Understanding Medication Adherence in Men with Chronic Conditions Using the Andersen Behavioural Model

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Abstract

Chronic illnesses have a huge impact on health outcomes and cause disease burden. Although better adherence to medication has been found to associate with better health outcome and reduce disease burden, the level of adherence can be influenced by an individual's socio-environmental factors. However, as little studies have used a framework model to understand medication adherence, this study aims to use the Andersen Behavioural Model to explain medication adherence. The Andersen Behavioural Model is a theoretical framework which is able to demonstrates the effects of predisposing, enabling, and need factors in predicting medication adherence. Data used in this cross-sectional study are taken from the longitudinal Florey Adelaide Male Ageing Study (FAMAS) that began in 2002. A total of 447 male participants aged 47 to 92 were recruited in this study, who completed the 2015-2016 FAMAS follow-up questionnaire. The associations between factors in the Andersen Behaviour Model and medication adherence were analysed. The proxy measure used for medication adherence is the number of medication taken. While several associations between the Andersen Behavioural Model and medication adherence were significant, some were not. The significant associations were then analysed using a multiple regression model, to demonstrate the relationship between the significant variables and medication adherence after adjusting for covariates. Findings of this study show that the level of adherence can be influenced by a number of factors of the individuals, such as age, individual beliefs, and number of chronic conditions. Limitations of the present study and suggestions for future studies were provided.

Keywords: Chronic Condition, Andersen Behaviour Model, Medication Adherence, Australia

Declaration

This thesis contains no material which has been accepted for the award of any other degree of diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

[redacted]

Date: 25/09/2020

Contribution Statement

In writing this thesis, my primary supervisor and I collaborated to generate research questions of interest and design the appropriate methodology. I conducted the literature search, data analysis, and was responsible for the thesis write-up. Supervisor 2 was responsible for participant recruitment and data collection.

[redacted]

Date: 25/09/2020

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CHAPTER 1 - Introduction

1.1 Overview

The prevalence of chronic conditions is accelerating worldwide in all regions and socioeconomic strata, as well as being responsible for about 60% of global deaths (World Health Organisation, 2002). The death rate caused by chronic conditions is also relatively high in Australia, as the Australian Institute of Health and Welfare (AIHW, 2011) has reported chronic conditions account for nearly 90% of all Australian death. In addition, the AIHW reports nearly half of the Australia population have at least one chronic condition (AIHW, 2016). Furthermore, approximately one-third of the world population is diagnosed with multi-comorbidity (Marengoni et al., 2009), and one-fifth of the Australian population has multi-comorbidity (AIHW, 2016). The most common chronic conditions found in Australia include arthritis, asthma, back pain, cancer, cardiovascular disease, chronic obstructive pulmonary disease, diabetes, and mental health conditions (AIHW, 2016).

A chronic condition is a long-term health condition which has a persistent impact throughout a person's life (AIHW, 2016). The AIHW (2018) has reported that chronic conditions contribute up to 61% of disease burden. The disease burden can be measured by the extent of financial cost, disability, and morbidity suffered by the individuals due to their chronic conditions. Aligning with this, one of the leading cause of disability and morbidity in Australia is contributed by chronic conditions (AIHW, 2018). Moreover, disease burden negatively impacts the individuals' quality of life as they have trouble functioning properly on a daily basis. As a result, the disease burden leads to lower physical and social functioning (Deshpande et al., 2011). For instance, individuals with chronic conditions are more likely to experience breathing difficulties, seizures, and impairments. Furthermore, different chronic conditions result in different impairments and restrictions. An example provided by the AIHW (2015) was people with back pain, arthritis, and osteoporosis have a higher prevalence

of experiencing chronic pain and discomfort than people with asthma and diabetes. Thus, people with chronic conditions may need to make adjustments to their aspiration, lifestyle, and employment, in order to accommodate their needs for chronic conditions. Other than physical impact, chronic conditions also take a psychological and emotional toll on the individuals, making them more prone to low esteem, shame and guilt, hence resulting in anxiety and depression (Hemati & Kiani, 2016; Turner-Cobb et al., 2015; Turner & Kelly, 2000). Research has found that low esteem causes greater stress severity, which can then result in greater severity of symptoms of chronic conditions in the individuals' daily life (Juth et al., 2008). Chronic conditions severely impact the individuals' life physically, psychologically, and emotionally. Thus, the individuals may need to learn some coping strategies to deal with their stress in relation to chronic conditions, in order to control for their symptom severity of chronic conditions.

The chronic condition is associated with a high rate of hospitalisation and the leading cause of death in Australia (AIHW,2018). AIHW (2019a, 2019b) has reported that males record a higher hospitalisation and death rate due to chronic conditions as compared to females in Australia, as males accounting for 39% of the hospitalisation rate and female accounting for 35%. Although females (49%) do record a slightly higher rate of diagnosis of one or more common chronic conditions than males (46%), yet males account for a higher death rate from chronic conditions. In addition, the AIHW (2019a) reports that males are more likely to die of malignant cancer, coronary heart disease (e.g. heart attack/angina), and diabetes than females. As a result, Australian men have a shorter life expectancy of 80.5 years when compared to Australia women, who have a life expectancy of 84.6 years (AIHW, 2019a; AIHW, 2019b).

1.2 Andersen Behavioural Model

The Andersen Behaviour Model (ABM) is a widely used theoretical framework to understand individuals' health service utilisation (Andersen, 1968; Andersen, 1995). This model has been successfully applied to different populations, such as Caucasian, Chinese, and Latino, to account for the factors that affect the utilisation of health services (Bradley et al., 2002; Insaf et al., 2010; Zhang et al., 2019). For instance, a study used the ABM model to examine factors that affected health service utilisation in Australian with arthritis and found enabling factors (e.g. income and healthcare insurance) were a strong predictor compared to need factors (e.g. comorbid conditions and physical activity) (Lo et al., 2016).

