). Accordingly, seven propositions were used to focus the study on issues relevant to the research aims (Yin, 2014), while the Fonua Health Model was chosen as the theoretical framework, to test the relevance of the research to PI peoples’ perspectives (Tu’itahi, 2009).

The most salient aspects of PIR as evident in this “two-case” case study were the three phases of PIR that people with T2DM can encounter. These are refusal to start insulin treatment, hesitance to titrate insulin doses, and proceeding to stop insulin therapy altogether (Allen et al., 2016; Brod et al., 2008; Korytkowski, 2002). The results of this research found Case 1 was willing to start insulin therapy but was very hesitant to increase insulin doses to maximum therapeutic doses. Case 2 was resistant to the idea of starting insulin therapy and continued to resist insulin treatment for eight years.

These findings resonate with the wider literature on PIR, that PIR can cause serious delay in implementing and continuing with best treatment for diabetes, resulting in costly complications such as blindness, strokes, heart attacks and kidney failure (Allen et al., 2016; DiPiro et al., 2014; Larkin, 2008; NZGG, 2012; Orr-Walker, 2018).

The MOH has set out its plan for Pacific people's health and wellbeing in the document called 'Ala Mo'ui 2014-2018 (MOH, 2014a). 'Ala Mo'ui contributes to the goals of the Government for all New Zealanders to be healthier and independent, have health care services that are timely and accessible, and healthcare for all New Zealanders to be cost-effective and sustainable (MOH, 2014a). The document acknowledges the inequity in health outcomes for Pacific people and has offered strategies for the health and disability sectors to help improve outcomes for PI people. The primary strategy is to respect Pacific cultures and Pacific principles such as recognising that family, cultural history and languages are central to the PI person's identity, care and support (MOH, 2014a). This is also in accord with the principles of the Fonua Health Model, which illustrates that PI people see their health in a holistic manner (Tu'itahi, 2009).

Accordingly, this research respected the cultural affiliations of the participants, by seeking to conduct the research in a culturally sensitive and safe manner (HRCNZ, 2014; Pulotu-Endemann, 2001; Talemaitoga, 2018; Tu'itahi, 2009). The study sought approval from three Ethics committees and the locality provider, and approvals were subsequently granted (Appendices D, E, F, G – pp. 83 - 88). A cultural mentor was also part of the advisory team for the research as recommended by the Research Proposal Review Panel. Therefore, the researchers and Ethics committees complied with the directions given in the 'Ala Mo'ui document, to conduct services and research in culturally respectful and appropriate methods (MOH, 2014a). Moreover, there is a critical need to do Pasifika ethnic-specific research, so Pasifika ethnic-specific solutions can be applied for effective outcomes; as current methods and systems are not meeting PI people's health needs (MOH, 2014a; Spasifik, 2019; Talemaitoga, 2018).

The seven propositions, or issues, which guided the data collection and analysis worked well in eliciting the necessary information and in directing the analysis procedures. The results of this study showed the two participants exhibited the classic sign of PIR as found in the literature (Allen et al., 2016; Brod et al., 2008; Fu et al., 2009; Gherman et al., 2011; Talemaitoga, 2018). As described earlier, the reasons cited for PIR are

complex and multifactorial and include fear of needles and injections, social stigma, knowledge and beliefs about insulin, poor relationships with HCP, language difficulties and cultural barriers (Allen et al., 2016; Brod et al., 2008; Fu et al., 2009; Larkin, 2008; O'Connor, 2016; Patel et al., 2011). Reducing the negative impact of PIR on diabetes treatment outcomes should be a top clinical priority (Brod et al., 2008). The strategies to reduce PIR start with appreciating, understanding and acknowledging the complexity and multifaceted nature of PIR (Brod et al., 2008; Larkin, 2008; Tapu-Ta'ala, 2011).

Case 1 and Case 2 exhibited different components of PIR at different times and needed different approaches to assist them come to term with the need to use insulin therapy long-term. Case 1 admitted that she missed giving her insulin a few days of the week because she gets tired and forgets. However, Case 1 had good relationships with her HCP and the HCP kept a close watch on her case due to her stressful social situation. Consequently, despite her demanding home life being a solo parent to four dependent children, she was adequately supported by her diabetes care team, who kept reminding her at regular intervals to inject her insulin (Brod et al., 2008; Larkin, 2008; Tillery et al., 2013). The studies on PIR found that having a good patient and HCP relationship has a positive effect in reducing PIR and consequently improving diabetes treatment outcomes (Funnel et al., 2004; Jha et al., 2015; Nam & Song, 2014).

Case 2 showed severe PIR and resisted the implementation of insulin therapy for very long periods of time. Evidence from the research showed that despite poor glycaemic control as evidenced by her HbA1c tests, there was no specific exploration or intervention regarding PIR. This is in accordance with the literature which highlighted that PIR is often under-recognised, under-estimated or overlooked by HCP (Allen et al., 2016; Bogatean & Hancu, 2004; Brod et al., 2008; Tillery et al., 2013). However, when Case 2 moved to a different provider who recognised the severity of PIR in her case, she was given time to explain her reasons for rejecting insulin therapy (Fu et al., 2009; Larkin, 2008). Her fears and concerns were discussed, acknowledged and addressed (Allen et al., 2016; Larkin, 2008; Sahin et al., 2015). Her worst fears were needles and injections, so her insulin regime was simplified, and shorter needles were prescribed which helped reduced her anxiety and fears (Brod et al., 2008; Krall et al., 2015).

The involvement of the PIDNS may have also helped in fostering a closer therapeutic and culturally sensitive relationship between these PI participants and their HCP teams.

The capacity of the PIDNS to do home visits when necessary and interpret complex medical information at clinic appointments, was noted in the participants' medical notes as crucial in facilitating adherence to medications and attendance to her appointments. The presence of a Pasifika staff member in a health care setting, makes the facility a friendlier place to Pasifika people (Ludeke et al., 2012), as well as helping to increase the appropriate responsiveness of the non-Pasifika workforce, to meeting PI clients' holistic health care needs (MOH, 2014a; Tiatia, 2008; Talemaitoga, 2010). Accordingly, one of the strategies of the MOH as described in the 'Ala Mo'ui document, is to increase the "capacity and capability" of the Pacific health workforce (MOH, 2014a, p. 8). Increasing the Pasifika health workforce and developing Pasifika related resources, are essential to reduce health disparities in NZ (Talemaitoga, 2018).

Proposition six projected that PIR is more common in ethnic minority populations and it was necessary to study this phenomenon in culturally appropriate situations (Bogatean & Hancu, 2004; Jha et al., 2015; Nam et al., 2010). The study revealed the two participants became convinced of the effectiveness of insulin treatment, once they gave their insulin injections regularly as prescribed. Once they saw their BGL drop closer to normal levels and felt the benefits of insulin treatment physically, nothing could convince them otherwise. Subsequently, it appeared their ethnicity or cultural beliefs did not affect the way they made their decisions whether to accept, titrate or to stop insulin treatment. The literature on PIR does highlight that insulin therapy is effective in correcting high BGL and consequently the patient feels better mentally and physically, and the prospect of long-term health is positive (Allen et al., 2016; DiPiro et al., 2014; Larkin, 2008; Polonsky et al., 2017).

Proposition seven targeted the participants' family influence, misconceptions about the role of insulin and religious beliefs which may contribute to PIR. The two participants revealed that their immediate families were supportive and encouraged them to use insulin treatment. This positive influence from close family members is critical if the participant is going to continue with treatment long-term (HRCNZ, 2014; Leavasa, 2018; O'Connor, 2016; Polonsky et al., 2017; Tiatia, 2008). The participants also showed no signs of significant misconceptions about insulin treatment. Once they started to use insulin consistently as advised by their HCP, they felt better physically when symptoms of high BGL decreased such as tiredness and frequent micturition. According to Case 2, if PI people understand that insulin helps to treat their diabetes,

they will use insulin. This resonates with the principles of health literacy, which says that people need good understanding of the health information given and medications prescribed, to enable them to make positive health care decisions (Bpac NZ, 2012; MOH, 2015a; Pharmac, 2017; Polonsky et al., 2017).

The study also showed that the two participants have religious beliefs that positively impacted their decisions regarding insulin use. Religious beliefs are very important to PI people and have enormous impact on many decisions including health care decision-making (Leavasa, 2018; MOH, 2014a; Schaaf & Schaaf, 2005; Tiatia, 2008). However, the question remained if Pasifika cultural beliefs had an impact on the participants' decision-making regarding insulin use. The participants made no reference to their Pasifika cultural beliefs as barriers to insulin use. However, the two participants had overriding issues in their personal lives which mainly influenced their diabetes care decisions. Case 1 had very little practical support at home being a solo parent to four school aged children (Larkin, 2008; Polonsky et al., 2017), while Case 2 struggled to accept mentally and emotionally, that her body needs long-term insulin treatment (Hendrieckx et al., 2016; O'Connor, 2016; Tapu-Ta'ala, 2011).

Finally, the study findings were linked to the Fonua Health Model for theoretical analytical applications (Yin, 2014). At the centre of the model is the spiritual well-being of the Pasifika person (Tu'itahi, 2009). The two participants showed that their religious beliefs support insulin treatment. This showed that their spiritual health and beliefs were intact and positive toward the needs of their physical health. The next circle in the model is the mental health domain. Case 1 exposed a very stressful social and family situation that extended over a period of eight years due to being separated from her husband and caring for four children on her own. Consequently, her mental health status suffered significantly, requiring her to take anti-depression medications. Case 2's family and social situation appeared stable and subsequently her mental health status appeared stable.

The third circle in the Fonua Health Model is the physical domain of the Pasifika person. The participants were clearly not in optimum health physically. **They both had diabetes complications ranging from heavy proteinuria, depression and partial loss of vision.** The fourth outer circle of the Fonua Model identifies the community as the next domain to be in balance and supportive towards the Pasifika person's health. The

participants recognized that their communities have been supportive of them and their aspirations for health. These communities included their extended families, children's schools, churches, health care services and social service agencies. The fifth circle encompasses the whole model and represents environmental and global influences on a Pasifika person's health (Tu'itahi, 2009). Global influences include natural disasters and the spread of infectious diseases world-wide, for example. These could influence the participants' mental, emotional and physical health, but this was not the case at the time of this study.

The limitation of the study is the small number of participants. However, in CS research, it is entirely appropriate to have a small number of cases which can be replicated. The more replications of cases, the more robust the findings (Yin, 1994, 2014; Zainal, 2007). The "two-case" research design used in this study was therefore better than having a single-case study (Yin, 2014, p. 63). The CS methodology is popular in social science research where there is a need to study individuals, systems or communities up close, in-depth and in a holistic manner (Cronin, 2014; Crowe et al., 2011; Stake, 1995; Yin, 2014). It relies on showing all the relevant evidence, dealing with any major rival revelations, addressing any major issues arising, and the researchers' "prior expert knowledge is brought to the study" (Baxter & Jack, 2008; Thomas, 2014; Yin, 1994, p. 5).

Another perceived limitation is the clash between traditional research methods and the cultural sensitivity of traditional research methods expected to be used. For example, audio recording participants' interview responses is deemed the best method to ensure their voices are heard. However, it is culturally sensitive to consider that audio recording PI participants' interviews may not be comfortable to them. Therefore, it is appropriate not to impose this method on them, if there is apparent misunderstanding or discomfort (Fa'avae, Jones, & Manu'atu, 2016; Farrelly & Nabobo-Babat, 2014; HRCNZ, 2014; Oldehaver, 2018). There is also traditional concern about the accuracy and the subjectivity of the researcher recording participant responses by hand and paper. Yet, according to Stake (1995), the researcher in CS research does become a biographer if the participant is a person. In addition, the researcher sought to equalize the balance of power by being sensitive to the participants' moods, before and during the "talanoa" or interviews (Fa'avae et al., 2016, para 35; Farrelly & Nabobo-Babat, 2014).

The researcher is satisfied that the CS methodology was used to conduct this research. The use of multiple data sources added to the richness of the findings. The use of rival explanations in the analysis phase were useful in clarifying conflicting information from the participants' perspectives, and with information extracted from their medical notes. The direct participant observations confirmed that living with diabetes and daily management such as watching their diet, needing to be active and including insulin therapy, is a highly emotional condition. The researcher also found that although the number of participants was small, the variables and data generated during the research were substantial (Appendices I – P). These results were to be expected when using CS methodology according to Yin (2014) and Zucker (2009). Any future research regarding PIR in Pasifika populations could target PI men with T2DM as CS participants alongside women, for gender response comparisons. Otherwise, a larger study could be undertaken using another culturally appropriate methodology.

9. CONCLUSION

The seven propositions used to guide the data collection and analysis worked well in drawing out the participants' perspectives, which revealed some different sides of their stories compared to other data sources. The participants confirmed that being diagnosed with diabetes and living with diabetes was scary, stressful, worrying, emotionally draining, difficult to accept and denial was an easier reaction. These experiences as expressed by the participants are well documented and acknowledged in the literature as common to those diagnosed with a chronic condition such as diabetes. The addition of insulin therapy to diabetes treatment is another traumatic event in the life of a person with diabetes. Consequently, there is a significant struggle by patients to accept the prescription of insulin treatment, especially those who have T2DM. This is termed PIR in the literature.

This study confirmed that there are multiple and complex psychosocial factors that all contribute to PIR. Case 1 showcased a very vulnerable family and social situation where she was the sole carer for her four school aged children. Her diet was often high in fat and sugar from buying takeaways and she had little time for exercise. Case 2 on the other hand liked exercise and liked cooking vegetables for herself. Her husband and family were supportive. However, she had severe emotional and mental distress when it came to needles and injecting of insulin. There had been many studies to find effective strategies on how to reduce PIR in people with T2DM. This study revealed that timely and consistent efforts from the HCP team to support Case1 since the prescription of insulin, helped her to implement and stay on insulin therapy. Likewise, Case 2 started to accept the need to continue insulin treatment, when the PIDNS made consistent efforts to explore and address her personal fears, regarding insulin therapy.

The main goal of this study was to see if the participants' ethnicity and cultural beliefs had any significant impact on PIR. The study showed the participants' ethnicity and PI cultural beliefs did not influence their decisions to implement insulin therapy or to continue with it. Case 1 trusted the HCP's decisions and her improved feelings of physical wellbeing since commencing insulin treatment, convinced her that insulin was the right treatment for her diabetes. However, despite her positive attitude towards insulin therapy, the research revealed she needed timely, consistent and regular support from the HCP, for her to continue injecting her insulin daily as prescribed. Case 2, on

the other hand, finally admitted her aversion to needles and injections was the main reason she often stopped her insulin injections. Therefore, her cultural beliefs were not affecting her decisions concerning insulin treatment.

This research also confirmed that PI people need their close family members and communities to support them in positive ways, for health outcomes to be positive. The two participants needed their immediate families to encourage them to persevere with insulin treatment. This research also revealed that community messages regarding diabetes care including insulin therapy need to be accurate and positive, because Pasifika people do listen to messages on community media such as radio, television and the internet. These messages via social media are powerful and persuasive so it is important for Pacific people to get the right health messages on these forums. Furthermore, the participants claimed their religious beliefs encouraged them to use insulin treatment, if they found the treatment helpful. Therefore, spirituality was a positive force for these two participants, when making their decisions regarding insulin treatment.

The Fonua Health Model used as the cultural theoretical framework for this research, highlighted that the two participants in the study had issues which adversely affected balance in their everyday lives, so were not in optimal status of health. Case 1 had severe family and social issues which affected her physical and mental health in significant ways. Her intermediate environment and networks such as schools, church, social agencies and HCP have been supportive. Therefore, Case 1 managed to stay well enough to care for her children and herself. But complications of diabetes were already evident through blood tests, such as overt proteinuria and hyperlipidaemia. Case 2 had serious complications of diabetes already evident in her body such as vision loss in one eye and had heavy proteinuria. So even though Case 2 had a supportive family and community, her physical health was not in a desirable status. Therefore, according to the Fonua Health Model, the holistic outlook for the current and long-term health status of the two participants were severely unbalanced.

The results of this study are relevant to the experiences of the two participants from the Pacific indigenous nations, who are residents in NZ (Yin, 2014). They both have T2DM and have been prescribed insulin treatment within the last ten years. However, using the Fonua Health Model (Tu'itahi, 2009) as the theoretical framework for this

study, one can relate the findings of the study to other PI people in similar situations (Baxter & Jack, 2008; Thomas, 2014; Yin, 2014; Zucker, 2009). Tu'itahi proposes that for a Pasifika person to be in holistic and comprehensive health, all domains and levels of the spiritual, mental, physical and communities should co-exist together in equal balance and harmony. Moreover, Stake (1995) adds another dimension of interpretation to CS research findings, called “naturalistic generalizations” (p. 85). It is a process where readers gain awareness from details presented in the CS, and they apply their own conclusions to relevant personal experiences (Melrose, 2009; Stake, 1995).

Implications

The literature review for this study highlighted the need for simplified and culturally attractive health education materials for Pasifika people, especially when it comes to proposing a painful and unattractive treatment such as insulin therapy (MOH, 2014a; O'Connor, 2016; Pharmac, 2017; Tapu-Ta'ala, 2011). The simplified diabetes management messages can be framed in pictorial form to deal with low health literacy issues, which are common amongst Pasifika people (Bpac NZ, 2012; MOH, 2014a, 2015a). As highlighted by Patel et al. (2011) and Polonsky et al. (2017), one key strategy to minimize PIR is discussing healthy lifestyle messages with the client when first diagnosed with T2DM; at the same time start an “effective insulin conversation” with clients (Polonsky et al., 2017, p. 2). Consequently, when the need for insulin treatment arises later, the patients will not be shocked by the need to start insulin therapy.