Other than healthcare utilisation, the ABM is also capable of predicting medication adherence (Andersen, 1995; De Smet et al., 2006; Murray et al., 2004). De Smet et al. (2006) has successfully used the ABM to investigate medication adherence in asthma patients and concluded that it was associated with certain factors in the model such as health beliefs, numbers of medication per day, and perceived severity of the disease. In addition, Murray et al. (2004) used the ABM to examine medication adherence in patients with multiple chronic conditions and concluded that aging and increase in number of medications prescribed were associated with poorer adherence of medication.

The ABM provides a conceptual framework for demonstrating the effects of different factors in predicting health service utilisation, which includes predisposing factors, enabling factors, and need factors. The predisposing factors include an individual's demographic (e.g. age, gender) and social characteristics (e.g. education, marital status). Enabling factors include the barriers and facilitators of the use of health care services, such as income, health insurance, and service availability. Need factors represent both a perceived and evaluated need for health care. The perceived need refers to the individual's belief with regard to

illness, while the evaluated need refers to the assessment of the health status of the individual by medical personnel (Andersen, 1968; Andersen, 1995).

1.2.1 Predisposing factors

Predisposing factors refer to the demographic variables, which includes age, marital status, and education level. A study has found that men who are widowed, living alone, and have a lower education level are more likely to have a poor adherence in taking medication (Uchmanowicz et al., 2018). In terms of age, research has suggested that older people are more likely to be diagnosed with multiple chronic conditions and thus require taking more prescription medications per day (Kocurek, 2009). However, even though age is a crucial factor in determining the rate of adherence, most studies used younger adults as the target population as older adults are more prone to multiple comorbidities (Yap et al., 2016).

In terms of education level, Taibanguay et al. (2019) has conducted a study investigating the effect of education on medication adherence with rheumatoid arthritis patients and found that education has a significant effect on adherence, as the patients' adherence rate significant improved after receiving education related to their disease. Evidence has also suggested that people with higher education levels have a better adherence rate due in part to enhanced health literacy (Pandey et al., 2017). This has been further supported by a study investigating the impact of education levels and medication adherence in post-Myocardial Infarction patients and found that people with lower education level had a significantly lower adherence rate compared to people with greater than 12 years of education (Pandey et al., 2017).

Prior research investigating adherence rate of married and unmarried patients with health failure concluded that unmarried patients have a lower adherence rate of medication (DiMatteo, 2004). Furthermore, it was found that adherence tends to be higher in individuals

who are married (Gagnadoux et al., 2011). One of the grounds for married patients having a higher adherence rate could be the social support they have received (Sherbourne & Hays, 1990). Based on the past findings that found older people are required to take more medication, higher education levels have better health literacy, and people who are married receive more social supports, the present study hypothesised that older adults with high education levels who are married have higher medication adherence.

1.2.2 Enabling factors

Masculinity can be considered as one of the enabling factors, as it can act as a resource or tool that encourage an individual's health care utilisation. Barriers faced by patients with chronic conditions can affect their adherence rate of medication. Past research has found masculinity to be strongly associated with ignorance in help-seeking behaviours (O'Brien et al., 2005). According to traditional masculinity, men are supposed to be strong and independent. Admitting having chronic conditions could be viewed as weak, which contradicts with masculinity identity, and thus resulting in poor help-seeking behaviour (Courtenay, 2000). In addition, men who conform more to masculinity norms are significantly less likely to engage in positive health behaviours (Mahalik et al., 2007).

1.2.3 Need factors

Research has indicated that the severity of chronic conditions has an impact on medication adherence, with people who have a more severe condition having poorer adherence (DiMatteo et al., 2007; Meichenbaum & Turk, 1987). The severity of chronic conditions comprises self-perceived severity and the actual severity of the disease. Self-perceived severity is a measure where individuals evaluate their overall health status, including physical, social, and emotional status. In 2017-18, 57% of Australian males rated their health status as excellent or very good (AIHW, 2019a). A study has found that people

who perceive themselves as having a better health status tend to have better adherence to medication, as they would want to maintain their health (DiMatteo et al., 2002).

Evidence has found that the actual severity of chronic conditions has an impact on the rate of adherence, with people who have more severe illness having a poorer adherence to medication (Lemay et al., 2018). This is because people with lower severity have the needs to keep their conditions in control (DiMatteo, 2007). Moreover, previous research has found that higher adherence to medication is associated with lower comorbidity (Rolnick et al., 2013). As a result, the severity of illness has a significant impact on predicting medication adherence.

1.3 Hegemonic Masculinity

The concept of hegemonic masculinity serves as a culturally idealised form of men's identity, where they should be strong, independent, and tough (Connell, 1987). Over the years, this concept has been commonly used, debated, and refined (Connell & Messerschmidt, 2005b)**.** The American Psychological Association (APA) (2018) has stated that the traditional ideology of masculinity restricts the behaviour of men, as well as negatively affects their mental and physical health. As a result, it has been suggested that men's underuse of medical and healthcare services might possibly be partly explained by hegemonic masculinity (Davidson & Meadows, 2010), whereby men are supposed to act, think, and feel in a certain way based on society's expectations (Levant & Richmond, 2007). It has been suggested that such an ideology is derived from white, upper-middle-class, heterosexual, Christian values, which favour independence, strength, being the primary provider, initiative-taking, and having a deep voice (Connell & Messerschmidt, 2005a). Since it is not common for all men to exhibit all these qualities, it has been suggested that most men

regard hegemonic masculinity as a desired goal and not as a reality, since hegemonic masculinity is presented as a most honourable form of "manhood" (Connell, 1987).

Further, previous studies have shown how masculinity can be impacted by illness. For instance, studies have found that having Rheumatoid Arthritis can negatively affect men's sense of power and control, leading to feelings of helplessness and depression, and forcing them to re-interpret masculine activities within their ability (Flurey et al., 2018; Lack et al., 2011). Moreover, the notion of being a 'breadwinner' is considered as a trait for hegemonic masculinity. However, when men are diagnosed with multiple comorbidities, they are unable to work full-time, causing them to lose a sense of identity of 'being a man' as they are not in the position to be the breadwinner of the household (Varekamp & van Dijk, 2010). Furthermore, hegemonic masculinity traits encourage men to put their health at risk in order to secure their masculinity identity. Aligning with this, men have found to have worse adherence to medication than women (Degli Esposti et al., 2002). As a result, masculinity has a negative impact on chronic conditions, as people with multiple chronic conditions tend to have a lower sense of masculinity, due to their inability to conduct certain activities that are considered as masculine.

In addition, the concept of hegemonic masculinity is evolving based on the influence of our society and culture environment. For instance, traditional masculinity suggests that men should be tough and have no feeling, whereas the modern masculinity encourages men to understand themselves on a deep and personal level (Oliffe et al., 2019). However, previous quantitative research has failed to account for the contextualisation of masculinity, as most studies overlooking men do attend to their health (Calasanti et al., 2013). Therefore, as hegemonic masculinity is evolving, new masculinity measures have to take other factors into account, such as emotional factors.

Furthermore, there is a lack of uniformity in terms of measurement of masculinity, resulting in the inability to compare results from various studies. Previous research has defined masculinity differently by using various scales to assess masculinity, ranging from masculinity norms to role conflicts, masculine conceptions and ideologies. Thus, the present study aims to use the Masculinity in Chronic Disease Inventory (MCD-I), which measure the internalised masculine beliefs. Additionally, most masculinity measures were designed based on the normative form of hegemonic masculinity, which is Caucasian, heterosexual, and middle-class men (Smiler, 2004). However, these measures were then misused on the older population, ethnically and sexually diverse men (D Griffiths et al., 2012). Consequently, results may be biased, causing the findings of the study to be less valid. Therefore, the present study used the MCD-I measure that was developed based on Australian men, making the quality of findings more applicable to Australian men (Chambers et al., 2016).

1.3.1 Chronic Condition

Revealing chronic conditions to others can threaten men's masculinity identity, as the symptoms of chronic conditions contradict with the notion of hegemonic masculinity. For example, having chronic conditions will result in a person experience pain, fatigue, and losing strength, whereas masculinity defines a man as being strong and independent (Gibbs et al., 2005). In addition, health care practitioners often construct men as stubborn and unwilling to seek help, which further reinforces men's reluctance to seek help (Seymour-Smith et al., 2002). Subsequently, men are less likely to admit having chronic conditions, as a way to protect their masculinity identity, and thus resulting in not seeking help (Courtenay, 2000).

1.4 Medication Adherence

Medication adherence is defined by the World Health Organization (WHO) as the extent to which the patient accepts the prescribed medication from their doctor in order to

improve the overall health of the patient by taking into account of lifestyle, values, and care preference (WHO, 2003). Medication adherence is a complex behaviour that has been associated with many aspects, such as socioeconomic status, healthcare system, and patient-related factors (Kardas et al., 2013). WHO has reported approximately 50% of patients do not take their medication for chronic conditions as prescribed (WHO, 2003). Having poor adherence to medication leads to worsening the disease, increasing of risk for morbidity and lower quality of life (Bourbeau & Bartlett, 2008; Williams et al., 2008). As a result, poor adherence can contribute to having a shorter life expectancy (Feehan et al., 2017).

1.4.1 Factors Contributing to Poor Adherence

Many factors contribute to poor medication adherence, including cost, willingness, forgetting, medication side effects, treatment duration, and patients' beliefs (Egan et al., 2003; Vermeire et al., 2001). Insurance can also affect adherence rate, as medication that are not covered by insurance has been associated with poorer adherence (Kennedy et al., 2008). Another study has found that poor taste of medication also leads to poor adherence (Jin et al., 2008). Hence, adherence rate can be affected by many factors, ranging from patient's beliefs to patient's ability to afford the medication.

1.4.2 Level of Medication Adherence

Less than optimal levels of medication adherence can have a negative outcome on the patient's condition. For instance, previous research has investigated the association between the level of medication adherence and major adverse cardiovascular event (MACE) among patients with myocardial infarction or atherosclerotic disease. In comparison to patients with full medication adherence, patients with nonadherence have a significantly higher rate of getting MACE (18% vs 26% risk) (Bansilal et al., 2016). In addition, comorbid conditions reduce when patients follow their cancer treatment (Søgaard et al., 2013). Moreover,

evidence suggests that poor adherence results in a more intense relapse rate, leading to a poorer quality of life (Zhang et al., 2019). Therefore, a higher level of medication adherence is important in maintaining and improving the patient's condition.

1.4.3 Measurement of Medication Adherence

According to Brown & Bussell (2011), measurement of medication adherence can be challenging as medication adherence is an individual patient behaviour. Different methods have been used to measure adherence such as (1) subjective measurement: interviewing the patient, family members, and physicians about the patient's medication use; (2) objective measurement: pill counts, rates of prescription refill records, and electronic monitors; (3) biochemical measurements: adding a nontoxic marker into medication and detecting its presence in patient's blood or urine. However, each method has its own strengths and weaknesses, and there is not a method that is considered as the gold standard (Jimmy & Jose, 2011). Nonetheless, research has shown that the easiest way to measure adherence is through the patient's self-report (Walsh et al., 2002).

1.5 Research Gap

Majority of the research in relation to the relationship between masculinity and medication adherence in men with chronic conditions was done in the United States (Galdas et al., 2005; Galvan et al., 2017). As hegemonic masculinity varies between social groupings and culture, what is considered as masculinity in the United States could be different from Australia (Connell & Messerschmidt, 2005a). Subsequently, findings in the United States could be different from findings in Australia, resulting in findings found based on the United States population to be potentially inapplicable to Australia population. Therefore, the present study aims to conduct research focusing on Australian men regarding the relationship between masculinity and medication adherence.

In addition, previous research fails to account for the conceptuality of masculinity, as the traits used in previous research are mostly based on the traditional ideal traits, instead of taking social reality into account. The measures used for previous studies were also developed based on Western hegemonic ideals, which can be less applicable to sexually and ethnically diverse men, especially the Australian population (D Griffiths et al., 2012). Therefore, the present study aims to use the Masculinity in Chronic Disease Inventory (MCD-I), which is a new masculinity measure developed based on the Australian population (Chambers et al., 2016). The MCD-I is sensitive to age and sexual health, while addressing the conceptuality of masculinity by using multiple factors to measure internalised masculine beliefs (Occhipinti et al., 2019).