Subsequently, the researcher has taken the findings and analytic generalisations from this research, together with her prior knowledge of the subject (Tu'itahi, 2009; Yin, 2014) to develop an educational pictorial chart (Figure 5, p. 64). It can be used as an educational guide for HCP working with PI people with diabetes, as well as a guide for Pasifika people to help them navigate their ways, when faced with the need to treat diabetes. The red ‘hibiscus tree’ in the circular chart represents a Pasifika person who is diagnosed with diabetes. The five hibiscus petals represent what that person needs to do to treat diabetes effectively. The roots or support systems need to be functioning and fully implemented, for the PI person with diabetes to have effective and culturally appropriate health care. These support systems include positive family support, positive community healthcare messages, and a healthcare workforce that is both culturally and

clinically competent (Broodkoorn, 2018; O'Connor, 2016; Talemaitoga, 2010, 2018; Tiatia, 2008).

The Pasifika 'hibiscus' educational chart also acknowledges that there are outside influences that can impact a person with diabetes and their healthcare e.g. government healthcare policies or global natural disasters. However, if a person with diabetes can self-manage their diabetes care alongside having the right support systems in place, and positive spiritual beliefs, they can expect to live out their full potential (MOH, 2014a, 2017; Orr-Walker, 2017; Talemaitoga, 2018; Tu'itahi, 2009). The outside circle encompasses the 'hibiscus' and other factors that can impact on a person with diabetes and their holistic well-being. The circle promotes the concept that insulin therapy gives health and quality of life to a Pasifika person with diabetes, when it is used as directed by their HCP (NZGG, 2012; Krebs, 2019; Orr-Walker, 2017; Talemaitoga, 2018). Nevertheless, there appears to be very strong resistance to implementing insulin therapy by some PI people, because it somehow invalidates their faith in God (Leavasa, 2018; Schaaf & Schaaf, 2005). Therefore, spiritual beliefs concerning insulin treatment require meaningful conversations, between the HCP and their Pasifika client with diabetes.

A Pasifika Educational Chart in Diabetes

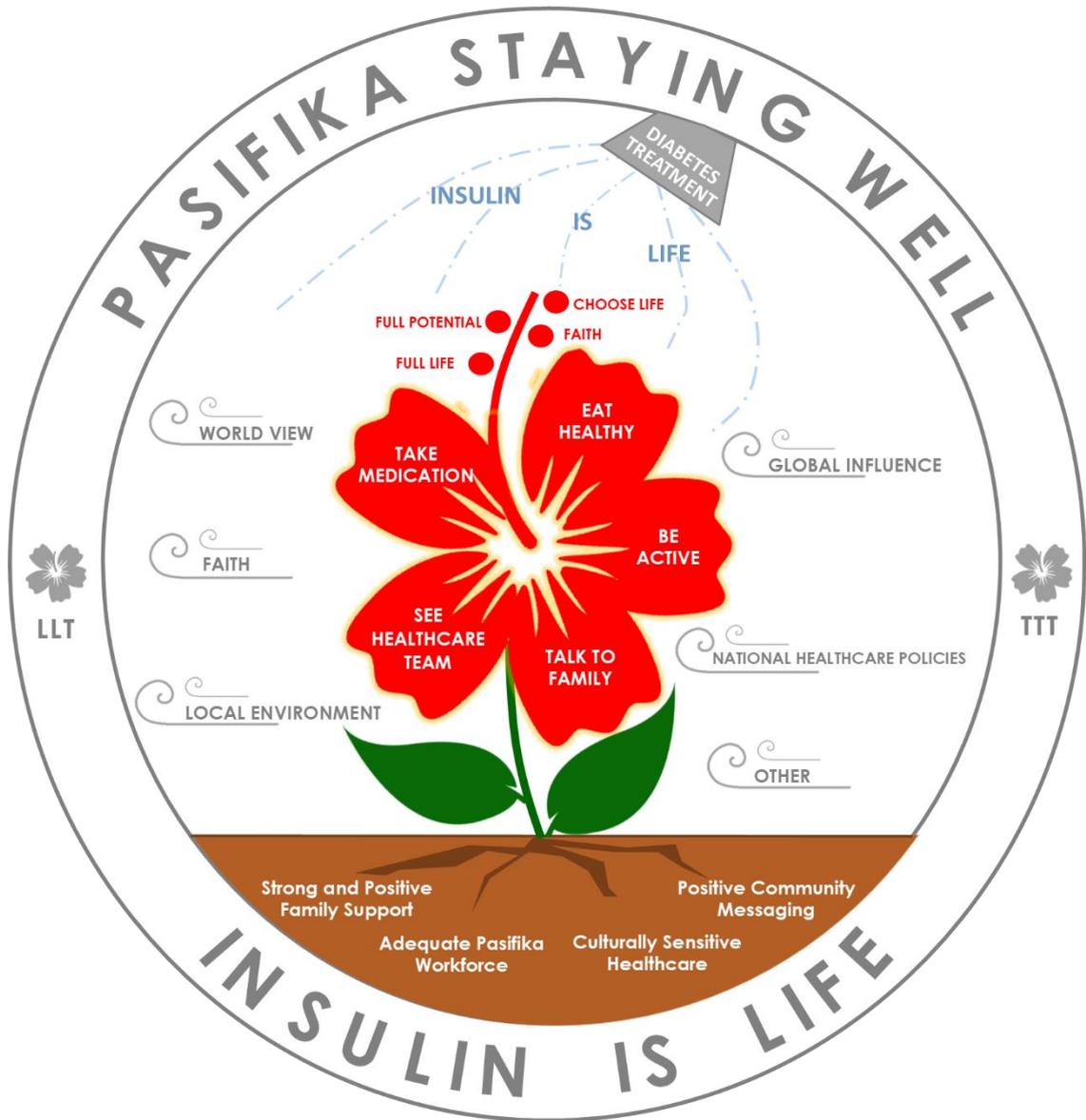


Figure 5. A Pasifika Educational Chart in Diabetes: addressing PIR and Holistic Diabetes Care by Lupesiliva Tu'ulua (2019)

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Appendices A - P

Appendix A

INTERVIEW TOOL: Study Propositions – Questions and Answers

PROPOSITION 1 <i>The diagnosis of diabetes is a very distressing time for the patient and families</i>	Case1	Case 2	Rival explanations, if any
Question 1. Do you remember the time you were diagnosed?			
Question 2. How did you feel at the time when you were told you had diabetes?			
Question 3. How did your family respond to your diagnosis of diabetes?			

PROPOSITION 2 <i>Patients with diabetes feel worn-out and burnt-out with the demands of diabetes management</i>			
Question 1. How do you feel about the requirements to eat healthily because you have diabetes?			
Question 2. How do you feel about exercising because it's good for controlling diabetes?			
Question 3. How do you feel about testing your blood glucose levels?			

Question 4. How do you feel about having to inject insulin every day because the Health Care Team (HCT) said you need insulin?			
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PROPOSITION 3 <i>Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR)</i>			
Question 1. Do you remember the first time you were told you needed insulin?			
Question 2. How did you feel when you were told you needed insulin?			
Question 3. Why did you feel that way when you were told you needed insulin?			
Question 4. How do you feel now about having to inject insulin to control diabetes?			

PROPOSITION 4 <i>After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR)</i>			
Question 1. After giving yourself the first injection of insulin, how did you feel?			

<p>Question 2. How did your family and friends react to the fact you had started insulin treatment?</p>			
<p>Question 3. Did your doctor or nurse ask you to keep increasing your insulin doses according to the blood glucose levels?</p>			
<p>Question 4. How do you feel about giving your insulin every day and making changes as necessary?</p>			

<p>PROPOSITION 5 <i>There are multiple and complex psychosocial factors that all interact together and adversely affecting an important decision to start and stay with insulin therapy.</i></p>			
<p>Question 1. How do you feel when you hear the word insulin?</p>			
<p>Question 2. How does your family and friends receive the fact you need to give yourself insulin injections daily?</p>			
<p>Question 3. What's the most difficult thing for you about insulin treatment?</p>			
<p>Question 4. Is there anything that discourages you most from continuing with insulin therapy?</p>			

<p>PROPOSITION 6 <i>PIR is more common in ethnic minority populations and there is an increasing need to study this phenomenon in “culturally sensitive settings”.</i></p>			
<p>Question 1. Would it be fair to say you distrust the use and the benefits of insulin therapy for yourself?</p>			
<p>Question 2. If, in your heart you believe that insulin is the best treatment for you, what would stop you from continuing insulin treatment?</p>			
<p>Question 3. If, in your heart you believe that insulin is the best treatment for you, what encourages you to keep on giving insulin every day?</p>			
<p>Question 4. Do your beliefs as a PI affect the way you see insulin therapy as the right treatment for you?</p>			

<p>PROPOSITION 7 <i>Family, culture, religious beliefs and misconceptions, all contribute to PIR</i></p>			
<p>Question 1. What are your families’ views on insulin treatment?</p>			

Question 2. Do PI people believe in the benefits and necessity of insulin to treat T2DM?			
Question 3. Are your religious beliefs for or against insulin treatment?			
Question 4. What have your close friends and families told you about insulin treatment?			

Appendix B

Participant Information Letter



Study title	Exploring psychological insulin resistance in two Pacific Islands clients with Type 2 Diabetes Mellitus who are residents in New Zealand	
Principal investigator	Name: Dr Virginia Jones Department: Center of Postgraduate Nursing Studies, Christchurch Campus Position : 1st Supervisor	Contact phone number: (03) 364 3852

Introduction

Thank you for showing an interest in this project. Please read this information sheet carefully. Take time to consider and, if you wish, talk with relatives or friends, before deciding whether to participate.

If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

What is the aim of this research project?

This research aims to explore how Pacific people living with Type 2 diabetes respond to the prescription of insulin treatment to control their diabetes. Insulin treatment is often necessary in people with Type 2 diabetes to treat diabetes effectively. Yet many people with Type 2 diabetes reject the use of insulin treatment and consequently many people have poorly controlled diabetes resulting in costly and disabling complications such as kidney failure, blindness and foot amputations. This research looks at exploring the reasoning which influences two Pacific peoples' decisions to commence insulin treatment, delay insulin treatment or to decline insulin treatment.

Who is funding this project?

Health Workforce New Zealand and Post-Graduate Nursing Department of the Canterbury District Health Board (CDHB).

Who are we seeking to participate in the project?

The researcher is seeking two people from the Pacific Islands with Type 2 diabetes who are New Zealand residents. These two people would have been prescribed insulin treatment within the last ten years by the appropriate health professional. The participants will be given de-identified labels for identification and there will be no identifying detail in the documents generated during the study.

If you participate, what will you be asked to do?

If you choose to participate you will be asked by the student researcher to hold several in-depth interviews which may last up to two hours at a time. The student researcher will also look at your medical files for some demographic and diagnostic information relevant to the research. The study supervisors will also have access to your medical information, but any names will be removed before the supervisors have access to your information. Your participation throughout the study is voluntary and you may withdraw from the study at any time without any effects to your health care.

Is there any risk of discomfort or harm from participation?

There is no foreseeable harm from participation in this study. The researcher will work around you to fit in with your time and convenience. The interviews may however bring up some memories of the past that may upset you. We have resources to deal with issues that may arise as part of your usual health care or through your GP. The interviews can be stopped at any time that you wish.

What information will be collected, and how will they be used?

The interviews will be conducted using a semi-structured format. The student researcher will record your answers to the interviews by using pen and paper. The answers will be read back to the interviewees for reflection and validation. All data in writing will be kept in a locked cupboard at the workplace for ten years. Medical history and clinical information will be held securely on CDHB computers and are accessed only by log-ins and passwords. People accessing patients' medical notes are audited regularly by the CDHB to ensure only authorized staff are accessing these notes.

What about anonymity and confidentiality?

No names will appear in the study documents and all communications will be kept confidential.

If you agree to participate, can you withdraw later?

You may withdraw from participation in the research at any time and without any disadvantages to yourself or your healthcare.

Any questions?

If you have any questions now or in the future, please feel free to contact either:

<p>Name: Lupesiliva Tu'ulua</p> <p>Position: Student Researcher</p> <p>Department: Diabetes Centre, CDHB</p>	<p>Contact phone number:</p> <p>027 454 3052</p>
<p>Name: Dr Virginia Jones</p> <p>Position: First Supervisor</p> <p>Department: Centre of Postgraduate Nursing Studies, Christchurch</p>	<p>Contact phone number:</p> <p>03 364 3852</p>
<p>Name: Dr Michelle Schaaf</p> <p>Position: Cultural Mentor</p> <p>Department: TE TUMU, University of Otago</p>	<p>Contact phone number:</p> <p>03 479 8805</p>

This study has been approved by the University of Otago Human Ethics Committee (Health). If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (phone +64 3 479 8256 or email gary.witte@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

Appendix C

Participant Consent Form



CONSENT FORM FOR PARTICIPANTS

Following signature and return to the research team this form will be stored in a secure place for ten years.

Title of the project

Exploring psychological insulin resistance in two Pacific Islands clients with Type 2 Diabetes Mellitus (T2DM) who are residents in New Zealand

Principal Investigator: Dr Virginia Jones (03 364 3852)

Name :

1. I have read the Information Sheet concerning this study and understand the aims of this research project.
2. I have had sufficient time to talk with other people of my choice about participating in the study.
3. I confirm that I meet the criteria for participation which are explained in the Information Sheet.
4. All my questions about the project have been answered to my satisfaction, and I understand that I am free to request further information at any stage.
5. I know that my participation in the project is entirely voluntary, and that I am free to withdraw from the project at any time without disadvantage.
6. I know that the *interviews* will explore how I feel about the use of insulin treatment in diabetes and that if the line of questioning develops in such a way that I feel hesitant or uncomfortable I may decline to answer any particular question(s) and /or may withdraw from the project without disadvantage of any kind.
7. I understand the nature and size of the risks of discomfort or harm which are explained in the Information Sheet.
8. I understand that my medical case notes will be appropriately accessed by the student researcher and the supervisors for the purpose of the research.
9. I know that when the project is completed all personal identifying information will be removed from the paper records and electronic files which represent the data from

the project, and that these will be placed in secure storage and kept for at least ten years.

10. I understand that the results of the project may be published and be available in the University of Otago Library, but that either (i) I agree that any personal identifying information will remain confidential between myself and the researchers during the study and will not appear in any spoken or written report of the study or (ii) I agree to be named or identified in the study and will sign a waiver form.
11. I know that there is no remuneration offered for this study, and that no commercial use will be made of the data.

Signature of participant:

Date:

Name of person taking consent

Date:

Appendix D

University of Otago – Human Ethics Committee Approval Letter



University of Otago -
Human Ethics Commit

5 February 2018

Academic Services

Manager, Academic Committees, Mr Gary Witte

H17/150

Dr V Jones

Centre for Postgraduate Nursing Studies (Chch)

72 Oxford Terrace, Levels 2 and 3

University of Otago, Christchurch

Dear Dr Jones,

I am again writing to you concerning your proposal entitled “Exploring Psychological Insulin Resistance in two Pacific Islands clients with Type 2 Diabetes Mellitus who are residents in New Zealand.”, Ethics Committee reference number H17/150.

Thank you for your letter of 16th January 2018 addressing the points raised by the Committee.

On the basis of this response, I am pleased to confirm that the proposal now has full ethical approval to proceed.

The standard conditions of approval for all human research projects reviewed and approved by the Committee are the following:

Conduct the research project strictly in accordance with the research proposal submitted and granted ethics approval, including any amendments required to be made to the proposal by the Human Research Ethics Committee.

Inform the Human Research Ethics Committee immediately of anything which may warrant review of ethics approval of the research project, including: serious or unexpected adverse effects on participants; unforeseen events that might affect continued ethical acceptability of the project; and a written report about these matters must be submitted to the Academic Committees Office by no later than the next working day after recognition of an adverse occurrence/event. Please note that in cases of adverse events an incident report should also be made to the Health and Safety Office:

<http://www.otago.ac.nz/healthandsafety/index.html>

Advise the Committee in writing as soon as practicable if the research project is discontinued.

4192423

Make no change to the project as approved in its entirety by the Committee, including any wording in any document approved as part of the project, without prior written approval of the Committee for any change.

If you are applying for an amendment to your approved research,

please email your request to the Academic Committees Office:

gary.witte@otago.ac.nz

jo.farronediaz@otago.ac.nz

Approval is for up to three years from the date of this letter. If this project has not been completed within three years from the date of this letter, re-approval or an extension of approval must be requested. If the nature, consent, location, procedures or personnel of your approved application change, please advise me in writing.

The Human Ethics Committee (Health) asks for a Final Report to be provided upon completion of the study. The Final Report template can be found on the Human Ethics Web

Page

<http://www.otago.ac.nz/council/committees/committees/HumanEthicsCommittees.html>

Yours sincerely,

Mr Gary Witte

Manager, Academic Committees

Tel: 479 8256

Email: gary.witte@otago.ac.nz

c.c. Dr P Seaton Director, Senior Lecturer Centre for Postgraduate Nursing Studies
(Chch)

Appendix E

Te Komiti Whakarite Ethics Approval Letter

Canterbury

District Health Board

Te Poari Hauora o Waitaha

28th February 2018

Dr Virginia Jones
Centre of Post-Graduate Nursing Studies
Christchurch Campus
University of Otago

RE: Exploring Psychological Insulin Resistance in two Pacific Island clients with Type 2 Diabetes Mellitus who are residents in New Zealand.

Tēna koe Dr Jones,

Ka nui te mihi tēnei ki a koe me tou roopu o nga Kairapūkōrero ki te hapai o te kaupapa whakahirahira mou, mōku mo tātou katoa. Ko Rapunga Korero te mea nui. No reira tēnā koe me te roopu o nga Kairangahau, tēna koutou katoa.

Thank you for submitting the above research proposal to Te Komiti Whakarite, the Canterbury DHB Māori Health Research committee for Māori consultation.