To date, no studies have used a conceptualised framework to assess factors that influence medication adherence. As a result, factors that were found to be significant predictors of medication adherence could lose its significance after taking in account of other covariates. Thus, the present study aims to investigate factors that influence medication adherence using the ABM.

1.6 Aims and hypothesis

Up to this point, no study has used the Andersen Behavioural Model to explain medication adherence in Australian men. Thus, the current study seeks to examine the extent to which the Andersen Behavioural Model accounts for medication adherence in Australian males with chronic conditions. As mentioned above, the MCD-I is used in this study, as it is suitable to use on older Australian men with chronic conditions.

The current study first identifies the predictor variables for medication adherence individually at a bivariate level, then examine the significant variables using the Andersen Behavioural Model. As a result, the aim of the current study is to investigate the extent of

Andersen Behavioural Model in explaining medication adherence in Australian men with chronic conditions. To address this aim, four objectives is implied in the present study (Table 1).

Table 1

Objectives for the Present Study

Objective 1	**To examine the influence of Predisposing Factors (age, education, and marital status) on men's medication adherence**
	It is hypothesised that younger men will report lower medication adherence than older men.
	It is hypothesised than people with lower education level will report lower medication adherence than people with higher education level.
	It is hypothesised that married people have a higher medication adherence rate compared to other groups.
Objective 2	**To examine the influence of Enabling Factor (masculinity) on men's medication adherence**
	It is hypothesised that people with higher masculinity level will have a lower medication adherence than people with lower masculinity level.
Objective 3	**To examine the influence of Need Factors on men's medication adherence**
	It is hypothesised that people with weaker perceived need will have a lower medication adherence than people with stronger perceived need.
	It is hypothesised that people with higher actual need have a lower medication adherence than people with lower actual need.
Objective 4	**To examine the relationship between Predisposing Factors, Enabling Factors, and Need Factors with medication adherence, after adjusting for significant covariance**
	It is hypothesised that all of the significant variables at the bivariate level will remain significant after putting in a model.

CHAPTER 2 – Methods

2.1 Study Design

Data used in the present study were drawn from the Florey Adelaide Male Ageing Study (FAMAS) that began in 2002. The FAMAS is a longitudinal study investigating various health-related behaviours and chronic disease status of mid to older aged men. Participants in the FAMAS were required to complete a follow-up questionnaire annually and a clinic evaluation every five years. They were required to document any changes to their contact details, physician details, health, and physical status. Details of the study can be found in Martin's study (Martin et al., 2007).

The present study used data previously collected in the 2015-2016 FAMAS follow-up questionnaire. As the present study used the Andersen Behavioural Model (ABM) to explain men's medication adherence, only a subset of data is used.

2.2 Theoretical Framework

This study adopted the Andersen Behavioural Model (ABM) to identify the potentially influential factors of medication adherence. This study included age, education, and marital status under predisposing variables. As the enabling factor refers to the barriers and facilitators of improving adherence to medication, this study included masculinity under the enabling factor. Need factors can be categorised into perceived need and actual need. Perceived need was operationalised using self-assessed health status, while the actual need was operationalised using the number of chronic conditions of the study participants. As mentioned above, there appears to be many ways of measuring adherence to medication. This study used the number of medications taken by the participants as the proxy measure for medication adherence (Figure 1).

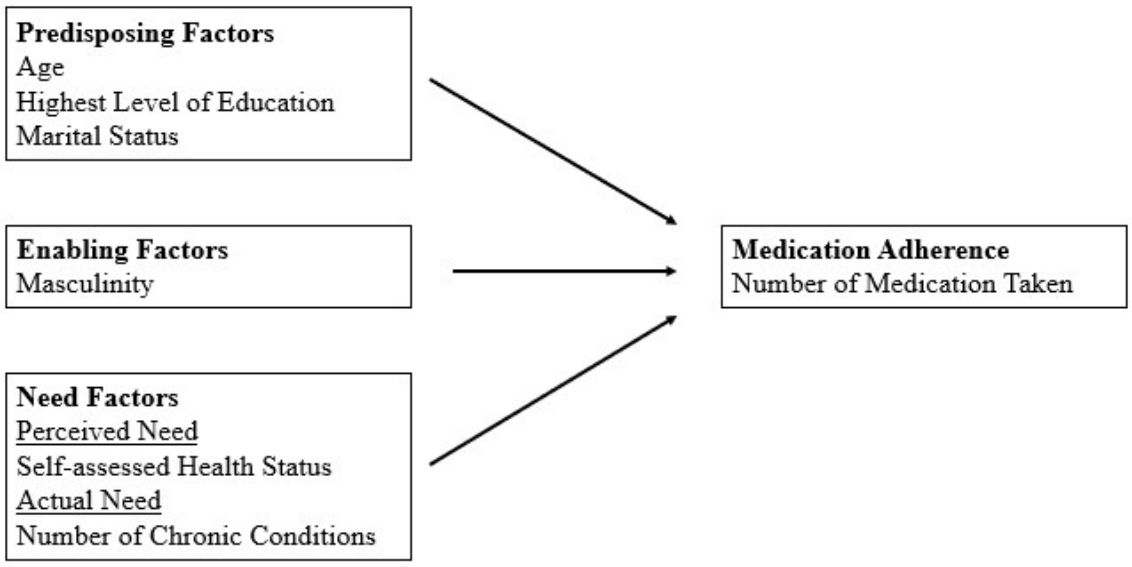

Figure 1. Adopting Andersen Behavioural Model to explain potential factors that influence medication adherence.

2.3 Participant Criteria

Participants in the FAMAS were recruited through ringing the number listed in the Electronic White Pages (EWP) who lived in the North-West region of Adelaide. A residential household who is male, aged 35 to 80 years at the time of recruitment, willing to comply with the protocol and given consent, the last to have his birthday in the household were invited to participate in the study. Respondents who were considered incapable of participating in the study due to immobility, language barriers, living outside the catchment area, and unable to provide written informed consent were excluded (Martin et al., 2007).

2.4 Participant Recruitment

2.4.1 Sampling

At the initial time of recruitment, there were a total of 1195 participants who participated in the baseline clinic visit (response rate = 45.1%) (Martin et al., 2007). Over time, the number of participants decreased due to loss of follow up and death. Thus, only 633

respondents completed the 2015-2016 follow-up questionnaire (response rate = 68.7%) (Occhipinti et al., 2019).

2.4.2 Demographic Profile

The sample used in the FAMAS demographically reflects the State population, as the Northern and Western regions of Adelaide consists of over a third of the State's population and comprises approximately half of Adelaide's population. However, there are two notable exceptions: the younger age groups and never-married men were under-represented, while the older age groups were over-represented (Martin et al., 2007).

2.5 Participants

Of the 633 respondents who completed the 2015-2016 follow-up questionnaire, 447 (70.6%) men were eligible for the current study as they self-reported with one or more chronic conditions. The participants were aged between 47 and 89 (M = 65.73, SD = 9.33). Data with partial responses were excluded.

2.6 Measures

2.6.1 Demographic information

Basic demographic information, such as their work status, marital status, the highest level of education completed, and annual household income were asked (Appendix A: Question J1 and Section S). The age was obtained at the time of the initial recruitment in 2002 and have been adjusted to the age at the time of survey data collection in 2015-2016.

2.6.2 Masculinity

The Masculinity in Chronic Disease Inventory (MCD-I; Chambers et al, 2016) is a 22-item self-report measure used to assess masculinity, with six subscales representing different aspects of masculinity: Strength (five items), Sexual Importance/Priority (four

items), Family Responsibilities (four items), Emotional Self-Reliance (two items), Optimistic Capacity (four items), and Action Approach (three items). Each item (e.g. "*Being physically strong is important to me*") is scored on a 5-point Likert scale (1 = '*Not at all true*" to 5 = "*Very true*") (Appendix A: Section P). The scores in each masculinity subscales were combined, and the overall scores from all six subscales were then totalled. The total masculinity score ranges from 22 to 110, with a higher score indicating a stronger endorsement of these masculine ideals. The MCD-I demonstrates a good internal reliability as the total score has a Cronbach's α of .88, with all subscales having a high Cronbach's α between .68 to .93 (Occhipinti et al., 2019).

2.6.3 Perceived Need

Participants were asked to self-assess their health status. Six questions regarding how individuals view their health were asked. Questions such as '*In general, would you say your health is excellent/ very good/ good/ fair/ poor?*' and '*Compared to one year ago, how would you rate your health in general now?*' were included. All questions were rated on a 5-point Likert scale, with four questions using the same scale (1= "*Definitely true*" to 5 = "*Definitely false*") (Appendix A: Question A1, A2, A33, A34, A35, and A36). As two reversed worded questions were used (A33 and A35), scores on these questions have been reversed. The total score of the six questions was then totalled.

2.6.4 Actual Need

Participants were asked to self-report their history of diagnosed chronic conditions. A list of 18 chronic conditions options was then provided below (Appendix A: B1). Options of chronic conditions included in the questionnaire include high cholesterol, high blood pressure, and osteoarthritis. The participants had to self-select all of the chronic conditions that they had.

2.6.5 Medication Adherence

Medication adherence was measured by the number of medications that the participants were taking. Study participants were asked to self-report all the medications that they were taking for the past four weeks, irrespective of whether the medication was prescribed by the doctor or taken over-the-counter. They were first asked whether they were taking any medication for most of the past four weeks. Subsequently, participants were asked to self-report the medications they took for most of the last four weeks from a list of 32 medications ('*Did you take any of the following? (tick ALL that apply)*'). Options given in the list include Glucosamine, Paracetamol, and Lipitor (Appendix A: Q2). Medication conditions that the corresponding medication selected was treated were also asked. The number of medications taken was then totalled.

2.7 Procedures

An introductory letter, information brochure, and follow-up questionnaire were sent to participants' households, inviting them to participate in the current study. Participants were informed that the questionnaire might possibly be similar to the previous questionnaires, as the purpose of the follow-up questionnaire is to update any changes over time. A reply-paid envelope was included for the participants to mail back the responses once it has been completed. Alternately, the participants could choose to complete the questionnaire through an online platform by using the link and log-on details provided on the front page of the follow-up questionnaire.

The questionnaire took approximately 30 to 40 minutes to complete, and participants were given two weeks to complete and return the questionnaire. No reimbursement was provided to the participants. A contact number was provided on the questionnaire if the participants had any doubts while completing the questionnaire. Confidentiality of the

participants' responses was reassured as sensitive personal information was included in the questionnaire.

2.8 Statistical Analysis

All responses were analysed using the IBM Statistical Package for the Social Sciences (SPSS) software, version 26.0 (IBM, 2019). Missing values and invalid data of relevant variables were first screened and excluded. Descriptive statistics of the participants' demographic characteristics, masculinity, perceived need, actual need, and medication adherence were obtained. The Central Limit Theorem (CLT) is applied in this study to fulfil the assumption of normality as the sample size is larger than 30 (Laplace, 1810).

The Pearson's Product-Moment Correlation Coefficient was used to investigate the relationship between continuous predictor variables and medication adherence at a bivariate level. For categorical predictor variables, an One-way ANOVA was used to assess the relationship between predictor variables and medication adherence at a bivariate level. To determine the effects of measured variables on medication adherence, a multiple regression model was further used, after adjusting for significant covariates.

2.9 Ethics

Ethics approval was obtained from the Royal Adelaide Hospital Research Ethics committee in Phase 1 of the FAMAS study. Informed consent for future contact regarding additional studies was acquired from the study participants in Phase 1. Consent was considered to be given when the participants returned the questionnaire or submitted the online survey. Exemption from ethical approval was granted by the University of Adelaide Human Research Ethics Committee as this study uses previously acquired de-identified data from the FAMAS.

CHAPTER 3 – Results

3.1 Preliminary analysis

3.1.1 Data preparation and cleaning

Of the 478 respondents, 447 respondents (94%) reported having one or more chronic condition, which makes them eligible for the current study.