We have read your proposal, which involve two Pacific Island clients with Type 2 diabetes mellitus.

Ultimately this type of research has the potential to reduce the health disparities between Māori and non-Māori.

We are happy to offer our support regarding any further culturally responsive practice and guidance you may seek advice on.

We wish you every success in your research and the Komiti would appreciate a summary of your findings on completion of the current project.

I hope this letter will suffice in terms of the application. Please contact me should you need any other information that may not have been included in the letter relevant to your research.

Heoi ano



Eru Waiti
Chairperson
Te Komiti Whakarite

Appendix F

HDEC: out of scope letter



Health and Disability Ethics

Committee

Wednesday, 24 January 2018

Ms Lupesilvia Tu'ulua

Canterbury District Health Board

lupesiliva.tuulua@cdhb.health.nz

Dear Ms Tu'ulua,

Study title: Exploring Psychological Insulin Resistance in two Pacific Islands clients with Type 2 Diabetes Mellitus who are residents in New Zealand. A “two case” case study.

Thank you for emailing HDEC a completed scope of review form on 21 January 2018. The Secretariat has assessed the information provided in your form and supporting documents against the Standard Operating Procedures.

Your study will not require submission to HDEC, as on the basis of the information you have submitted, it does not appear to be within the scope of HDEC review. This scope is described in section three of the Standard Operating Procedures for Health and Disability Ethics Committees.

Your study meets the student-led research exemption criteria described below. Your scope of review form described an observational research project for the attainment of a masters degree. Your study explores clients experience of psychological insulin resistance including their experiences of the treatment pathway and decisions that they make about their diabetes treatment. For the avoidance of doubt a study conducted wholly or principally for the purposes of an educational qualification requires HDEC review only if it:

- is an intervention study, or
- is not conducted at or below a Master's level.

4192423

If you consider that our advice on your project being out of scope is incorrect, please contact us as soon as possible giving reasons for this.

This letter does not constitute ethical approval or endorsement for the activity described in your application but may be used as evidence that HDEC review is not required for it.

Please note, your locality may have additional ethical review policies, please check with your locality. If your study involves a DHB, you must contact the DHB's research office before you begin. If your study involves a university or polytechnic, you must contact its institutional ethics committee before you begin

Please don't hesitate to contact us for further information.

Yours sincerely,

Tom Kent

Advisor

Health and Disability Ethics Committees

hdec@moh.govt.nz

4192423

Appendix G

Locality Authorization

From: CDHB Research Office [mailto:cdhb.researchoffice@otago.ac.nz]
Sent: Thursday, 29 March 2018 9:46 a.m.
To: Lupesiliva Tuulua <Lupesiliva.Tuulua@cdhb.health.nz>
Cc: CDHB Research Office <cdhb.researchoffice@otago.ac.nz>
Subject: RE: CDHB Locality authorization forms - signed

Hi Lupe,

The documentation for your project “**Exploring psychological insulin resistance (PIR) in two Pacific Islands clients with type 2 DM.**” has been assessed. On the basis of the information that you have submitted, your project is authorised to be conducted in the CDHB.

Please find attached the following documents as confirmation:

- Fully signed CDHB Locality Authorisation Form

We would ask that you inform us about outputs/publications and the outcome from your project.

All the best for the project. Please don't hesitate to get in touch if we can assist further.

With Kindest Regards
Emily

Emily Oughton | CDHB Research Advisor | University of Otago, Christchurch
Level 5 Research Office, 2 Riccarton Ave, PO Box 4345, Christchurch Mail Centre, Christchurch 8140, New Zealand
Tel +64 3 364 1513 or DD 81513 | www: <http://www.otago.ac.nz/christchurch/research/researchoffice/>
Office Hours: **Monday:** 9.30 – 2.30 **Tuesday:** 9.30 – 2.30 **Thursday:** 9.30 – 2.30 **Friday:** 9.30 – 2.30

From: Lupesiliva Tuulua [mailto:Lupesiliva.Tuulua@cdhb.health.nz]
Sent: Thursday, 29 March 2018 8:26 a.m.
To: CDHB Research Office <cdhb.researchoffice@otago.ac.nz>
Subject: FW: CDHB Locality authorization forms - signed

Hi Emily

Just checking that you have received these signed forms I sent on 22/3/18.

Any indication of when I might hear from your office?

Regards
Lupe

4192423

Appendix H

CONSENT TO USE THE FONUUA MODEL IN MY RESEARCH

05/11/2018

Malo e lelei Lupesiliva

I am happy for you to use the Fonua model for your study. This reply to your email confirms my consent.

If you need further info about my model, just contact me. I am more than happy to support you.

Best wishes

Kind Regards

sione

Sione Tu'itahi

Executive Director

Health Promotion Forum of New Zealand

Runanga Whakapiki Ake i te Hauora o Aotearoa (HPF)

Vice President

South West Pacific Region, International Union for Health Promotion and Education (IUHPE)

Ph (09) 3003733. Mobile 0276659939

Email: sione@hauora.co.nz

Website: www.hauora.co.nz

Appendix I

Medical Data – Case 1

S O A P	RELEVANT MEDICAL DATA		
CASE 1	Name: UOA - Case 1 Age: 40 years Sex: F	Marital Status: Separated NOK: Son Occupation: Mum at Home	Date: 26/6/18
Subjective	<p>Medical History</p> <p><i>Diagnosis:</i> Obesity, Hypertension, T2DM diagnosed 2012; on insulin since March 2017, Proteinuria, Hyperlipidaemia, Hyperuricemia, Chronic depression 2018</p> <p><i>Allergies:</i> None known,</p> <p><i>Social Hx:</i> No smoking, no alcohol, moderately healthy diet, walks half an hour most days</p> <p>Separated from husband for legal reasons in 2010, lives with four school aged children, currently aged 8 – 17 years.</p> <p>Multiple social agencies involved, the church; and school child health nurses' involvement, current and past. Pillars mentoring programme for the children.</p> <p>Referral from GP to special diabetes services, 2013 and 2014 to Diabetes Nurse and Dietitian – noted as HIGH PRIORITY and lack of support – cares for four school aged children by herself.</p> <p>Further referral from GP in June 2018 – high needs, has lots of family stresses - need lots of support</p>		

	<p><u>Family Hx:</u> Father (75) is alive and keeping well in the PI. Mother died suddenly at age 57 from ‘very high BP’. She has eight siblings. One older sister died suddenly at age 46, with similar circumstances to how mum died.</p> <p><u>Attendance Records:</u> PT said she used to see her previous GP every three months, but the place shut down.</p> <p>Her new GP is expensive so does not see them as often. She went for a free annual diabetes check recently at current GP (June 2018).</p> <p>Attendance records at the Diabetes Centre (DC) specialist services showed she had a total of 24 appointments made with the Pacific Islands Diabetes Nurse Specialist (PIDNS) and Dietitian in the previous two years, including one Diabetes Physician (DP) appointment (March 2017). So, she has had contact with the diabetes specialist service about once every month in the past 24 months. Appts at the DC are free of cost.</p> <p><u>Medications:</u> Lantus insulin 16u nocte, Metformin 1g bd, Quinapril 5mg daily, Atorvastatin 40mg daily, Citalopram 20mg mane (new, June 2018)</p>	
Objective	<p>Observation / Recordings: Weight 115 kg, Height 159 cm, BMI 45.5, BP128/83 (June 2018)</p> <p>Footcare is reasonable, foot pulses present, vibration thresh-hold normal (2017)</p> <p>Diabetic eye screening May (2018) was normal, for re-screen in 24 months</p> <p>Blood Results:</p> <p>HbA1c tests: 11/4/16 = 60 mmol/mol, 07/3/17 = 99 mmol/mol, 30/6 17 = 66 mmol/mol, 12/9/17 = 62 mmol/mol, 23/4/2018 = 70 mmol/mol, 26/6/18 = 69 mmol/mol</p> <p><i>(Target HbA1c is 50-55 mmol/mol, or as determined by individual circumstances, according to NZGG (2012)).</i></p>	<p>2017 -2018</p> <p>April 2018 blood results</p>

Lipids: Cholesterol 7.7 mmol/L (5.8), Triglycerides 6.8 mmol/L (3.6), HDL 0.91 mmol/L (1.06), Total cholesterol 8.5 mmol/L (5.5). *Results in brackets were from June 2017 tests. Lipids test results very high.*

Optimal Levels: Total cholesterol < 4 mmol/L, LDL cholesterol < 2.5 mmol/L, HDL cholesterol > 1 mmol/L, TC:HDL ratio < 4.5, Triglycerides < 1.7 mmol/L (CHL laboratories)

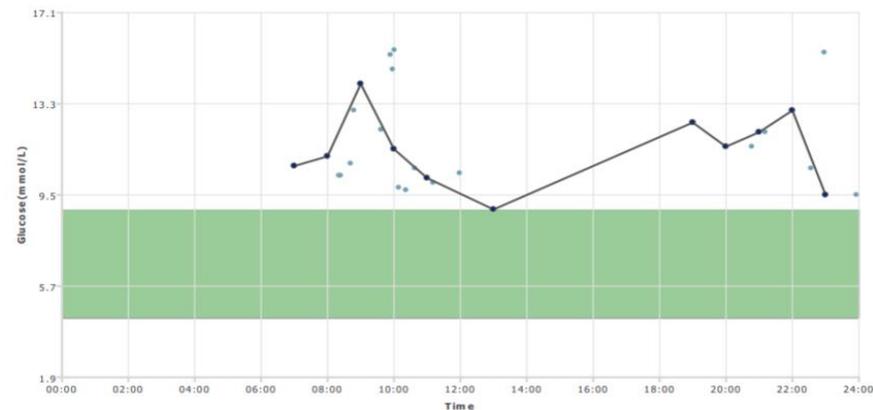
Urine microalbumin: 2257 mg/L (07/3/17), 5280 mg/L (30/6/17), 4886 mg/L (20/9/17) 2257 mg/L (23/4/18) HH. (Normal = Microalbumin < 30mg/L)

Renal function test: eGFR 103 mL/min/1.73m², **Creatinine:** 65 mmol/L (normal)

LFT: deranged but much improved from 1 year earlier.

Thyroid functions: normal

CareSenN gluco-meter download: Blood glucose levels over 30 days (June 2018). Target blood glucose range in **green colour** is **5 mmol/L – 9 mmol/L**



<p>Assessment</p>	<p>Obesity: PT has regular follow-up with a dietitian at the diabetes specialist services. She knows the benefits of physical activity in losing weight and treating T2DM, therefore tries to walk an hour most days.</p> <p>She has lost 3 kg in the last 12 months.</p> <p>T2DM: control has improved a lot since the PT started on insulin treatment fifteen months earlier. HbA1c improved from 99 mmol/mol to 69 mmol/mol in one year. According to bpac NZ (2010), the lower the HbA1c the better (within safe individual levels) and any sustained improvement over a long period of time has favourable implications for reducing long-term diabetes complications. The HbA1c test measures how much glucose is attached to the red blood cells in the blood. The higher the amount of glucose circulating in the blood, the higher the HbA1c test result will be (bpac NZ, n.d). It appears therefore that the PT has been complying with giving her insulin injections as originally prescribed, most of the time. She admits to missing her insulin at times when her motherly duties overwhelm and wears her out.</p> <p>The wake-up BGL in June (see BGL graph) indicate levels of 9 –15 mmol/L which are high. This indicates the need to increase the insulin dose at bedtime. Likewise, the evening BGL tests indicate that she needs at least a second injection of insulin (NZGG, 2012; Orr-Walker, 2017), either a fast-acting insulin at dinner time, or a second injection of Lantus in the morning (as well as at bedtime).</p> <p>A phone call recently to suggest to the PT that a second dose of insulin maybe needed in the morning as well as night time was not well received. The PT said she was missing quite a few doses of Lantus insulin at night, but she is now giving the Lantus every night, and her BGL are in single figures before breakfast.</p> <p>Heavy albuminuria: PT admitted not taking her prescribed medications regularly which includes kidney protection medication (Quinapril).</p>	
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	<p>Hypercholesteremia: PT has also stopped taking her statin medication, which was to help lower her cholesterol levels, therefore her lipid levels are very high.</p> <p>Deranged liver function tests: according to the literature maybe due to non-alcoholic fatty liver disease, which can improve with complying with healthy lifestyle changes, as well as taking her cholesterol, diabetes and ace inhibitor medications as prescribed (Health Navigator NZ, 2017; Murtagh & Rosenblatt, 2011).</p> <p>Hyperuricaemia: PT is asymptomatic experiencing no gout pain currently. This condition is also associated with obesity and other comorbidities as above (DiPiro et al., 2014).</p> <p>Chronic Depression: a recent formal diagnosis made by the GP and the PT was started on an anti-depressant medication. She has had immense distress in her family and social life over the last decade, in addition to having diabetes and caring for four school aged children as a solo parent.</p>	
Plan	<p>When the PT was first started on insulin injections in March 2017, the following plan was put in place:</p> <ol style="list-style-type: none"> 1. The PIDNS will call her every week and see her every two weeks to review her BGL and titrate her insulin doses according to her BGL tests. 2. Monthly follow-up with the dietitian to help her stay with a healthy diet and encourage her to keep physically active 3. The GP was informed by letter of the outcome of this consultation and follow-up plans for PT at secondary level care at the DC. 4. Home visits - because of the stressful home environment and the PT being a solo parent, she has needed a lot of psychological and social support. She has appreciated home visits by the PIDNS in the past and it will be more essential now with the addition of insulin therapy to her daily routine (NZGG, 2011). The PIDNS is well placed to offer the 	

	<p>necessary cultural, social and spiritual counselling that the PT requires. According to the MOH (2014), one of their priority goals is to have an adequate Pacific qualified health workforce, to meet service demands for Pacific people in NZ.</p> <ol style="list-style-type: none"> 5. The PT has good support from her current Church and from various social agencies. She is encouraged to make use of these support services, as they exist to make a difference in the holistic health of Pacific people and their families (MOH, 2014). 6. Regular follow-up with the PIDNS and Dietitian will continue at the DC, or home visits by the PIDNS as considered appropriate. Medical follow-up will be arranged as required at the DC, otherwise the PT is encouraged to see her GP team as usual <p>Summary of Progress Notes March 2017 – June 2018</p> <p>07/3/17: <u>PIDNS follow-up appt. PT had not taken medications for six months due to having lots of in-laws staying at her house.</u> She was very stressed about this and it affected her finances as well. No money left for her medications and proper healthy food. She and the kids were living on take away food. <u>An appt was arranged for her to see the DP, together with the PIDNS at the DC as soon as possible.</u></p> <p>17/3/17: At the clinic appt with the DP, PIDNS and dietitian, insulin Lantus 10u was prescribed once daily at bedtime.</p> <p>22/3/17: Phone call by the PIDNS to PT. <u>She had only given the insulin once in five days</u> because she was having headaches.</p> <p>28/3/17: PT had a follow-up appt with the Dietitian. PT was referred to Active Families and Green Prescription.</p>	
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	<p>31/3/17: Follow-up appt with the PIDNS. The PT had done some self-monitoring of her BGL at home. She was asked to increase her <u>Lantus dose to 14u at bedtime.</u></p> <p>07/4/17: A home visit by the PIDNS to view the PT's BGL. The <u>PT was asked to increase her Lantus to 18u at bedtime.</u></p> <p>09/5/17: Dietitian had written that Green Prescription staff had got in contact with the PT.</p> <p>30/5/17: Follow-up appt with the PIDNS – the PT said she had the flu for two weeks and <i>decided to stop her Lantus injection.</i></p> <p>Plan: <u>PT asked to restart her Lantus starting again, at 14u at bedtime.</u> PT was encouraged to take all other prescribed medications as well. To test her BGL twice daily before breakfast and before dinner.</p> <p>21/6/17: Appt with the PIDNS. PT said she was taking her <u>Lantus 14u at night,</u> plus her other prescribed medications.</p> <p>30/6/17: Appt with the Dietitian. The PT had lost 8kg in four months and was very pleased with her better lifestyle efforts.</p> <p><u>She continues to give her Lantus at 14u at bedtime.</u></p> <p>(Finally, a three-month gap before the next follow-up appt)</p> <p>12/9/17: A brief catch-up with the PIDNS, then she joined a research team looking at the CNP kidney study. Her HbA1c was taken by the research team and the result was 62 mmol/mol, much improved from 99 mmol/mol, just before she started insulin treatment.</p> <p>20/9/17: Follow-up appt with the PIDNS. <u>PT had run out of tablets.</u> One Lantus insulin pen left. <u>PT admitted she misses her night insulin at times.</u> <u>PIDNS asked PT to increase her Lantus dose to 16u.</u> PT was encouraged to</p>	
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	<p>take her other medications as well. The PIDNS provided a prescription for the PT's tablets as she is a RN prescriber.</p> <p>15/11/17: Phone contact to arrange a home visit</p> <p>16/11/17: "Doing Ok". "Kids Ok". PT has joined a gym. She has run out of Metformin tablets.</p> <p>04/1/18: Home visit by the PIDNS. PT requested a prescription for all her medications, plus meter strips for BGL tests and insulin pen needles.</p> <p>25/1/18: Follow-up appt at the DC. PT was asked how she was getting along with her Lantus insulin injection. <i>She did not answer this question.</i> (The PIDNS decided not to pursue this query at this time.)</p> <p>A three-month gap.</p> <p>16/4/18: PT did not attend appt with the Dietitian.</p> <p>23/4/18: PT went to see her GP for a full free Annual Diabetes Check.</p> <p>01/6/18: DC cancelled an appt for PT and Dietitian (unknown reason).</p> <p>11/6/18: Phone follow-up by PIDNS. PT had run out of her statin tablets and asked for a prescription.</p> <p>21/6/18: Follow-up appt at the DC.</p> <p>A new referral was received from the GP team to the Diabetes Nurse Specialists reiterating the fact that the PT has <i>high health needs</i> compounded by her family and social circumstances. A solo mother with four children with little family support. <i>She has issues with diet and often forgetting to take medications.</i> The PT is to continue with her prescribed medications including her Lantus insulin 16u – 20u at bedtime.</p>	
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	26/6/18: Follow-up appt at the DC with the Dietitian. HbA1c test was done which was 69 mmol/mol (stable over the last 12 months). She was referred to the DC Social Worker to see if WINZ can help PT further with finances and job search for her 18-year-old son leaving school soon.	
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Case 1 – Medical Data - ends

Appendix J

CASE 1 - Findings: *Interviews, *Direct Observations, *Medical Data

CASE 1 Propositions & Literature	<u>Interviews</u> (Five including member checking) Manually recorded	<u>Direct Observations</u>	<u>Demographic Data, Social History & Medical Records (MR).</u> SUMMARY
<p>PROPOSITION 1 <i>The diagnosis of diabetes is a very distressing time for patients and families.</i> Alberti (2002) Drury and Gatling (2005) Hendrieckx et al. (2016) Murtagh and Rosenblatt (2011) MOH (2015) Schaaf and Schaaf (2005)</p>	<p>Case 1 consented 13 April 2018</p>	<p><i>PT stands for Participant</i></p>	<p><u>Age</u>: 40 years <u>Sex</u>: F <u>Marital status</u>: separated <u>Dependants</u>: four school aged children <u>Ethnicity</u>: Samoan <u>Age of diagnosis T2DM</u>: 35 years <u>Prescribed insulin</u>: 1 year ago.</p>
<p>P1. Q1. Do you remember the time you were diagnosed with diabetes?</p>	<p>Yes, 2009. When I was pregnant with my daughter. She was born in 2010</p>	<p><i>PT looked stressed about something, so I asked about the family. We started talking about her family issues first. Her husband rang her cell phone at this time. (The interview was held at a quiet communal place).</i></p>	<p>Year of diagnosis confirmed by MR - 2009</p>
<p>P1. Q2.</p>			

How did you feel at the time when you were told you had diabetes?	Worried. It was a new thing. It's trouble, how bad is it? Is there a cure? If I die from it who would look after my children? I did not trust anybody to look after my children.	<i>PT appeared open and honest with her replies</i>	Medical notes / GP referral letter showed that the PT separated from her husband (due to legal reasons), at the same time as her diabetes diagnosis. She was now responsible alone for the care of three children and a pregnancy.
P1. Q3. How did your family respond to your diagnosis of diabetes?	My husband tried to make me eat a healthy diet, as we were told by the hospital staff.	<i>Over-concerned spouse on the phone. The PT's phone rang three times during the first interview (husband ringing – currently separated). The husband wanted to know who she was with and why.</i>	
PROPOSITION 2 <i>Patients with diabetes feel worn-out and burnt-out with the demands of diabetes management.</i> Alberti (2002) Drury and Gatling (2005) Gebel (2013) Giese (2018) Hendrieckx et al. (2016) Mascott (2015) Murtagh and Rosenblatt (2011)	Case 1 Interview	Direct Observations	Social history <i>Occupation:</i> stay home Mum <i>Education:</i> tertiary level <i>Health Literacy:</i> fair <i>Finances:</i> tight, on WINZ benefit
P2. Q1. How do you feel about the requirements to eat healthily because you have diabetes?	I felt good when I had to change my diet when I was first told I had diabetes.	<i>PT looked more relaxed as interview continued.</i>	In the last two years (01/7/2016 – 01 July 2018), she has been sent a total of 24 appts at the DC to see the Dietitian and Nurse Educator plus one Dr's

	I had support from my husband, now without him, it's too stressful. I need to look after four kids and myself.		appt. So, she had enormous social, medical and moral support from the DC staff.
P2. Q2. How do you feel about exercising because it's good for controlling diabetes?	Exercise is helpful for my body. It makes me feel good walking and going to the gym. Exercise makes me feel light		The MR showed that the dietitian and diabetes nurse regularly remind the PT of the benefits of exercise in diabetes treatment.
P2. Q3. How do you feel about testing your Blood Glucose Levels (BGL)?	It's good for me, for letting me know what my blood sugars are.	<i>PT appeared to have accepted that testing BGL is part and parcel of diabetes care.</i>	MR showed that the PT only <i>once</i> brought a glucometer to her appts (over the last 12 months). The HCP were then able to download some BGL results
P2. Q4. How do you feel about having to inject insulin every day because the HCP said you need insulin?	I find it's useful for me. I'm on Lantus 16 – 20 units at night. My body felt a change when I started injecting insulin. I used to feel heavy, but when I inject insulin my body feels light.	<i>PT seemed quite sincere about the good changes she feels, since giving herself insulin</i>	HbA1c test a month ago was 69 mmol/mol. <u>Before starting insulin, a year ago, the HbA1c was 97 mmol/mol.</u> HbA1c has improved
PROPOSITION 3 <i>Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR)</i> Allen et al. (2016) Brod et al. (2008) Hendrieckx et al. (2016) Korytkowski (2002) Larkin (2008)	Case 1 Interview	Direct Observations	Medical Records (MR) Notes

Polonsky et al. (2005)			
P3. Q1. Do you remember the first time you were told you needed insulin?	Yes. One year ago	<i>PT relaxed as interview progressed.</i>	MR confirmed the PT started insulin a year ago in March 2017.
P3. Q2 How did you feel when you were told you needed insulin?	I remember when I was first told I needed insulin – I accepted it. I felt the advice was right. I needed it.	<i>PT appeared to have given an honest answer.</i>	The Nurse’s notes said that the PT gave two injections the first week, then stopped because she got a headache and she thought it may have been due to insulin.
P3. Q3. Why did you feel that way when you were told you needed insulin?	I accepted the doctor’s advice, because I needed help. My diabetes care was not good.	<i>PT’s reply appeared very genuine.</i>	The diabetes nurse’s notes showed that the PT took weeks to finally give herself insulin more than once a week. The Nurse was regularly ringing or visiting to encourage the PT to continue with insulin.
P3. Q4. How do you feel now about having to inject insulin to control diabetes?	Much better. I now feel good. I feel stronger than before starting insulin.	<i>PT appeared more relaxed as interview continued.</i>	HbA1c test a month ago was 69 mmol/mol. <u>Before starting insulin, a year ago, the HbA1c was 97 mmol/mol.</u> HbA1c has improved
PROPOSITION 4 <i>After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR)</i> Allen et al. (2016) Brod et al. (2008) Fu et al. (2009) Gherman et al. (2011)	Case 1 Interview	Direct Observations <i>This second interview was held at home, and the children were at home. The PT was again looking uptight. I stopped our interview and asked how things</i>	Medical Records (MR) Notes Attendance records over the last two years showed a total of 24 appts made for this PT to see the PI Diabetes Nurse Specialist (PIDNS) and Dietitian including one Dr’s appt. <u>Near 100% attendance rate.</u> Enormous support from HCP and great attendance rate.

<p>Karter et al. (2010) Larkin (2008) Polonsky and Jackson (2004)</p>		<p><i>were with the children and her partner (separated, but rings home every day). After a while the PT relaxed and the interview continued.</i></p>	
<p>P4. Q1 After giving yourself the first injection of insulin, how did you feel?</p>	<p>After the first injection I felt different. I felt much better</p>	<p><i>PT's reply seemed quite genuine</i></p>	
<p>P4. Q2 How did your family and friends react to the fact you had started insulin treatment?</p>	<p>I told my husband and he encouraged me to take my tablets and insulin, because he heard on Samoan radio, you were talking about what happens if I don't take my insulins and tablets. My sister in Auckland also said her husband is on insulin and it's doing good for him.</p>		
<p>P4. Q3 Did your doctor or nurse ask you to keep increasing your insulin doses according to the BGL? <u>Member check 2:</u> The PT was asked if she would increase her dose of Lantus at night, to improve her wake-up</p>	<p>Yes. When I feel weak, I guess that my blood sugar is high. Then I do a blood sugar test and it's usually 15 or higher. Then I inject a higher number, 20u of Lantus, instead of 16u. I believe insulin and its benefits for me. Case 1 was contacted a second time by phone if she would</p>	<p><i>PT appeared confident to attempt insulin dose adjustments herself.</i></p>	<p>MR showed the BGL were still higher than target range and need more insulin. The wake-up BGL are currently too high at 9 – 15 mmol/L. The ideal wake-up levels would be 5 – 7 mmol/L *Her HbA1c tests are much improved though, since insulin was started >1 year ago.</p>

BGL (currently 9 – 15 mmo/L)	increase her night time Lantus from 20u to 24u, and she said <i>yes</i> . “I want my BGL levels before breakfast to be lower than what it is. BGL of 6 – 8 mmol/L would be better.”		
<p>P4. Q4 How do you feel about giving your insulin every day and making changes as necessary?</p> <p><u>Member check 2:</u> How do you feel about continuing to increase the insulin dose until you wake up with BGL of 5 – 8 mmol/L?</p>	<p>Feel OK now about adjusting insulin doses and taking tablets. I took tablets for years, but they did not make any difference. Since I started insulin, my blood sugars are better, and my body feels better. I used to feel full and nauseated before starting insulin. I also had achy legs and my body felt heavy before I started insulin.</p> <p>I saw the dietitian recently and she showed me my BGL on the computer. They could be lower, so I have been giving my insulin every night now and my headaches have gone. The Nurse also told me if I miss the insulin injection at night, I can give it in the morning before breakfast. I am doing that now.</p>	<i>PT is more relaxed and talked more freely as interview progressed.</i>	<p>The MR showed that the insulin doses have not been increased in the last six months.</p> <p>The PT brought a meter to the Dietitian appt recently and is the first meter download in a year since her insulin start. This made it easier to make suggestions of how much to increase the insulin doses by, and what time of the day it was safe to do so. For example, the PIDNS (also a RN prescriber) was able to say, if she misses the night dose of insulin, she can safely give it in the morning.</p>
PROPOSITION 5 <i>There are multiple and complex psychosocial factors that all interact</i>	Case 1 Interview	Direct observations	Medical Record (MR) Notes

<p><i>together and adversely affecting an important decision, to start and stay on insulin therapy.</i></p> <p>Brod et al. (2008) Gheman et al. (2011) Karter et al. (2010) Larkin (2008) Leavasa (2018) O'Connor (2016) Patel, et al. (2011) Sahin et al. (2015) Talemaitoga (2018)</p>			
<p>P5. Q1 How do you feel when you hear the word insulin?</p>	<p>Case 1 When I first heard about insulin, I was worried and scared, especially about the needles. I also heard bad things about insulin before, but when things were explained, and I started insulin, I felt better. I trust that insulin is helpful.</p>	<p><i>PT appeared honest and gave a genuine answer.</i></p>	<p>The MR and HCP notes indicated that the PT did not adhere to the instructions to give insulin every day at bedtime, especially in the first few weeks and months. This equals the PT's sentiment of fear and worry when she was first asked to start insulin treatment.</p>
<p>P5. Q2 How does your family and friends receive the fact you need to give yourself insulin injections daily?</p>	<p>My husband is supportive He tells me on the phone to give my insulin because he heard 'you' on the radio. My sister also said it's helpful for me because her husband is on insulin and it is good for him.</p>	<p><i>The PT is relaxed.</i></p>	
<p>P5. Q3</p>	<p>At first, I was very scared about injecting myself. But now it's</p>	<p><i>The PT's reply seemed very sincere.</i></p>	<p>MR showed her recent HbA1c test was 69 mmol/mol; much improved from 97</p>

<p>What's the most difficult thing for you about inulin treatment?</p>	<p>not difficult. I like insulin because it makes me feel better. But sometimes I forget to give my insulin, especially when my boys have rugby training in the evening. We get home, cook dinner, eat and I fall asleep and forget my insulin injection.</p>		<p>mmol/mol a year earlier. But the HbA1c test could be improved.</p>
<p>P5. Q4 Is there anything that discourages you most from continuing with insulin therapy?</p>	<p>NO. I have found insulin useful for my body, and I believe in its benefits.</p>	<p><i>PT seemed genuinely convinced of the benefits and usefulness of insulin for herself.</i></p>	
<p>PROPOSITION 6 <i>PIR is more common in ethnic minority populations (and women) and there is an increasing need to study this phenomenon in “culturally sensitive settings”.</i> Bogatean and Hancu (2004, p. 247) Jhas et al. (2015) Larkin (2008) Ludeke et al. (2012) Nam et al. (2010) Polonsky and Jackson (2004) Polonsky et al. (2004) Patel et al. (2011)</p>	<p>Case 1 Interview</p>	<p>Direct Observations</p>	<p>Medical Records (MR) Notes</p>

<p>P6. Q1 Would it be fair to say you distrust the use and the benefits of insulin therapy for yourself?</p>	<p>At first, I doubted but after the first injection, I believed insulin helped me to feel better. My body used to feel heavy. My stomach used to feel full and nauseated, but since I started insulin, my body felt light. I felt better in the stomach too.</p>		<p>PT's improved blood test results show that she would have been giving her insulin injections, at least 50% of the time.</p>
<p>P6. Q2 If, in your heart you believe that insulin is the best treatment for you, what would stop you from continuing insulin treatment?</p>	<p>Nothing. I find that insulin is useful for my body and for me to feel well. I need the insulin to feel better.</p>	<p><i>PT seemed convinced of the benefits of insulin for herself.</i></p>	<p>The MR and progress notes in the last 15 months often recorded that the PT missed her insulin and other medications on many occasions. The practicality of taking medications as prescribed appear to be the hard part.</p>
<p>P6. Q3 If, in your heart you believe that insulin is the best treatment for you, what encourages you to keep on giving insulin every day?</p>	<p>Because it makes me feel better. I feel unwell when I miss the injections. My body feels heavy and my joints and bones (shin) feel achy. My stomach also feels full and I feel nauseated.</p> <p>I wondered if I can inject my insulin in the morning, if I forget it at night?</p>	<p>Right action-<i>when PT gives the insulin</i> Right feeling-<i>it makes her feel better</i> Right belief-<i>consequently the PT rightly believes in the benefits of insulin</i> Right question-<i>and therefore she rightly asks if she can give the insulin in the morning, if she misses the night dose.</i></p>	<p>The PT's recent blood result (HbA1c) showed that her diabetes control is much improved since starting insulin a year ago. This correlates with the fact that she would have been giving her insulin as prescribed, at least 50% of the time.</p>
<p>P6. Q4</p>			

Do your beliefs as a PI affect the way you see insulin therapy as the right treatment for you?	NO. I believed it was good for me, because the Dr and the Nurse said it was good for me.		
<p>PROPOSITION 7 <i>Family, culture, religious beliefs and misconceptions, can all contribute to PIR.</i></p> <p>Bogatean and Hancu (2004) Drury and Gatling (2005) Leavasa (2018) Ludeke et al. (2012) O'Connor (2016) NZGG (2012) Patel et al. (2011) Talemaitoga (2010) Te Karu et al. (2018)</p>	<p>Case 1 Interview</p>	Direct Observations	Medical Records (MR) Notes
<p>P7. Q1 What are your families' views on insulin treatment?</p>	<p>My husband (though separated) is supportive. My oldest kid asked me about my insulin. When I explained to him it's to treat my diabetes, he was happy for me.</p> <p>Case 1</p>	<i>PT appeared relaxed and gave an emotionally honest reply, especially when talking about her oldest son who is a teenager.</i>	
<p>P7. Q2 Do PI people believe in the benefits and necessity of insulin to treat T2DM?</p>	<p>My family members using insulin believe in the benefits of insulin. Some PI people who are religious believe they can trust</p>		

	God only, and there's no need for them to take insulin treatment.		
P7. Q3 Are your religious beliefs for or against insulin treatment?	For. My religious beliefs help me to use insulin treatment. I pray and believe that God gives me the strength, as I do my part by taking the tablets and insulin. The Bible says that beliefs and works should go together.	<i>The PT appeared quite genuine about her beliefs and that her faith gives her encouragement to take her medications, including insulin.</i>	The PT's improved HbA1c test results show that she was giving herself the insulin injections, most of the time. The right dose to achieve optimal diabetes control though, needs to be increased.
P7. Q4 What have your close friends and families told you about insulin treatment?	My close family encouraged me to take insulin. My husband heard good messages about insulin on the Samoan radio. My brother-in-law is on insulin. He and my sister believe in the benefits of insulin.		