3.2 Descriptive Statistics

3.2.1 Demographic Profile

Table 2 shows the demographic characteristics of the study participants. The majority of the participants in the current study were men aged 60 to 69 (42%), retired (46%), married (77%), had the highest education level as TAFE, Apprenticeship, Trade Certificate, or Diploma (44%), and had a middle annual household income of $40,000 to $100,000 (43%). However, men aged 40-49 (3%), had the highest education level of primary school (5%), part-time or casual employment (9.2%), widowed (2.9%) and never married (2.9%) were under-represented in the current study.

Table 2

Demographic Profile of Study Participants (N=447)

Characteristic	N	%
Age (Years)		
40 – 49	15	3.4
50 - 59	99	22.1
60 – 69	187	41.8
70 – 79	102	22.8
80 - 89	44	9.8
Education[a]		
Primary School	24	5.4
High School	143	32
TAFE/Apprenticeship/Trade Certificate/Diploma	197	44.1
Bachelor Degree or Higher	69	15.4
Others	14	3.1
Work Status[b]		
Self-Employed	55	12.3
Full-Time Employed	119	26.6
Part-Time/Casual Employment	41	9.2
Retired	206	46.1
Others	26	5.7
Marital Status		
Married	345	77.2
Living with a Partner (defacto)	33	7.4
Widowed	13	2.9
Divorced	27	6.0
Separated	16	3.6
Never Married	13	2.9
Annual Household Income[c]		
Low	155	34.7
Middle	193	43.2
High	78	17.4
Do Not Know	21	4.7

[a] *Highest Level of Education*: primary and high school indicates either partial or full completion. [b] *Work status:* unemployed, home duties, student, unable to work, carer and others were combined into category Others. [c] *Annual household income*: low income is lower than $40,000 per annum, middle income is between $40,000 to $100,000 per annum, and high income is greater than $100 000 per annum.

3.2.2 Enabling Factors

The average total MCD-I score was 82.74 (*SD* = 13.13), indicating the masculinity level of the study participants were relatively high (Appendix B: Table B1).

3.2.3 Need Factors

Table 3 presents the descriptive statistics for perceived need and actual need. The perceived need has good reliability as the Cronbach's alpha coefficient is .82. On average, the number of chronic conditions reported by the participants was 2.27 (*SD* = 1.46). The majority of the study participants were diagnosed with high blood pressure (51%), followed by high cholesterol (43%), then osteoarthritis (28%) (Appendix B: Table B2).

3.2.4 Medication

On average, the number of medications taken by the study participants was 2.19 (*SD* = 1.81). The most common medications taken by the participants were fish oil (25%), paracetamol (24%), followed by aspirin (23%) (Appendix B: Table B3).

Table 3

Descriptive Statistics of Need Factors (N=447)

Variable	*M*	Median	*SD*	Range	Minimum	Maximum
Actual Need[a]	2.27	2.00	1.46	10	1	10
Perceived Need	14.97	14.00	4.31	24	6	30

Note. M = mean; *SD* = standard deviation

The theoretical value for actual need ranged from 1 to 10.

The theoretical value for perceived need ranged from 0 to 30.

[a] Actual need refers to the number of chronic conditions that the participants had.

3.3 Objective 1 - To examine the influence of Predisposing Factors (age, education, and marital status) on men's medication adherence.

3.3.1 Age

To analyse the association between age and medication adherence, a Pearson Product-Moment Correlation Coefficient was used. There was a weak, positive correlation between age and medication adherence, which was statistically significant [$r(445) = .27$, $p = 0.000$]. This suggests that people who were older take more medication than people who were younger.

3.3.2 Highest Level of Education

One-Way ANOVA was used to investigate the effect of education on medication adherence. All groups have a similar level of medication adherence, with men who had the highest education of TAFE, Apprentices, Trade Certificate, or Diploma having the highest medication adherence ($M = 2.23$, $SD = 1.82$) (Appendix C: Table C1). Table 4 shows there was not a significant effect of education on medication adherence [$F(4,442) = .07$, $p = .991$]. Therefore, no follow up analysis was conducted.

Table 4

One-Way Analysis of Variance (One-Way ANOVA) of Highest Level of Education by Medication Adherence (N = 447)

	SS	***df***	***MS***	***F***	***p***
Between Groups	.942	4	.236	.071	.991
Within Groups	1462.512	442	3.309		
Total	1463.454	446			

Note. SS = Sum of Squares; *df* = Degree of Freedoms; *MS* = Mean Square

3.3.3 Marital Status

One-way ANOVA was used to investigate the relationship between marital status and medication adherence. The number of medications taken by each subgroup was similar, with the widowed group taking the highest number of medications ($M = 2.62$, $SD = 1.50$) (Appendix C: Table C2). Table 5 shows that there was no significant difference between marital status and medication adherence [$F(5,441) = 1.04$, $p = .391$], hence no follow up analysis is required.

Table 5

One-Way Analysis of Variance (One-Way ANOVA) of Marital Status by Medication Adherence (N = 447)

	SS	***df***	***MS***	***F***	***p***
Between Groups	17.12	5	3.42	1.04	.391
Within Groups	1446.34	441	3.28		
Total	1463.45	446			

Note. SS = Sum of Squares; *df* = Degree of Freedoms; *MS* = Mean Square

3.4 Objective 2 - To examine the influence of Enabling Factor (Masculinity) on men's medication adherence.

Table 6 describes the summary of a Pearson Product-Moment Correlation conducted to determine the relationship between total masculinity of the MCD-I and the six MCD-I subscales (Strength, Sexual Importance, Family Responsibilities, Emotional Self-Reliance, Optimistic Capacity, Action Approach) with medication adherence. The relationship between the total masculinity and medication adherence was negatively correlated, $r(445) = -.158$, p

= .001. Other than Emotional Self-Reliance, the relationship between the MCD-I subscales and medication adherence were all statistically correlated with negatively weak correlations. This suggests that men with a higher level of masculinity was associated with a lower level of medication adherence. Moreover, men who had a greater belief in physical strength, sexual importance, protective over partner and family, positive in life, and likely to take actions were associated with lower medication adherence.