<p>P7. Q5 Who or what was most helpful for you in learning to start insulin treatment, and in deciding to continue with your insulin injections?</p>	<p>Case 1 Interview The most helpful thing for me, to go on giving myself insulin is because it makes me feel better. I had lots of headaches recently and I went to the GP and I had more tests. But since I started giving myself insulin every day, my headaches have gone.</p> <p>I now give it in the morning if I forget it at night time. The Diabetes Nurse said I can do that.</p>	<p>Researcher Observation <i>The PT has been consistent with her answers, but many times during the interviews, she appeared uptight.</i></p>	<p>Medical Records (MR)</p> <p>The MR showed that the PT saw the HCP (GP and DC team) on average, once a month in the previous two years. The PT has attended a near 100% of the appts. This is a phenomenal record of appts and attendance. But it appeared this <i>extra</i> HCP team support was one main reason the PT could stay ‘afloat’, and not be overwhelmed with her social and health issues. Her diabetes control though not ideal, is still much better than one year ago, before she was prescribed and started on insulin treatment.</p>
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CASE 1 - Findings: *Interviews, *Direct Observations, *Medical Data - *Ends*

Appendix K

Analysis: Stage 1 - Describing Experience – Case 1

<p>PROPOSITION 1 <i>The diagnosis of diabetes is a very distressing time for the patient and families</i></p>	<p>Case 1 Key Words *Stress *Distress *Fear *and related words Negative Emotions</p>	<p>Key Words *Good *Better *Positive *and related words Positive Emotions</p>	<p>Rival Explanations if any</p>
<p>Question 1. Do you remember the time you were diagnosed?</p>	<p>Stressed, family issues, young age at diagnosis (35) 3</p>		
<p>Question 2. How did you feel at the time when you were told you had diabetes?</p>	<p>Worried, trouble, bad, die, did not trust, fear, worry, uncertainty, panic, PT separated from partner around this time, sole carer for four children 11</p>		
<p>Question 3. How did your family respond to your diagnosis of diabetes?</p>	<p>Caring but over-anxious spouse 1</p>		

<p>PROPOSITION 2 <i>Patients with diabetes feel worn-out and burnt-out with the demands of diabetes management</i></p>	<p>Case 1 – UOA 1</p> <p>Negative Emotions</p>	<p>Describing experience</p> <p>Positive Emotions</p>	<p>Rival Explanations if any</p>
<p>Question 2.1. How do you feel about the requirements to eat healthily because you have diabetes?</p>	<p>WINZ benefit, finances tight, stressful, look after kids alone, separated from husband, extra stress doing a WINZ course 6</p>	<p>Felt good when I changed my diet</p> <p>1</p>	
<p>Question 2.2. How do you feel about exercising because it's good for controlling diabetes?</p>	<p>Busy solo mum to four kids Stopped going to gym</p> <p>2</p>	<p>Exercise is helpful Makes me feel good Likes exercise Support from a dietitian and a nurse</p> <p>4</p>	
<p>Question 2.3. How do you feel about testing your Blood Glucose Levels (BGL)?</p>		<p>Good for me Let's me know about my blood sugars Acceptance</p> <p>3</p>	<p>Despite the PT accepting that blood glucose testing is what she needs to do on a regular basis at home, the medical notes showed she only presented her meter <i>once in 12 months</i> with some meaningful number of tests done</p> <p>Rival 1</p>

<p>Question 2.4. How do you feel about having to inject insulin every day because the HCP said you need insulin?</p>		<p>Useful Change Body feels light Sincere HbA1c test improved since insulin start</p> <p>5</p>	
<p>PROPOSITION 3 <i>Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR)</i></p>	<p>Case 1</p> <p>Negative Emotions</p>	<p>Describing Experience</p> <p>Positive Emotions</p>	<p>Rival explanations if any</p>
<p>Question 3.1. Do you remember the first time you were told you needed insulin?</p>	<p>Yes</p>		
<p>Question 3.2. How did you feel when you were told you needed insulin?</p>		<p>I accepted it Felt the advice was right I needed it Honest answer</p> <p>4</p>	<p>The progress medical notes recorded the PT gave <i>two</i> insulin injections out of seven days then <i>stopped</i> because she was getting headaches, and she thought it may have been due to insulin</p> <p>Rival 2</p>
<p>Question 3.3. Why did you feel that way when you were told you needed insulin?</p>		<p>Accepted Dr's advice Needed help Genuine</p> <p>3</p>	<p>The medical notes recorded that the PT <i>took weeks before she gave herself insulin injections more than twice a week.</i> The nurse was <i>having to ring or do home visits often to remind and encouraged the PT to keep giving her insulin daily as prescribed.</i></p> <p>Rival 3</p>

<p>Question 3.4. How do you feel now about having to inject insulin to control diabetes?</p>		<p>Much better Feel good now Improved energy Feel better More relaxed HbA1c improved 6</p>	
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<p>PROPOSITION 4 <i>After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR)</i></p>	<p>Case 1</p>	<p>Describing Experience</p>	
<p>Question 4.1. After giving yourself the first injection of insulin, how did you feel?</p>	<p>Negative Emotions Uptight Family issues Many HCP appts – high needs 3</p>	<p>Positive Emotions Felt much better Appeared genuine 2</p>	<p>Rival explanations if any</p>
<p>Question 4.2. How did your family and friends react to the fact you had started insulin treatment?</p>		<p><i>Husband encouraged me to take insulin</i> <i>Positive radio messages on a Samoan radio</i> <i>Sister encouraged me to take insulin</i> <i>Insulin good for her husband</i> <i>Positive messages</i> <i>Acceptance of insulin treatment</i> 6</p>	

<p>Question 4.3. Did your doctor or nurse ask you to keep increasing your insulin doses according to the blood glucose levels?</p>	<p>Feel weak when BGL are high, like 15 or more</p> <p>1</p>	<p>I believe insulin is beneficial I would like my BGL to be lower than what they are. HbA1c test had improved since insulin started a year ago</p> <p>3</p>	<p>Medical Notes: When the PT was contacted to increase the insulin dose as her wake-up BGL were 9 – 15 mmol/L (normal 4 -8 mmol/L), there was <i>hesitance</i> to increase the insulin dose at night</p> <p>Rival 4</p>
<p>Question 4.4. How do you feel about giving your insulin every day and making changes as necessary?</p>		<p>Feel OK now PT is relaxed Benefits of insulin are many Blood sugars are better Give insulin every night now Headaches are gone</p> <p>6</p>	<p>Medical notes showed the <i>insulin dose had not been increased in the previous six months. The insulin injections have been missed especially when take her boys to rugby training once or twice a week.</i> Meter brought to clinic appt only <i>once</i> in 12 months. Rival 5</p>

Unit of Analysis 1: Describing Experience

	<p>Negative Emotion</p>	<p>Positive Emotions</p>	<p>Rival Explanations if any</p>
<p>Question 5.1. How do you feel when you hear the word insulin?</p>	<p><i>At first:</i> Worried Scared Needles Bad</p>	<p><i>After starting and continuing with insulin for a while:</i> Better Helpful</p>	<p>The medical notes recorded that the PT <i>missed a lot of insulin injections at the start</i> of the prescribed treatment. This matched the fear and negative emotions she felt at the start. <i>But once</i></p>

	4	Trust Honest 4	<i>she started the insulin treatment she felt the positive effects</i> Rival 6
Question 5.2. How does your family and friends receive the fact you need to give yourself insulin injections daily?		Supportive Helpful Good Positive community messages Encouragement 5	
Question 5.3. What's the most difficult thing for you about insulin treatment?	At first, I was scared Injecting Forgetting to give my insulin Busy with children – e.g. evening rugby training Concept of injecting insulin originally difficult Solo mum – too busy Diabetes control could be better 7	Feel better HbA1c test much improved (since insulin treatment started a year ago) 2	
Question 5.4. Is there anything that discourages you most from continuing with insulin therapy?		Insulin is useful for my body I believe in the benefits of insulin PT appear convinced of the benefits of insulin for herself 3	

Unit of Analysis 1: – Describing Experience

<p>PROPOSITION 6 <i>PIR is more common in <u>ethnic minority populations (and women) and there is an increasing need to study this phenomenon in “culturally sensitive settings”.</u></i></p>	<p>Case 1</p>	<p>Describing Experience</p>	
<p>Question 6.1. Would it be fair to say you distrust the use and the benefits of insulin therapy for yourself?</p>	<p>At first, I doubted</p>	<p>Felt better after first injection Body feel light now Good physiological response to insulin treatment Acceptance of insulin treatment Improved diabetes tests (HbA1c) - showed PT been giving her insulin at least 50% of the time</p>	<p>Rival Explanations if any</p>

<p>Question 6.2. If, in your heart you believe that insulin is the best treatment for you, what would stop you from continuing insulin treatment?</p>		<p>Nothing (would stop me from giving insulin now) Insulin is useful I need insulin I feel better</p> <p>4</p>	<p>The progress medical notes revealed that in the last 15 months, the PT often missed the insulin injections and stopped on occasions taking other prescribed medications for BP, kidney protection and cholesterol lowering tablets. So, the PT has accepted the need for insulin and other medications, but the practicality of injecting insulin (and taking other medications), may explain why the medications are not taken every day, as prescribed.</p> <p>Rival 7</p>
<p>Question 6.3. If, in your heart you believe that insulin is the best treatment for you, what encourages you to keep on giving insulin every day?</p>		<p>Feeling better Asking if alright to give insulin in the morning, if missed the previous night dose – a positive response (instead of declining insulin use) Right action, right feeling, right belief, right question Improved HbA1c tests Insulin given at least 50% of the time</p> <p>7</p>	
<p>Question 6.4. Do your beliefs as a PI affect the way you see insulin therapy as the right treatment for you?</p>		<p>I believe insulin is good for me The Dr and Nurse said it was good for me PT trusted the advice from HCP Insulin improves feeling of well-being</p>	

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Unit of Analysis 1: Describing Experience

PROPOSITION 7 <i>Family, culture, religious beliefs and misconceptions, all contribute to PIR</i>	Case 1	Describing Experience	
Question 7.1. What are your families' views on insulin treatment?	Negative Emotions	Positive Emotions Husband supportive Oldest child was happy after need for insulin injections was explained Positive family support PT's answers about positive family support are consistent 4	Rival Explanations if any
Question 7.2. Do PI people believe in the benefits and necessity of insulin to treat T2DM?	Some PI people believe there's no need to use insulin treatment Some PI people believe trusting God only is enough Religious beliefs can stop some PI people from using insulin treatment 3	My family members using insulin believe in benefits of insulin 1	
Question 7.3. Are your religious beliefs for or against insulin treatment?		My religious beliefs help me use insulin I pray and believe in God I ask for strength	The medical notes showed the diabetes control is much improved, <i>however could be better.</i> The insulin dose daily at night time could be increased to make the wake-up BGL fall

		I do my part by taking insulin and tablets Beliefs and works should go together 5	into the target range. But the HCP progress notes showed that <i>there was hesitance and reluctance</i> on the PT's part to do this (PIR), when approached on several occasions Rival 8
Question 7.4. What have your close friends and families told you about insulin treatment?	Case 1 Describing Experience	Close family encourage me Husband heard good messages about insulin on Samoan radio My sister and her husband believe in insulin – he's on insulin. It's good for him. Positive and encouraging messages from close families 4	
Question 7.5 Who or what was most helpful for you in learning to start insulin treatment, and in deciding to continue with your insulin injections?	The PT needed extra HCP team support (<i>intensive follow-up</i>) and social support from the PIDNS and a DC dietitian, to keep the PT engaged, and to adhere to taking her insulin at least 50% of the time, as well as taking her other medications. 3	Most helpful was because insulin makes me feel better Headaches have gone since I started giving insulin every day If I miss the dose at night, I give it in the morning now (my nurse said I can do that) 3	The progress and medical notes revealed that the PT saw the HCP team on average once a month in the previous 24 months. A lot of these appts were home and community visits by the PIDNS to try and keep the PT engaged in her own health care, especially taking her insulin and other prescribed medications. Due to the PT's highly stressful home and social background, there was phenomenal support given from the HCP team at the DC for this PT. This appeared to have helped the PT (<i>in addition to her feeling better</i>) to maintain adherence with taking prescribed medications (<i>a lot of the time</i>), including giving her insulin injections. Rival 9

Case 1 – Stage 1- Describing Experience - Ends

Appendix L

Analysis: Stage 2 - Describing Meaning – Case 1 – (*Links to Fonua Model - FM*)

PROPOSITIONS	SOURCES: Literature, Personal and Professional	Describe Meaning	Rival Explanations if any: need a sceptical attitude according to Yin (2014)
<p>1.The diagnosis of diabetes is a very distressing time for the client and families</p> <p>Link to FONUA MODEL* (FM) (Figure 2) *The mental and emotional wellbeing of the participant is severely affected here at the time of diabetes diagnosis (second circle of the FM). It is therefore necessary that Case 1's immediate family, her support networks, such as the HCP team, spiritual family and her community (second and fourth level /circle) work together to keep her safe, while she navigates her troubled emotions and mental stresses at this time.</p>	<p>Alberti (2002)</p> <p>Drury and Gatling (2005)</p> <p>Hendrieckx et al. (2016)</p> <p>MOH (2015)</p> <p>Murtagh and Rosenblatt (2011)</p> <p>Schaaf and Schaaf (2005)</p> <p>Talemaitoa (2010)</p>	<p>The literature acknowledges that the diagnosis of diabetes has a huge impact on a person's life and their family but is often under-estimated. Denial, fear, anger and related emotions are common. Some people will need a psychologist's input to help accept the diagnosis and move forward.</p> <p>In PI people, a culturally appropriate approach and involvement of the PI trained health workforce will be helpful.</p> <p>Case 1 went through all the negative emotions of someone being diagnosed with diabetes, as described in Stage 1.</p>	
<p>2.Patients with diabetes feel worn out and burnt-out with the demands of diabetes management.</p> <p>Link to FONUA MODEL* *The physical domain of the person is certainly affected with the daily</p>	<p>Alberti (2002)</p> <p>Drury and Gatling (2005)</p> <p>Gale (2014)</p>	<p>Diabetes distress from daily management of diabetes as well as living a 'normal' life is well recognised and written about in the literature. Eating healthily, increased physical activity, taking medications</p>	<p>Rival Explanation 1 Despite the PT accepting the need to eat healthily, increase physical activity and testing her BGL daily, <i>the HCP progress notes revealed a huge struggle by the PT to comply</i></p>

<p>demands of diabetes care management as in Case 1. However, the positive feelings of physical wellbeing since insulin start was also remarkable, which facilitated a positive attitude towards insulin use. But as the <i>Fonua Model</i> indicates, Case 1 also needed much social and practical support with regular requirements of diabetes management such as reminding to eat healthy, be active and to take her medications. The HCP team provided much of that crucial support, for Case 1 to continue with good diabetes care including implementing insulin therapy.</p>	<p>Gebel (2013) Giese (2018)</p> <p>Hendrieckx et al. (2016)</p> <p>Mascott (2015)</p> <p>MOH (2015)</p> <p>Murtagh and Rosenblatt (2011)</p>	<p>including insulin, testing BGL up to six times a day can wear any one out. Case 1 showed some negative emotions in relation to tight finances and in caring alone for four children because she is separated from her spouse (for legal reasons). On the other hand, Case 1 showed a lot of positive emotions because since she started insulin injections, it made her felt physically better. A healthy diet and exercises made her feel better too. She also acknowledges that testing her own BGL at home was good for her, so she knows how well she is doing.</p>	<p><i>with these requirements.</i> For example, the PT presented a meter with some regular BGL tests in it, only <i>once</i> in the previous 12 months. This equates to the signs and symptoms of diabetes distress and burn-out, yet the HCP found it hard to distinguish it from clinical depression, due to high levels of stress and anxiety (Gebel, 2013). The discord of positive emotions and inadequate diabetes care management can also be attributed to the PT's need for more practical help, alongside clinically, psychologically and culturally appropriate healthcare (Hendrieckx et al. 2016; Levasa, 2018; Talemaitoga, 2010)</p>
<p>3.Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR).</p> <p><i>Link to FONUA MODEL*</i> *Case1 found the advice to start insulin therapy was not too difficult to accept. She believed it was the right advice (second circle – mental state stable).</p>	<p>Allen et al. (2016)</p> <p>Brod et al. (2008)</p> <p>Bogatean and Hancu (2004)</p> <p>Funnel et al. (2004)</p> <p>Hendrieckx et al. (2016)</p> <p>Korytkowski (2002)</p>	<p>Much of the literature on PIR concur that starting insulin treatment is difficult for patients with T2DM to accept. However, Case 1 consistently maintained that when the DP asked her to start insulin treatment, she accepted that she needed it. She felt straight away that the advice was right. When she started giving the</p>	<p>Rival Explanation 2 The HCP progress notes showed that in the first week since prescribed insulin therapy, the PT gave only two insulin injections. She stopped because she thought her headaches were due to the insulin. The progress notes also recorded that the PIDNS was ringing and visiting the PT</p>

<p>Her body also felt lighter and she got more energy since insulin start. Her HbA1c test also improved (third circle – physical domain – positive effects). But despite her genuinely positive attitude towards insulin use, she still struggled to give her insulin as prescribed. She missed many injections and needed the HCP team to keep a close vigil on her case. The HCP team and the PIDNS were also providing much of the psychological and social support, due to the unique and complex psychosocial needs of this case (second and fourth level / circle of the FM are positive).</p>	<p>Larkin (2008) Orr-Walker (2017) Polonsky and Jackson (2004) Polonsky et al. (2005)</p>	<p>insulin she felt better too. She felt light in her body and got more energy. Her positive reports appeared very genuine too. Clinically, her HbA1c test also improved significantly, meaning her diabetes control was much better since starting on insulin therapy. But there is still room for improvement.</p>	<p>often, to remind her to give her insulin daily and to take other medications as prescribed. This implied that despite the PT's positive attitude towards insulin start, she needed constant and regular follow-up from the HCP for her to carry on and to continue with insulin treatment (Funnel et al., 2004; Jha et al. 2015; Larkin, 2008; MOH, 2014; Nam et al., 2010).</p>
<p>4.After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR).</p> <p><i>Link to FONUA MODEL*</i> *Continuing with insulin treatment as a lifelong therapy is a hard concept to accept, especially by patients with T2DM. This is according to the literature and to clinician experience. Still, Case 1 had a positive attitude towards insulin use. Her family also gave positive advice (mental domain and family level of the FM were</p>	<p>Allen et al. (2016) Brod et al. (2008) Korytkowski (2002) Fu et al. (2009) Gherman et al. (2011) Larkin (2008) Polonsky and Jackson (2004) Polonsky et al. (2005)</p>	<p>The PT was originally scared of the thought of injecting and of using a needle. But she accepted the advice to use insulin immediately. She felt much better in her body since starting insulin treatment. She talked with her husband (separated), and with her sister who gave her positive messages and encouraged her to keep on using insulin. The PT is convinced of the benefits of insulin for herself and has also seen her BGL improve. She also seemed confident in</p>	<p>Rival Explanation 3 Despite the PT's very positive attitude towards insulin use and positive family support, <i>the medical notes recorded several occasions where the participant was reluctant to increase her insulin dose, to further improve her BGL. In fact, the insulin doses had not been titrated for a period of six months. The insulin injections have also been missed at least once a week. The HCP progress notes also recorded a high number of home visits,</i></p>