Table 6

Pearson Product-Moment Correlation Coefficient Between Masculinity in Chronic Disease Inventory (MCD-I) Scores and Medication Adherence (N = 447)

	M	***SD***	**Medication Adherence**	***p***
Total Masculinity	82.74	13.13	-.158*	.001*
Strength	18.09	3.87	-.111*	.019*
Sexual Importance/Priority	13.75	4.85	-.152*	.001*
Family Responsibilities	17.17	3.36	-.104*	.028*
Emotional Self-Reliance	6.96	2.02	.028	.548
Optimistic Capacity	15.28	3.03	-.104*	.028*
Action Approach	11.49	2.31	-.131*	.005*

Note. M = mean; *SD* = standard deviation; MCD-I = Masculinity of Chronic Disease Inventory. Adapted from "Measuring Masculinity in the Context of Chronic Disease" by S. K. Chamber, M. K., Hyde, J. L. Oliffe, L. Zajdlewicz, A. Lowe, A. C. Wooten, and J. Dunn, 2015, *Psychology of Men & Masculinity, 17,* p. 232.
* $p < 0.05$

3.5 Objective 3 - To examine the influence of Need factors on men's medication adherence.

3.5.1 Perceived Need

A Pearson Product-Moment Correlation was used to determine the relationship between perceived need and medication adherence. There was a weak, positive correlation between perceived need and medication adherence, which was statistically significant ($r(445) = .25$, $p = .000$). Thus, people who rated their health as excellent have a higher rate of adherence to medication than people who have rated their health as poor.

3.5.2 Actual Need

An Independent Sample t-test was performed to compare the mean of two groups in actual need (one chronic condition vs multimorbidity) to determine whether there was a statistically significant difference between their medication adherence. Results shown in Table 7 demonstrate that the mean medication adherence differs between participants with one chronic condition ($M = 1.38$, $SD = 1.4$, $n = 176$) and participants with multimorbidity ($M = 2.72$, $SD = 1.85$, $n = 271$) at the .05 level of significance ($t = -8.18$, $df = 445$, $p < .001$, 95% CI for mean difference -1.66 to -1.02). On average, participants with multimorbidity tend to have higher medication adherence than participants with only one chronic condition. A large effect size was found between actual need and medication adherence (Cohen's $D = -1.34$).

Table 7

Result of Independent Samples T-test and Descriptive Statistics for Medication Adherence by Actual Need (N=447)

	Actual Need[a]									
	One Chronic Condition			Multimorbidity						
	M	*SD*	*N*	*M*	*SD*	*N*	95% CI for Mean Difference	t	*df*	Cohen's D
Medication Adherence	1.38	1.40	176	2.72	1.85	271	-1.66,-1.02	-8.18**	445	-1.34

Note. M = mean; *SD* = standard deviation
** $p < .001$.
[a] Actual Need refers to the number of chronic conditions that the participants had.

3.6 Objective 4 - To examine the relationship between Predisposing Factors, Enabling Factors, and Need Factors with medication adherence, after adjusting for significant covariance

In order to identify the independent predictors of medication adherence, a multiple linear regression was performed. The total masculinity of the MCD-I has been removed from the multiple linear regression as it violated the assumption of multicollinearity (VIF = 45.7) (Appendix D). After removing the total masculinity, all assumptions of multiple linear regression were established (Appendix E). Table 8 shows a significant regression equation was found [$F(8,438) = 13.86$, p=0.000], $R^2 = .449$ (R^2 Adj = .187). Participants' predicted medication adherence can be calculated by -3.06 + 0.04 (age) + 0.07 (perceived need) + 1.03 (actual need). Age, perceived need, and actual need were significant predictors of medication adherence. Aligning with this, actual need played the most important factor in predicting medication adherence, followed by age, then perceived need. In other words, medication

adherence increases when age, perceived need, and actual need increases. Therefore, people who were older, had a higher score on self-assessed health status, and more chronic conditions were associated with better adherence. Furthermore, the results of multiple linear regression showed that the five subscales of the MCD-I (strength, sexual importance, family responsibilities, optimistic, and action based) were not significant predictors of medication adherence.

Table 8

Age, Masculinity (Five Subscales), Perceived Need, Actual Need as Predictors of Medication Adherence

Variable	B	SE	β	*t*	*p*	95% CI
(Constant)	-3.07	.96		-3.18	.002*	[-4.96, -1.17]
Age	0.04	.01	.23	4.68	.000**	[0.03,0.06]
MCD-I[a]						
Strength	0.00	.03	.01	.09	.926	[-0.05, 0.06]
Sexual Importance	0.01	.02	.04	.72	.475	[-0.03,0.5]
Family Responsibility	-0.02	.03	-.03	-.64	.526	[-0.07,0.04]
Optimistic	0.02	.04	.04	.58	.560	[-0.05,0.09]
Action Based	-0.05	.05	-.06	-.98	.328	[-0.15,0.05]
Perceived Need	0.07	.02	.16	3.20	.001*	[0.03,0.11]
Actual Need	1.03	.17	.28	6.14	.000**	[0.70,1.36]

Note: $R^2 = .449$ (R^2 Adj = .187)

[a]MCD-I = Masculinity in Chronic Disease Inventory. Adapted from "Measuring Masculinity in the Context of Chronic Disease" by S. K. Chamber, M. K., Hyde, J. L. Oliffe, L. Zajdlewicz, A. Lowe, A. C. Wooten, and J. Dunn, 2015, *Psychology of Men & Masculinity, 17,* p. 232.

* $p < 0.05$

** $p < 0.001$

CHAPTER 4 - Discussion

4.1 Summary of General Findings

The current study aimed to use the Andersen Behavioural Model to explain medication adherence in Australian men with chronic conditions. This study first examined the relationship between predisposing, enabling, and need factors with medication adherence at a bivariate level, then used a model to explain factors that influence medication adherence. Age, perceived need, and actual need were significantly associated with medication adherence, both at a bivariate level and in a model. In terms of masculinity, total masculinity and five subscales (Strength, Sexual Importance, Family Responsibility, Optimistic, and Action-Based) were significantly associated with medication adherence at a bivariate level. However, the five subscales of masculinity lost significance when put in a model and total masculinity was removed from the model as it violated the assumption of multicollinearity. Two variables were not significantly associated with medication adherence, which were education level and marital status. Therefore, using the Andersen Behavioural Model, the current study found age, perceived need, and actual need were associated with the rate of medication adherence.