<p>positive) and encouragement for her to continue with insulin treatment. The HCP also supported her significantly and encouraged her to take her insulin injections daily (third and fourth circle of the FM – good balance).</p>		<p>adjusting her insulin doses as required.</p>	<p>outpatient appts and phone contact by the PIDNS, to encourage the PT to persevere with insulin treatment.</p>
<p>5. There are multiple and complex psychosocial factors that all interact and adversely affecting an important decision to start and to stay on insulin therapy (PIR).</p> <p>Link to FONUA MODEL* *The literature on PIR is abundant and most authors have agreed the issues facing clients like Case 1 are multifaceted and complex. The issues for Case 1 were originally fears of the needle and negative messages from the community. The persistent issue is forgetting to give her insulin some days, due to a very busy daily routine being a solo mum to four school aged children. According to the FM, having a favourable and balanced environment is also needed, if the person is to live a healthy and stable life.</p>	<p>Brod et al. (2008) Gherman et al. (2011) Larkin (2008) Leavasa (2018) O'Connor (2016) Patel et al. (2011) Sahin et al. (2015) Talemaitoga (2018) Taylor et al. (2017) Woudenbergh, Lucas, Latour, & Scholte op Reimer (2012)</p>	<p>When the PT first heard about insulin, <i>she was worried, and scared of the needle</i>. She also <i>heard bad things about insulin</i>. But after starting to inject insulin she felt better in her body. She got less aches and pains and felt light. She later discovered her headaches might have been due to high BGL. <i>So, she needs to give her insulin every day</i>. She also received good and positive support from her close family members. Her diabetes control improved as she continued to persevere (with encouragement) to give her insulin injections daily.</p>	<p>Rival Explanation 4 Despite the PT's testimonies of the convincing benefits of insulin treatment for herself, and the positive support from her close family members, <i>she still lacked adequate self-management of diabetes including insulin treatment</i>. She originally missed the injections due to <i>fear</i> of the needle and injecting. Some of the challenges she faces is remembering to inject insulin and take her medications daily and needing to titrate insulin to the ideal dose. She also gets very tired being a solo mum.</p>
<p>6. PIR is more common in <i>ethnic minority</i> populations (and <i>women</i>) and there is an increasing need to</p>	<p>Bogatean and Hancu (2004, p. 247)</p>	<p>The PT <i>first doubted</i> that insulin was going to be helpful. But after injecting</p>	<p>Rival Explanation 5 Although Case 1 seemed fully persuaded of the benefits and</p>

<p>study this phenomenon in “culturally sensitive settings”.</p> <p>Link to FONUA MODEL*</p> <p>*The FM is a pan-Pacific model looking at a Pacific person’s health in a holistic manner, as this is how Pacific people generally view their wellbeing. Health is not just physical well-being, but mind, emotions, spiritual and social wellbeing need to be stable too. The PI person’s community and environment all need to be operating in harmony too, for a person to be truly well and able to reach their full potential. Case 1 has tremendous challenges in her social and family environments (second level / circle of the FM) so her projected health outcomes were poor. Moreover, it is noteworthy that the presence of a PIDNS in the HCP team, might have also helped to provide culturally appropriate healthcare to Case 1 (third and fourth level / circle – positive according to the FM).</p>	<p>Jha et al. (2015)</p> <p>Larkin (2008)</p> <p>Ludeke et al. (2012)</p> <p>Machinani, Bazargan-Hejazi, & Hsia (2013)</p> <p>Nam et al. (2010)</p> <p>Patel et al. (2011)</p> <p>Polonsky and Jackson (2004)</p> <p>Polonsky et al. (2005)</p> <p>Taylor et al. (2017)</p>	<p>insulin for the first time and at consequent times she said she felt much better. Her body felt light, and body aches and pains disappeared. This led to her accepting insulin as part of her diabetes treatment. She said there is nothing that will stop her from giving insulin because she knows she needs insulin to feel better. The PT also believes and trusts the HCP advice. She also noticed that her BGL improved. Consequently, being a Pacific Islander did not appear to affect her belief in insulin use.</p>	<p>usefulness of insulin for herself, the progress medical notes revealed in the fifteen months since the prescription of insulin, there were often missed doses. The insulin injections were even stopped at times. The PIDNS often rang and did home visits to check that the PT was still giving her insulin and was taking other medications as well. It could be that some of the barriers to adequate diabetes care are the wearisome daily practicality of giving insulin, testing BGL, and the continuous cost of medications (Hendrieckx et al., 2016). As well, being a solo mother to four school aged children competes constantly with her demanding diabetes care.</p>
<p>7.Family, culture, misconceptions and religious beliefs can all contribute to PIR</p> <p>Link to FONUA MODEL*</p>	<p>Bogatean and Hancu (2004)</p> <p>Drury and Gatling (2005)</p>	<p>Case 1 has had positive support from her husband to keep taking her insulin. He had heard HCP on the Samoan radio talked about the</p>	<p>Rival Explanation 6</p> <p>The family and the PT herself have been positive early on about the benefits of using insulin to treat diabetes. The</p>

<p>*In Case 1, family, religious beliefs and good understanding of the benefits of insulin treatment, were positive influences which helped her to continually believe in the usefulness of insulin (all first four domains / levels of the FM were positive). This helped minimize the effects of PIR in her case. Additionally, being a PI by ethnicity did not appear to affect her perception of the benefits of insulin therapy for herself. She felt much better in her body (felt light and less aches and pains) and she became convinced beyond doubt, that insulin was necessary for her health and wellbeing (good outcome for the physical body – third circle of the FM).</p>	<p>Hendrieckx et al. (2016) Leavasa (2018) Ludeke, et al., (2012) MOH (2014) NZGG (2012) O'Connor (2016) Patel et al. (2011) Schaaf and Schaaf (2005) Talemaitoga (2010) Talemaitoga (2018) Te Karu et al. (2018)</p>	<p>necessity of insulin therapy to treat diabetes and to prevent complications. In addition, Case 1 has close relatives using insulin treatment and they have positive messages for insulin use. Her religious beliefs also help her to treat her diabetes with insulin. She believes that faith and works must go together. However, she also said she knows of some PI people who believe God will heal them and do not need to take medications to control diabetes (Levasa, 2018; Schaaf & Schaaf, 2005). She has no misconceptions now about the usefulness of insulin treatment for herself.</p>	<p>PT however has been slow and reluctant at times to increase the insulin dose to the maximum optimal dose. The PT was convinced of the benefits of insulin because she felt physically stronger, had more energy and her headaches disappeared after consistent use. This helped her significantly to comply with giving her insulin most days. But the medical progress notes also recorded a phenomenal number of client contact with the HCP, especially from the diabetes specialist services. According to the literature, this close follow-up is necessary if people will stay on insulin treatment long-term (Cutfield, n.d; Drury & Gatling, 2005; Larkin, 2008; MOH, 2014; NZGG, 2012).</p>
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Case 1 - Stage 2 – Describing Meaning - Ends

Appendix M

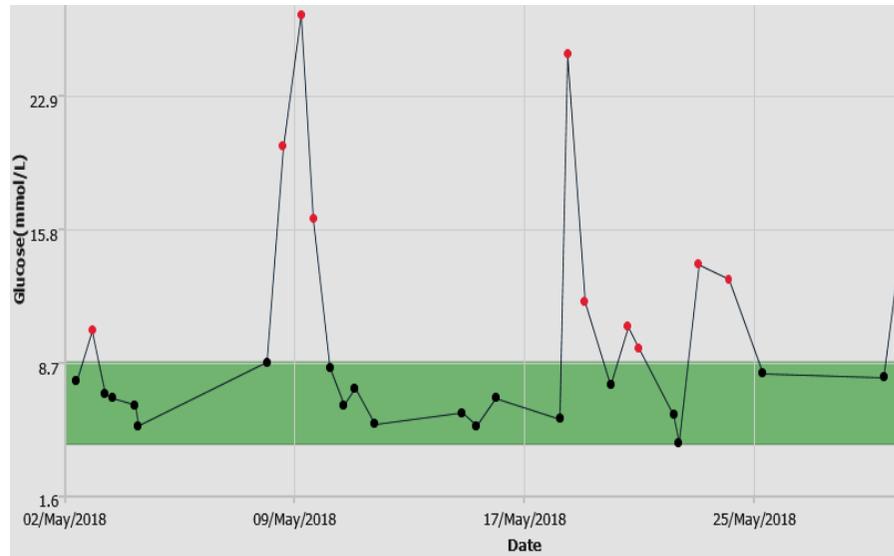
Medical Data – Case 2

S O A P	RELEVANT MEDICAL DATA		
CASE 2	Name: UOA - Case 2 Age: 46 years Sex: F	Marital Status: Married NOK: Husband Occupation: Mum at Home	Date: as 13 July 2018
Subjective	<p>Medical History Diagnosis: T2DM diagnosed 2007, Pregnancies 2010 and 2011 both times requiring Insulin during gestation, Diabetes Retinopathy, Sub retinal abscess 2016 - with significant visual loss right eye, Albuminuria, Dyslipidaemia, Allergies: None known Medications: current regular medications, Metformin 1g bd, Lantus 60u bd (mane & nocte); previously was prescribed 130-150u nocte, Apidra 15u at dinner-time, Cilazapril 2.5 mg daily (NEW), Atorvastatin 20 mg daily (NEW). Self-monitoring of blood glucose levels lost her meter for many months, so no tests for months However, was given a meter in Mar 2018 Social Hx: No smoking, No alcohol, Moderately healthy diet, Exercises ½ hour most days Husband works full time. PT stays at home to look after two young children 7- and 8-year olds. PT was married 11 years before conceiving, first baby born 2010, second child born 2011. Family Hx: Dad is 70 years old, healthy and living in the PI. Mum died six years ago aged 64 years. She died five days after a stroke. There are seven siblings. One younger sister has T2DM. Not sure if a parent had diabetes. Attendance Records: PT lived south of Christchurch for the last eight years and moved to Christchurch later in 2017 with her immediate family. She was sent regular six monthly appts with the visiting Diabetes Physician (DP) from Christchurch. She attended every appt with the DP, but the DP always recorded that the PT had not been giving her insulin. The Diabetes Nurse Specialist (DNS) was also involved; but after a little time of adherence to insulin treatment, the PT appeared to always stop her insulin injections again. She also DNA most of the Ophthalmology Dept appts, despite having acute serious eye problems which landed her in hospital in 2016. She was referred to the Christchurch Pacific DNS in Dec 2017 and was sent an appt with her in Jan 2018. She DNA that appt as well as DNA a DP appt at the Christchurch Diabetes Centre in Feb 2018. The DP checked the Chemist records</p>		

	<p>and saw that the PT did not pick up any medications from the Chemist for over three months over the Christmas period 2017/ 2018. After some persistent follow-up phone calls and appts sent from the PIDNS, the PT finally attended an appt in <i>March</i> 2018.</p>	
Objective	<p>Recordings: Weight 83 kg, Height 163.8 cm, Body Mass Index 30.9, Blood Pressure 127/80 (Apr 2018)</p> <p>Footcare: pedal pulses present, monofilament sensation intact (Sept 2017)</p> <p>Visual acuity: right eye 6/36, left eye 6/6 (Sept 2017). PT has an eye appt at the diabetes eye screening coming up soon (June 2018)</p> <p>Blood results:</p> <p>HbA1c 08/9/15 = 96 mmol/mol, 01 Apr 2016 = 135 mmol/mol, 06/10/16 = 102 mmol/mol, 25/7/17 = 131 mmol/mol, 26/6/18 = 85 mmol/mol (<i>Target HbA1c is 50 – 55 mmol/mol, or as determined by individual circumstances, according to NZGG, 2012</i>)</p> <p>Lipids taken 26/6/2018: total cholesterol 6.6 (<4 mmol/L), triglycerides 3.1 (<1.7 mmol/L), HDL 1.10 (>1.0 mmol/L), LDL 4.8 (<2.0 mmol/L). <i>Normal levels are in brackets (NZGG, 2012).</i></p> <p>Urine Biochemistry: July 2017 albumin 1266 (<30 mg/L), Alb/Crn ratio 238.9 (<3.5 g/mol), June 2018 albumin 2980 (<30 mg/L), Alb/Crn ratio 246.3 (<3.5 g/mol). <i>Normal levels in brackets (Éclair, 2018)</i></p> <p>Est eGFR: last test taken 25/7/2017 was 75 (80 - 120 mL/min/1.73m²). <i>Normal range in brackets (Eclair, 2018)</i></p> <p>CareSensN gluco-meter download:</p>	

A snapshot of Case 2's BGL tests, since restarting her insulin on a simplified regime: Lantus 60 units twice daily, morning and bedtime, Apidra 10 units with the main meal (usually dinner).

The pattern shows BGL excursions after meal times on a typical day. Other times, the BGL look very good.



Assessment

- *At the last DP appt (Sep 2017), Case 2 was restarted on her insulin injections - Lantus 130 units nocte, Apidra fast acting insulin as patient determines
- *Significant vision loss to the right eye since 2016 (6/36)
- No issues with left eye currently
- *Significant proteinuria
- *HbA1c test has dropped significantly (85 mmolmol) since moving to the main town (Jan 2018) and since her insulin regime was simplified. Close follow-up from the PIDNS was also in place.
- *Since close follow-up from the PIDNS, Case 2 has been testing her BGL more often, taken other medications as prescribed, and now enrolled with a local GP

	*The snapshot of BGL over two weeks as per meter download showed BGL excursions at meals times on a typical day. Other times of the day, the BGL look almost perfect. This means she should inject fast-acting insulin (Apidra) three times a day with the three main meals. However, this is work in progress, as the PT has been very opposed to injecting insulin over the last eight years.	
Plan	<ol style="list-style-type: none"> 1. Take medications including insulin, as prescribed. 2. See GP every three months for prescriptions and medical check-ups. 3. PIDNS will send out follow-up appts every six weeks 4. Attend other healthcare appts such as diabetes eye screening and other specialist appts. 5. Refer to PI Partnership Community Workers who can assist with transport and navigation of hospital services if required. 	

Case 2 – Medical data - Ends

Appendix N

FINDINGS: *Interview, *Direct Observations, *Medical Records – CASE 2

CASE 2 (UOA 2) Propositions & Literature Questions	<u>*Interviews</u> (Five including member checking) Manually recorded	<u>*Direct Observations</u>	<u>*Demographic Data, Social History & <u>Medical Records</u> (MR).</u> SUMMARY
<p>PROPOSITION 1</p> <p><i>The diagnosis of diabetes is a very distressing time for patients and families.</i></p> <p>(Alberti, 2002; Drury & Gatling, 2005; Hendrieckx et al., 2016; MOH, 2015; Murtagh & Rosenblatt, 2011; Schaaf & Schaaf, 2005; Talemaitoga, 2010).</p>	<p>Case 2 consented</p> <p>31 May 2018</p>	<p>PT stands for Participant</p>	<p><u>Age</u>: 46 years</p> <p><u>Sex</u>: F</p> <p><u>Marital Status</u>: Married</p> <p><u>Dependents</u>: 2 school aged kids</p> <p><u>Ethnicity</u>: Tongan</p> <p><u>Age at diagnosis</u>: 35 years</p> <p><u>Prescribed insulin</u>: 2010 while pregnant with first child: 8 years ago.</p>
<p>P1. Q1.</p> <p>Do you remember the time you were diagnosed with diabetes?</p>	<p>2007</p>		<p>Year of diagnosis confirmed by MR 2007</p>
<p>P1. Q2. How did you feel at the time when you were told you had diabetes?</p>	<p>I did not care. I did not take it seriously. I thought these people may not be right. There is no one in my family with diabetes. So, I ignored it.</p>		

<p>P1. Q3.</p> <p>How did your family respond to your diagnosis of diabetes?</p>	<p>My husband told me to be careful. He knew other people with diabetes and he understood that people with diabetes need to watch their diet and take tablets.</p>	<p><i>PT appeared to choose her words carefully when answering the questions</i></p>	
<p>PROPOSITION 2</p> <p><i>Patients with diabetes feel worn-out and burnt-out with the demands of diabetes management.</i></p> <p>(Alberti, 2002; Drury & Gatling, 2005; Gale, 2014; Gebel, 2013; Giese, 2018; Hendrieckx et al., 2016; Mascott, 2015; MOH, 2015; Murtagh & Rosenblatt, 2011).</p>	<p>Case 2</p> <p>Interviews</p>	<p>Direct Observations</p>	<p>Social history:</p> <p><i>Occupation:</i> stay at home Mum</p> <p><i>Education:</i> tertiary level</p> <p><i>Health Literacy:</i> Fair</p>
<p>P2. Q1. How do you feel about the requirements to eat healthily because you have diabetes?</p>	<p>I can't afford to cook for myself separately. I must eat vegetables by myself because my husband and kids don't like eating vegetables.</p>	<p><i>Seemed an honest answer</i></p>	
<p>P2. Q2. How do you feel about exercising because it's good for controlling diabetes?</p>	<p>I feel good when I do a lot of housework. I like exercise. As a family we go to the park often with the kids</p>		
<p>P2. Q3.</p>			

<p>How do you feel about testing your Blood Glucose Levels (BGL)?</p>	<p>It's OK. I got used to it. It's not that painful. I prefer it to insulin injections. Insulin injections hurt and bruise my tummy</p>	<p><i>Seemed to have accepted that testing her BGL is part and parcel of diabetes care.</i></p>	<p>The PT's progress notes recorded that she lost her testing meter for many months in the last 12 months, so there had been no way of knowing how the diabetes control was.</p>
<p>P2. Q4. How do you feel about having to inject insulin every day because the HCP said you need insulin?</p>	<p>I feel good because I see my blood sugars come down. Also, when I take the insulin injections I stop going to the toilet five times in the night, so I sleep good at night. I got headaches too when my blood sugars were high.</p>		<p>The MR showed the PT lived in a different town for eight years. She shifted to this new town seven months before participating in this research. She used to attend the visiting DP appts every six months, but records showed she often stopped giving her insulin. Her HbA1c test was always high (> 90 mmol/mol). A DNS was also frequently involved in her case.</p>
<p>PROPOSITION 3</p> <p><i>Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR)</i></p> <p>(Allen et al., 2016; Brod et al., 2008; Korytkowski, 2002; Hendrieckx et al., 2016; Larkin, 2008; Polonsky &</p>	<p>Case 2</p> <p>Interview</p>	<p>Direct Observations</p>	<p>Medical Records (MR) Notes</p>

Jackson, 2004; Polonsky et al., 2005).			
P3. Q1. Do you remember the first time you were told you needed insulin?	Yep, 2010, when I was pregnant with my first child	<i>PT relaxed as interview progressed</i>	MR confirmed that the PT needed to start insulin treatment in 2010, during pregnancy.
P3. Q2 How did you feel when you were told you needed insulin?	I did not like it, but I had no choice. After they explained it, I had to do it for my child.		
P3. Q3. Why did you feel that way when you were told you needed insulin?	I hate needles. I don't like needles	<i>PT seemed quite honest.</i>	
P3. Q4. How do you feel now about having to inject insulin to control diabetes?	I feel OK. I feel better now since injecting insulin every day. I could tell when my blood sugars go high. I can see and feel the difference now. They used to call me the ambulance lady, but now I look after myself, they don't call the ambulance anymore haha. I'm doing well.	<i>PT appeared more relaxed and more comfortable as interview continued.</i>	Since moving to this town, the PT was able to re-connect with a specialist diabetes service in February 2018. From there she was encouraged to be enrolled with a local GP practice. The PIDNS also sent regular appts and sought to re-engage this PT to help her treat her diabetes.
PROPOSITION 4	Case 2		

<p><i>After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR)</i></p> <p>(Allen et al., 2016; Brod et al., 2008; Fu et al., 2009; Gherman et al., 2011; Korytkowski, 2002; Larkin, 2008; Polonsky & Jackson, 2004; Polonsky et al., 2005).</p>	<p>Interview</p> <p>The PT was asked <i>twice</i> (member checking) to elaborate on some of her answers to this proposition, as it is pertinent to understanding factors contributing to PIR.</p>	<p>Direct Observations</p>	<p>Medical Records (MR) Notes:</p>
<p>P4. Q1</p> <p>After giving yourself the first injection of insulin, how did you feel?</p>	<p>It hurt. I hated it.</p> <p>There were bruises too.</p>	<p><i>PT appeared frank and honest</i></p>	
<p>P4. Q2</p> <p>How did your family and friends react to the fact you had started insulin treatment?</p>	<p>My husband laughed. He was being mean because he used to tell me to take my tablets and take care of the diabetes, but I did not care. So, when I was told to start insulin, he laughed at me, like, I told you to take care, but you did not listen. Now your diabetes is serious, and you have to use insulin</p>		

<p>P4. Q3</p> <p>Did your doctor or nurse ask you to keep increasing your insulin doses according to the BGL?</p> <p><u>Member check 2:</u></p> <p>The PT was asked again what she thought when the Dr or DNS asked her to keep increasing her insulin doses to bring her BGL to target range (7 -12 mmol/L most of the time).</p>	<p>Case 2</p> <p>Yes, they did. I accepted what they said, because I saw they knew what they were talking about. I was comfortable with adding 5 more units of insulin if my blood sugar was high. I could also cut down 2-5 units if my blood sugar dropped low. I trusted their advice because they were good people, otherwise they should not be Drs and Nurses. But, I used to say yes to increasing the dose, <i>but I was not giving the insulin at all, so no increasing for me!</i> Because I hated the needles. But now I give my insulin, and I haven't been in hospital this year haha (January to July 2018!)</p>	<p><i>The PT looked uncomfortable having to finally say that she was not giving her insulin at all many times, which was the reason she never had to increase doses.</i></p>	<p>The MR documented the PT ceased insulin use after the birth of her first baby. Five months later she was prescribed once a day insulin to take as well as Metformin tables to control diabetes, as her HbA1c test was too high at 117 mmol/mol (12.7%). But despite the PT acknowledging the expertise of the HCP and their goodwill, the DP wrote that the PT kept stopping her insulin injections, for long periods of time.</p> <p>Subsequently, the PT saw no need to increase her insulin doses.</p>
<p>P4. Q4</p> <p>How do you feel about giving your insulin every day and making changes as necessary?</p> <p><u>Member check 2</u></p>	<p>I feel better.</p> <p>Insulin works, if you stick with it. I can feel in my body that the blood sugars are lower. I have more energy, and I only go to the toilet once to pee in the night instead of five times, so I sleep better now. My BGL are better</p>	<p><i>PT more relaxed and talking more freely as interview progressed.</i></p>	<p>Since the PT came to a different city and was referred to another HCP service, she managed to re-engage with the HCP team who could help her focus on diabetes treatment. The PIDNS was part of this new HCP team. The progress notes recorded the PIDNS (a RN</p>

<p>Would you be comfortable to keep increasing your insulin doses at night, until you wake up with BGL of 6-9 mmol/L?</p>	<p>now that I give my insulin every day twice a day most days. I did not increase my insulin doses like they told me, because I was not giving the insulin injections at all, in the first place.</p>		<p>prescriber) changed the PT's insulin regime to try and simplify it and improve adherence to insulin treatment (Cutfield, 2017; NCNZ, 2016); Orr-Walker, 2017; Talemaitoga, 2018).</p>
<p>PROPOSITION 5</p> <p><i>There are multiple and complex psychosocial factors that all interact together and adversely affecting an important decision, to start and stay on insulin therapy.</i></p> <p>(Brod et al., 2008; Gherman et al., 2011; Leavasa, 2018; Larkin, 2008; O'Connor, 2016; Patel et al., 2011; Sahin et al., 2015; Talemaitoga, 2018; Taylor et al., 2017).</p>	<p>Case 2</p> <p>Interview</p>	<p>Direct observations</p>	<p>Medical Record (MR) Notes</p>
<p>P5. Q1</p> <p>How do you feel when you hear the word insulin?</p>	<p>Get lost insulin!</p> <p>Insulin is alright without the needle! I hate the needle. It hurts.</p>	<p><i>The PT's answers appear genuine</i></p>	<p>The PT's medical notes from previous providers did not record, if the causes of her PIR have been investigated in depth and hence addressed.</p>
<p>P5. Q2</p>			

How does your family and friends receive the fact you need to give yourself insulin injections daily?	They are supportive. They are there for me. My cousin often rings me to see if I am giving the insulin and take my tablets. My husband is supportive.		
P5. Q3 What's the most difficult thing for you about insulin treatment?	Looking at the needle. The pain of the injections and the size of the needle, and the bruises. The shorter needles given to me recently has made a big difference when I inject insulin now. I like shorter needles.		The PIDNS who is a RN prescriber, prescribed shorter 5mm insulin pen needles to replace the longer 8mm needles. This has helped improved adherence to insulin injections
P5. Q4 Is there anything that discourages you most from continuing with insulin therapy?	NO. Because I know the benefits of using insulin for myself. I will keep using insulin.	<i>PT seemed convinced now of the benefits of using insulin treatment for herself.</i>	At the time of this study, the PT has re-engaged with a HCP team and seemed ready to treat her poorly controlled diabetes. The PIDNS who is a RN prescriber has simplified her insulin regime. This has helped her adhered to the new regime and has motivated her to do BGL testing and bring them in for the HCP to view.
PROPOSITION 6 <i>PIR is more common in ethnic minority populations (and women) and there is an increasing need to study this</i>	Case 2 Interview	Direct Observations	Medical Records (MR) Notes

<p><i>phenomenon in “culturally sensitive settings”.</i></p> <p>(Bogatean & Hancu, 2004, p. 247; Jha et al., 2015; Larkin, 2008; Ludeke et al., 2012; Machinani et al., 2013; Nam et al., 2010; Patel et al., 2011; Polonsky & Jackson, 2004; Polonsky et al., 2005; Taylor et al., 2017).</p>			
<p>P6. Q1</p> <p>Would it be fair to say you distrust the use and the benefits of insulin therapy for yourself?</p>	<p>NO. I don't distrust the benefits of insulin. I do trust that insulin is useful for me, because if it wasn't for insulin, my blood sugars will keep going up and up.</p> <p>Case 2</p>		<p>Since the delivery of her first baby in 2010, the medical notes recorded that the PT often stopped giving the insulin injections for long periods of time. So, the BGL and HbA1c tests were often recorded very high. It's only this year in March 2018, with persistent calls from the PIDNS that she has re-engaged with her diabetes care and started giving her insulin injections again.</p>
<p>P6. Q2</p> <p>If, in your heart you believe that insulin is the best treatment for you, what would</p>	<p>Nothing. I find that insulin help brings down my blood sugars. As I said before, I stopped going to the toilet to pass urine five</p>	<p><i>PT seemed convinced now of the benefits of insulin for herself.</i></p>	<p>For eight years since insulin treatment was first prescribed, the PT's diabetes control was poor for most of the times, with HbA1c</p>

<p>stop you from continuing insulin treatment?</p>	<p>times in the night. I now sleep better.</p>		<p>tests recorded mostly >100 mmol/mol. It is only three months ago that the PT seemed to have given the insulin regularly, and her HbA1c test reduced significantly to 85 mmol/mol (June 2018).</p>
<p>P6. Q3 If, in your heart you believe that insulin is the best treatment for you, what encourages you to keep on giving insulin every day?</p>	<p>When I look at my children. I want to be well for my children. So, I need to give myself insulin. When I'm well, I sleep better, have more energy to do housework, help care for my children, help cook and look after my husband who works to care for my family. And I'm no longer the ambulance lady!</p>		<p>For many years the medical records showed she was not giving her insulin injections as agreed with her previous HCP team. Her renewed compliance with her insulin treatments started when the PIDNS was involved six months ago. As well, her insulin regime was simplified at that time, and a new meter was provided as she lost her other meter months earlier. The shorter 5mm insulin pen needles were also prescribed by the PIDNS.</p>

<p>P6. Q4</p> <p>Do your beliefs as a PI affect the way you see insulin therapy as the right treatment for you?</p>	<p>If PI people understand that insulin can help them treat diabetes, then we will be Ok with using insulin.</p>	<p><i>The PT seemed confident of her understanding of insulin benefits now.</i></p>	<p>Despite the PT understanding the benefits of insulin treatment, the medical records showed she still had huge challenges in giving herself the insulin injections consistently. She stopped the injections for long periods of time. Consequently, she has signs of diabetes complications already, such as loss of vision in the right eye and albuminuria.</p>
<p>PROPOSITION 7</p> <p><i>Family, culture, religious beliefs and misconceptions, can all contribute to PIR.</i></p> <p>(Bogatean & Hancu, 2004; Drury & Gatling, 2005; Hendrieckx et al., 2016; Leavasa, 2018; Ludeke et al., 2012; MOH, 2014; NZGG, 2012; O'Connor, 2016; Patel et al., 2011; Schaaf & Schaaf, 2005; Talemaitoga, 2010, 2018; Te Karu et al., 2018).</p>	<p>Case 2</p> <p>Interview</p>	<p>Direct Observations</p>	<p>Medical Records (MR) Notes</p>
<p>P7. Q1</p>	<p>Case 2</p>		

What are your families' views on insulin treatment?	My husband thinks that insulin is OK. He goes along with it. He often asks me if I have taken my tablets and my insulin.		
P7. Q2 Do PI people believe in the benefits and necessity of insulin to treat T2DM?	YES. I'm a Pacific Islander and I believe insulin helps in the treatment of diabetes. I know it works.	<i>The PT appeared confident in her belief that insulin does work well in treating her diabetes.</i>	However, the medical documents showed that beliefs and practical application of beliefs in consistently giving insulin therapy, do not always go together. Case 2 had struggled over the years to comply with giving her insulin injections daily, as advised.
P7. Q3 Are your religious beliefs for or against insulin treatment?	Case 2 My religious beliefs encourage me to use insulin treatment if it's helpful.		Despite positive religious beliefs encouraging insulin use if beneficial, Case 2 still found it hard to comply with insulin treatment over many years. The MR have recorded these struggles.
P7. Q4 What have your close friends and families told you about insulin treatment?	I have a close friend with diabetes, who did not care about insulin before. After I told her about the benefits of insulin for	<i>This seemed a genuine turnaround of belief and behaviour</i>	

	myself, she started to take her tablets and inject her insulin.		
<p>P7. Q5</p> <p>Who or what was most helpful for you in learning to start insulin treatment, and in deciding to continue with your insulin injections?</p>	<p>My answer would be myself. It's only me that would give myself insulin. They can't force me to inject insulin. Every time I talked with Nurse C, she would tell me, the diabetes would damage my kidneys. But if I treat diabetes. I would be well for the next 10-20 years at least. I won't be an ambulance lady. Then I say to myself, why don't I accept what they say?</p>	<p><i>The PT seemed adamant that the answer to giving herself insulin therapy was her mental and emotional acceptance of the insulin injections.</i></p>	<p>The medical progress notes also showed that since the involvement of the PIDNS in the previous six months, the PT had become more engaged and more interested in treating her diabetes as required. She is testing her BGL twice daily most days. Her much improved HbA1c test from March – June showed she had been giving her insulin (new regime) a lot more regularly and as prescribed.</p> <p>Perhaps simplifying her insulin regime as well, has had a huge impact in her compliance with her insulin treatment currently.</p>

Findings - Case 2 – Ends

Appendix O

Analysis - Stage 1 – Describing Experience – Case 2

<p>PROPOSITION 1 <i>The diagnosis of diabetes is a very distressing time for the patient and families</i></p>	<p>CASE 2</p> <p>Negative Emotions</p>	<p>Positive Emotions</p>	<p>Rival Explanations if any</p>
<p>Question 1. Do you remember the time you were diagnosed?</p>			
<p>Question 2. How did you feel at the time when you were told you had diabetes?</p>	<p>Did not care Did not take it seriously May not be right Ignore it Denial 5</p>		
<p>Question 3. How did your family respond to your diagnosis of diabetes?</p>	<p>Caring but anxious spouse 1</p>		

<p>PROPOSITION 2 <i>Patients with diabetes feel worn-out and burnt-out with the demands of diabetes management</i></p>	<p>CASE 2</p> <p>Negative Emotions</p>	<p>Positive Emotions</p>	<p>Rival Explanations if any</p>
<p>Question 2.1. How do you feel about the requirements to eat healthily because you have diabetes?</p>	<p>Can't afford to cook just for myself Husband and kids do not like vegetables</p> <p>2</p>	<p>Being honest</p> <p>1</p>	
<p>Question 2.2. How do you feel about exercising because it's good for controlling diabetes?</p>		<p>Feel good I like exercise Family walk in the park often</p> <p>3</p>	
<p>Question 2.3. How do you feel about testing your Blood Glucose Levels (BGL)?</p>		<p>It's OK Got used to it Accepted it</p> <p>3</p>	<p>Rival 1 Medical notes recorded PT had lost her meter for months, so there had been no BGL records for many months</p> <p>2</p>
<p>Question 2.4. How do you feel about having to inject insulin every day because the HCP said you need insulin?</p>		<p>Feel good BGL come down Stopped going to the toilet 5 times at night Sleep good at night</p>	<p>Rival 2 Medical records showed that the PT stopped her insulin injections many times over the last eight years. Her HbA1c test was consistently high. Her new improved adherence only started six months ago</p>

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PROPOSITION 3 <i>Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR)</i>	CASE 2		
	Negative Emotions	Positive Emotions	Rival explanations if any
Question 3.1. Do you remember the first time you were told you needed insulin?			
Question 3.2. How did you feel when you were told you needed insulin?	Did not like it No choice I had to do it for my child Difficult 4		
Question 3.3. Why did you feel that way when you were told you needed insulin?	I hate needles I don't like needles 2	PT is being honest 1	
Question 3.4. How do you feel now about having to inject insulin to control diabetes?		Feel OK. Well. Better now Feel different Don't call ambulance any more Can care for family now Less use of hospital services	

		Relaxed Enrolled at GP 9	
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PROPOSITION 4 <i>After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR)</i>	CASE 2		
	Negative Emotions	Positive Emotions	Rival explanations if any
Question 4.1. After giving yourself the first injection of insulin, how did you feel?	It hurt I hated it Bruises 3	PT being honest 1	
Question 4.2. How did your family and friends react to the fact you had started insulin treatment?	Husband laughed I did not care Diabetes is serious You have to use insulin Family members are affected Momentous event 6	Laughing seemed a coping mechanism 1	

<p>Question 4.3. Did your doctor or nurse ask you to keep increasing your insulin doses according to the blood glucose levels?</p>	<p>I used to say yes to increasing insulin doses, but never did because, I was not giving the insulin injections. I hated the needles High HbA1c tests</p> <p>6</p>	<p>Yes, accepted it They knew what they were talking about Comfortable with adding 5u more or 5u less insulin I trusted their advice Good people Competent Since restarting insulin again, I have not been in hospital since</p> <p>7</p>	<p>Rival 3 Despite the PT's positive understandings of the HCP goodwill and benefits of insulin treatment, she still resisted the need to give insulin injections, therefore never had to titrate insulin doses</p> <p>6</p>
<p>Question 4.4. How do you feel about giving your insulin every day and making changes as necessary?</p>	<p>When I was asked to increase my insulin doses by my previous HCP team, I did not do it, because I was not giving any insulin at all</p> <p>3</p>	<p>Feel better Insulin works if you stick with it More energy Pass urine less at night Sleep better Relaxed BGL better Giving insulin everyday</p> <p>8</p>	<p>Rival 4 The recent positive feelings of wellbeing experienced by the PT was due to the involvement of the PIDNS at her new diabetes service provider. The PIDNS worked closely with the PT to push the case for insulin use and its benefits</p> <p>3</p>

<p>PROPOSITION 5 <i>There are multiple and complex psychosocial factors that all interact together and adversely affecting an important decision to start and stay with insulin therapy.</i></p>	<p>CASE 2</p> <p>Negative Emotions</p>	<p>Positive Emotions</p>	<p>Rival Explanations if any</p>
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<p>Question 5.1. How do you feel when you hear the word insulin?</p>	<p>Get lost insulin Hate the needle Hurts Averse Need to use a needle</p> <p>5</p>		<p>Rival 5 It is interesting that with the PT showing significant psychological resistance to insulin therapy with consequent poor diabetes control, that there was no record of the previous HCP exploring further the reasons for PIR</p> <p>5</p>
<p>Question 5.2. How does your family and friends receive the fact you need to give yourself insulin injections daily?</p>		<p>Husband supportive Cousin supportive Family support is important</p> <p>3</p>	
<p>Question 5.3. What's the most difficult thing for you about insulin treatment?</p>	<p>Needle Pain of injections Size of the needles Bruises Fear of pain</p> <p>5</p>	<p>Shorter needles make a difference – 5 mm</p> <p>1</p>	
<p>Question 5.4. Is there anything that discourages you most from continuing with insulin therapy?</p>		<p>I know the benefits of insulin for me PT convinced of the benefits of insulin The PT has re-engaged with HCP team and GP</p> <p>3</p>	<p>Rival 6 The involvement of the PIDNS, who is a RN prescriber appeared to have helped the PT re-engage with HCP services. Simplifying her insulin regime and prescribing shorter pen needles also seemed to have facilitated adherence to insulin treatment.</p> <p>6</p>

<p>PROPOSITION 6 <i>PIR is more common in ethnic minority populations (and women) and there is an increasing need to study this phenomenon in “culturally sensitive settings”.</i></p>	<p>CASE 2</p> <p>Negative Emotions</p>	<p>Positive Emotions</p>	<p>Rival Explanations if any</p>
<p>Question 6.1. Would it be fair to say you distrust the use and the benefits of insulin therapy for yourself?</p>		<p>Insulin is useful I trust its usefulness It reduces blood sugars</p> <p>3</p>	<p>Rival 7</p> <p>Yet for the last eight years since prescription of insulin therapy, the medical notes recorded the PT often stopped the insulin injections for long periods of time. Her HbA1c test was always high, averaging at a 100 mmol/mol It’s only in March this year, with persistent contacts from the PIDNS that she has restarted her insulin injections.</p> <p>4</p>
<p>Question 6.2. If, in your heart you believe that insulin is the best treatment for you, what would stop you from continuing insulin treatment?</p>		<p>Insulin brings my blood sugars down I sleep better now I go to the toilet less I’m convinced of the benefits of insulin</p>	<p>Rival 8</p> <p>However, for the last eight years, the PT had struggled to give her insulin regularly. It is only in the last six months that she has restarted her injections and started testing her BGL at home with a meter. It</p>

		4	appeared the involvement of the PIDNS and simplifying her insulin regime, has motivated her to restart her insulin injections and persevere with it. 6
Question 6.3. If, in your heart you believe that insulin is the best treatment for you, what encourages you to keep on giving insulin every day?		To be well for my children. When I give insulin every day I sleep better, Go to the toilet less More energy to care for my family I'm no longer the ambulance lady! 5	Rival 9 The PT feels the benefits of insulin treatment and understands it keeps her well but was not giving insulin for a long time. But since the involvement of the PIDNS and simplification of her insulin regime, she appeared quite motivated to restart her insulin therapy. 4
Question 6.4. Do your beliefs as a PI affect the way you see insulin therapy as the right treatment for you?		I'm a Pacific Islander; if we understand insulin helps us we will use insulin. 2	Despite the PT's belief in insulin and its benefits, she still did not give her insulin for long periods of time. Consequently, she already has complications of poorly controlled diabetes, such as loss of vision in her right eye 3

PROPOSITION 7 <i>Family, culture, religious beliefs and misconceptions, all contribute to PIR</i>	CASE 2 Negative Emotions	Positive Emotions	Rival Explanations if any
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<p>Question 7.1. What are your families' views on insulin treatment?</p>		<p>My husband is Ok with it He often asks me if I have given my insulin Family is supportive 3</p>	
<p>Question 7.2. Do PI people believe in the benefits and necessity of insulin to treat T2DM?</p>		<p>I'm Pacific and I believe in insulin I know it works 3</p>	<p>Rival 10 But beliefs and practical applications do not always go together. The medical notes revealed the PT struggled for eight years to give her insulin consistently. 4</p>
<p>Question 7. 3. Are your religious beliefs for or against insulin treatment?</p>		<p>My religious beliefs encourage me to use insulin if it is useful 1</p>	<p>Rival 11 Despite Case 2's positive religious beliefs, she still found it hard to comply with giving insulin treatment over the last eight years. 1</p>
<p>Question 7.4. What have your close friends and families told you about insulin treatment?</p>	<p>A close friend did not care about her insulin treatment before 1</p>	<p>After I told my friend how insulin is working for me, she started giving her insulin injections. 2</p>	
<p>Question 7.5 Who or what was most helpful for you in learning to start insulin treatment, and in deciding to continue with your insulin injections?</p>		<p>Me, because only me would give myself insulin I got good advice from Nurse C. If I treat diabetes, it would not damage my kidneys. I would be well for the next 10-20 years.</p>	<p>Rival 12 While it's true that the PT is the one responsible for giving her own insulin, her medical notes showed that the involvement of the PIDNS in the last six months appeared instrumental in helping her restart her insulin treatment</p>

		3	and restart self-monitoring of her BGL. 2
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Case 2 - Analysis – Stage 1 – Describing Experience - Ends

Appendix P

Analysis - Stage 2 - Describing Meaning - Case 2 (*Links to Fonua model- FM*)

PROPOSITIONS	SOURCES: Literature, Personal and Professional	Describe Meaning	Rival Explanations if any: need a sceptical attitude according to Yin (2014)
<p>1.The diagnosis of diabetes is a very distressing time for the client and families</p> <p>Link to FONUA MODEL* (FM) (Figure 2) *Case 2 went through the mental and emotional trauma of being diagnosed with diabetes (second circle / domain of the FM). She thought the HCP had it wrong. They could not be right, so she went into denial of the diagnosis. She did not mention any physical symptoms at the time of diagnosis. Her husband was supportive.</p>	<p>Alberti (2002) Drury and Gatling (2005) Hendrieckx et al. (2016) MOH (2015) Murtagh and Rosenblatt (2011) Schaaf and Schaaf (2005) Talemaitoga (2010)</p>	<p>The literature acknowledges that the diagnosis of diabetes has a huge impact on a person’s life and their family but is often under-estimated and overlooked. Denial, fear, anger and related emotions are common. Some people will need a psychologist’s input to help accept the diagnosis and move forward.</p> <p>Case 2 went through doubting if the health professionals had it right, denial of diagnosis, and ignoring the diagnosis for a long time.</p>	
<p>2.Patients with diabetes feel worn out and burnt-out with the demands of diabetes management</p>	<p>Alberti (2002) Drury and Gatling (2005) Gale (2014)</p>	<p>Diabetes distress from daily management of diabetes as well as living a ‘normal’ life is well recognised and written about in the literature. Eating healthily,</p>	<p>Rival Explanation 1 Despite the PT accepting the need to eat healthily, increase physical activity and testing her BGL daily, the medical notes showed she lost her testing meter</p>

<p>Link to FONUA MODEL* *The physical, mental and emotional domains of the person is certainly affected with the daily demands of diabetes care management as in Case 2 (second and third domains / circles). She hated insulin injections, did not mind testing her BGL, loved being physically active and did not like having to cook healthy meals just for herself. Her husband and close relatives are fortunately very supportive (second level circle – family).</p>	<p>Gebel (2013) Giese (2018) Hendrieckx et al. (2016) Mascott (2015) MOH (2015) Murtagh and Rosenblatt (2011)</p>	<p>increased physical activity, taking medications including insulin, testing BGL up to six times a day can wear any one out. Case 2 showed some negative emotions in relation to cooking healthy food for herself, because her husband and children do not like vegetables. She liked and valued being active, so exercise was not an issue. She accepted that testing her BGL was part of having diabetes. She preferred pricking her fingers to injecting insulin into her abdomen. She resisted injecting insulin for years because it hurts and bruised her abdomen.</p>	<p>for months and did not try to see her HCP team to get another meter. So, there was no monitoring of her BGL for many months. She has recently restarted her insulin injections consistently and is consequently feeling the benefits of improved diabetes control. The recent involvement of the PIDNS providing close follow-up and culturally sensitive healthcare, may have helped to improve the PT's adherence to good diabetes management care (Levasa, 2018; Talemaitoga, 2010; Tu'itahi, 2009).</p>
<p>3.Starting insulin therapy to treat T2DM is a difficult concept for patients to accept (PIR).</p> <p>Link to FONUA MODEL* *The PT – Case 2 was mentally and emotionally averse to the idea of injecting insulin (mental and emotional domains –</p>	<p>Allen et al. (2016) Brod et al. (2008) Hendrieckx et al. (2016) Karter et al. (2010) Korytkowski (2002) Larkin (2008)</p>	<p>Much of the literature on PIR concur that starting insulin treatment is difficult for patients with T2DM to accept. This was the situation with Case 2. She hated the idea because the needle hurts, bruises her abdomen and puts her off. She was pregnant at the time with her first child, so she only accepted insulin therapy at the</p>	<p>Rival Explanation 2 Over recent months however, Case 2 finally appeared to have appreciated the advice from HCP and taken on board the need to better control diabetes for her own health's sake. The involvement of the PIDNS and simplifying her insulin regime as well as prescribing shorter needles seemed to have motivated Case 2 to take her diabetes health seriously and improved her diabetes control</p>

<p>second circle - of the FM severely traumatised). But the thought of her children / family made her accepted the injections of insulin while pregnant. This would allow her unborn baby to have a healthy environment in utero to grow in, as explained by HCP.</p>	<p>Polonsky and Jackson (2004)</p> <p>Polonsky et al. (2005)</p>	<p>time for the sake of her unborn child.</p>	<p>(Jha et al., 2015; Karter et al., 2010; Krall et al., 2015; Larkin, 2008; Ludeke, et al., 2012; MOH, 2014; Nam et al., 2010; Talemaitoga, 2010; Tu’itahi, 2009).</p>
<p>4.After initiation of insulin therapy, patients can refuse to titrate doses and even proceed to cease insulin therapy (PIR).</p> <p>Link to FONUA MODEL* *Continuing with insulin treatment as a lifelong therapy is a hard concept to accept, especially by patients with T2DM. Case 2 showed all the negative emotions (second domain of the FM) and PIR, and even stopped injecting herself insulin for long periods of time. Case 2 displayed immense emotional and mental distress at having to use</p>	<p>Allen et al. (2016)</p> <p>Brod et al. (2008)</p> <p>Fu et al. (2009)</p> <p>Gherman et al. (2011)</p> <p>Hendrieckx et al. (2016)</p> <p>Korytkowski (2002)</p> <p>Larkin (2008)</p> <p>Polonsky and Jackson (2004)</p> <p>Polonsky et al. (2005)</p>	<p>Case 2 experienced all the negative thoughts and psychological resistance to insulin therapy, when first proposed. For the last eight years, Case 2 regularly stopped giving herself insulin which was originally prescribed once daily. The HCP have asked her to keep titrating the dose until target BGL were reached, but Case 2 finally admitted (at interview 5) that she did not increase the doses because she was not giving the insulin anyway. She recently restarted her insulin therapy and is feeling much better with less headaches and much less need to pass urine in the night. She also sleeps better.</p>	<p>Rival Explanation 3 Despite the PT acknowledging the HCP team knew what they were doing, and she needed to accept their advice, she still resisted strongly the need to give herself insulin treatment. It was only very recently that she restarted her insulin injections after the involvement of a PIDNS and after prescribing a simpler insulin regime and shorter needles (Fu et al., 2009; Karter et al., 2010; Krall et al., 2015; Polonsky, 2007; Talemaitoga, 2018).</p>

<p>insulin therapy. Thus, she already has serious diabetes complications, such as vision loss in one eye (physical domain – severely affected - third circle of the FM).</p>			
<p>5. There are multiple and complex psychosocial factors that all interact and adversely affecting an important decision to use and to continue using insulin therapy (PIR).</p> <p>Link to FONUA MODEL* *In Case 2, her main issues were fears of the needle and pain of injecting insulin (emotional trauma – second domain / circle of the FM). Her family environment was favourable with a supportive husband (second circle – family level was positive) but Case 2 was struggling with the above fears emotionally and mentally.</p>	<p>Brod et al. (2008)</p> <p>Fu et al. (2009)</p> <p>Gherman et al. (2011)</p> <p>Hendrieckx et al. (2016)</p> <p>Larkin (2008)</p> <p>Leavasa (2018)</p> <p>O’Connor (2016)</p> <p>Patel et al. (2011)</p> <p>Sahin et al. (2015)</p> <p>Talemaitoga (2010, 2018)</p> <p>Taylor et al. 2017)</p> <p>Woudenberg et al. (2012)</p>	<p>Case 2 has clearly expressed her dislike and aversion to using needles and dislikes injecting herself with insulin. She hates the bruises too. So, the fear of pain, injecting and bruising are real and has contributed significantly to her experiencing PIR, and unfortunately for too many years.</p>	<p>Rival Explanation 4 Despite the extreme signs and symptoms of PIR experienced by Case 2, there was no record of the HCP team over the previous eight years, specifically addressing PIR. This concurs with the literature which identified that PIR is often under-recognised, under-estimated and overlooked by HCP (Allen et al., 2016; Brod et al., 2008; Sahin, et al., 2015; Tillery et al., 2013). But over recent months, the close involvement of a PIDNS, prescribing shorter needles and simplifying the PT’s insulin regime seemed to have addressed some of the psychological barriers to insulin therapy (Fu et al., 2009; Karter et al., 2010; Krall et al., 2015; Polonsky, 2007; Talemaitoga, 2018).</p>

<p>6. PIR is more common in <i>ethnic minority</i> populations (and <i>women</i>) and there is an increasing need to study this phenomenon in “culturally sensitive settings”.</p> <p>Link to FONUA MODEL*</p> <p>*The FM is a pan-Pacific model looking at a Pacific person’s health in a holistic manner, because this is how Pacific people generally view their wellbeing. Health is not just physical well-being, but mind, emotions, spiritual and social wellbeing need to be current too. Case 2 has a supportive home and community environment, as well as a good understanding of the effectiveness of insulin. However, her mental, psychological and emotional resistance to insulin use, has caused her physical body to</p>	<p>Bogatean and Hancu (2004, p. 247)</p> <p>Brod et al. (2008)</p> <p>Jha et al. (2015)</p> <p>Larkin (2008)</p> <p>Ludeke et al. (2012)</p> <p>Machinani et al. (2013)</p> <p>Nam et al. (2010)</p> <p>Polonsky and Jackson (2004)</p> <p>Polonsky et al. (2005)</p> <p>Taylor et al. (2017)</p>	<p>Case 2 had a good understanding of how effective insulin was in reducing her high BGL and making her go to the toilet less at night, so she gets a good night’s sleep. Therefore, her nationality as a PI did not seem to affect her understanding and belief that insulin was useful and effective in treating diabetes.</p>	<p>Rival Explanation 5</p> <p>Even though Case 2 has clearly expressed her belief in the effectiveness of insulin therapy, the medical records showed she stopped using insulin treatment for long periods of time over eight years. Consequently, she already has complications of T2DM such as heavy proteinuria and loss of vision on the right eye.</p>
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suffer complications of diabetes already.			
<p>7. Family, culture, misconceptions and religious beliefs all contribute to PIR</p> <p>Link to FONUA MODEL*</p> <p>*Case 2 had a supportive family, culture, church and community (spirituality, family and community domains of the FM – first, second and fourth levels were positive). She has a good understanding of the usefulness of insulin. However, she still showed classic signs of PIR such as ceasing to give her insulin injections for long periods of time. It appeared the mental and emotional stress of having to practically inject herself, was the main cause of her PIR (mental</p>	<p>Bogatean and Hancu (2004)</p> <p>Drury and Gatling (2005)</p> <p>Hendrieckx et al. (2016)</p> <p>Leavasa (2018)</p> <p>Ludeke, et al. (2012)</p> <p>MOH (2014)</p> <p>NZGG (2012)</p> <p>O'Connor (2016)</p> <p>Patel et al. (2011)</p> <p>Talemaitoga (2010, 2018)</p> <p>Te Karu et al. (2018)</p>	<p>Case 2 has a supportive husband and extended family. Her religious beliefs are positive and encourages her to use insulin treatment if she finds it useful. She has no misconceptions about the effectiveness of insulin treatment.</p>	<p>Rival Explanation 6</p> <p>Nevertheless, while Case 2 had lots of positive beliefs and support to encourage her to use insulin therapy, in practice she demonstrated the classic behaviours which are common to PIR; such as ceasing insulin therapy for long periods and refusing to titrate insulin doses.</p>

and emotional domain according to the FM - second circle - were severely out of balance).			
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Analysis – Stage 2 -- Describing Meaning – Case 2 - Ends