4.1.1 Objective 1 - To examine the influence of Predisposing Factors (age, education, and marital status) on men's medication adherence

Objective one was partially supported. Age was significantly correlated to medication adherence, with a weak positive correlation. Contrary to expectation, education level and marital status did not have a significant relationship with medication.

Findings shown above indicate that age was positively related to medication adherence, as it was hypothesised. This finding was consistent with study done by Drewnowski and Evans (2001), which supports the hypothesis where older adults have better

health consciousness than younger adults, leading them to take medications as prescribed. Furthermore, older people are more prone to multimorbidity, which requires them to take more medications for different chronic conditions (Kocurek, 2009).

Although findings of the present study have shown that people with lower education have poorer medication adherence due to lack of health literacy, yet the relationship was not significant. Perhaps, one possible explanation could be due to people with lower levels of education are more faithful to the medications prescribed by their doctors, believing that the doctor is more knowledgeable than they are, while people with higher education tend to seek alternative treatments (Tomar et al., 2019). In addition, people with higher education are more aware of the side effects of medication, as they have better medical knowledge than individuals with lower education level (Pandey et al., 2017).

Contrary to the expectation, men who are married did not have the highest rate of adherence. Instead, widowed men have the highest medication adherence rate, though the relationship is not significant. This result was surprising, as past literature has consistently indicated that widowed men have poor adherence (Alhaddad et al., 2016; Dabaghian et al., 2016; Pietrzykowski et al., 2020). Possibly, their partner could die from chronic conditions which makes them place greater emphasis on their health than others, leading to a higher medication rate. Therefore, it would be of interest to explore whether the causes of death of their partner have an influence on their help-seeking behaviour.

4.1.2 Objective 2 - To examine the influence of Enabling Factor (masculinity) on men's medication adherence

In terms of masculinity, the hypothesis was mostly supported, as the total masculinity and all subscales were significantly negatively associated with medication adherence, except for emotional self-reliance, which appears to not be significantly associated with medication

adherence. These findings are consistent with previous literature, as the masculinity norms encourage people to put their health at risk, in order to maintain the notion of masculinity (Mahalik et al., 2007). Aligning with this, people with higher masculinity would consider that having chronic conditions can threaten their masculine identity, hence, making them to be ignorant in seeking help (Courtenay, 2000).

4.1.3 Objective 3 – To examine the influence of Need Factors on men's medication adherence

The perceived need was positively correlated to medication adherence, as hypothesised. This is supported by the previous study, which supports the notion of people with better self-perceived health would attempt to sustain their health, preventing their chronic conditions from worsening, which associates them to have better adherence to medication (DiMatteo et al., 2002).

Unexpectedly, thought the relationship between actual need and medication adherence was significant, the relationship was positively correlated. This may possibly be due to the current study using the number of medication taken as the proxy measure for medication adherence, as people with multimorbidity tend to take more medication than people with one chronic condition (Wehling, 2009), leading to a positive correlation between actual need and medication adherence. Therefore, future research should use various methods to measure medication adherence, taking different factors into account such as the number of medications required, dose frequency, and severity of chronic conditions (Brown & Bussell, 2011).

4.1.4 Objective 4 – To examine the relationship between Predisposing Factors, Enabling Factors, and Need Factors with medication adherence, after adjusting for significant covariance

Age, perceived need, and actual need remain significant after adjusting for other significant covariates. This finding is consistent with previous literature, since older men are more likely to have multimorbidity and are less likely than younger men to be judged on their own health status. Thus, they are more likely to have the needs to take multiple medications to treat various chronic conditions that they have had (Benyamini & Burns, 2019; Chan et al., 2013).

Interestingly, although the five subscales of the MCD-I (Strength, Sexual Importance, Family Responsibility, Optimistic, and Action-Based) were significant at a bivariate level, all of them lost significance after adjusting for other significant covariates. Moreover, the relationship between Strength, Sexual Importance, and Optimistic with medication adherence changed direction after putting them in multiple linear regression, though the relationships were not significant. Other than that, even though the total masculinity was significant at a bivariate level, it was not included in the multiple linear regression as it violated the assumption of multicollinearity. One possible explanation of the findings found in this study could be that the participants in the current research were quite old ($M=65.73$, $SD = 9.33$), which brings them to focuson their health more than their masculinity level. For instance, Mahalik and Levi-Minzi (2007) recruited Australian men ($M= 32.98$, SD = 13.14) to participate in their research and found that masculinity to be significantly associated with harmful health behaviours. Thus, the association between masculinity and medication adherence could be dependent on the participants' age. Furthermore, older men have more experience in life, which enhances their ability to perceive resilience (Tannenbaum & Frank, 2010). In addition, older men tend to experience less social pressure to conform and maintain

masculinity values compared to younger men (Solomon & Schopler, 1982). Thus, this could explain the reason why masculinity lost significance after adjusting for significant covariates. Moreover, this study used a new masculinity measure, which is the MCD-I measure, which can cause results to be different from previous study as different traits were measured in both scales. For instance, study done by Mahalik and Levi-Minzi (2007) used the Conformity to Masculine Norms Inventory (CMNI) measures to evaluate masculinity, which assess certain factors that were not included in the MCD-I, such as violence, risk-taking, and playboy. The study found masculinity to be associated with harmful health behaviours. Therefore, it would be of interest for future research to explore how masculinity varies between age groups and influence their medication adherence, and also the differences in findings by using different measures.

4.2 Strengths of the Current Study

As the literature on factors that influence medication adherence in Australian men with a chronic condition is limited, the current study brought to light how socioeconomic status, masculinity, perceived health status, and the number of chronic conditions impact the rate of adherence. To date, there has been no research in Australia using the Andersen Behavioural Model to capture how medication adherence can be influenced by various factors. Using the Andersen Behavioural Model as a theoretical framework is important, as it provides information regarding the weight of influences of different variables on medication adherence and highlight how different predictor variables might differ when accounting for other predictor variables (Grant & Osanloo, 2015). Thus, this study provides a direction for future study on factors that influence the rate of adherence and a better understanding of how different factors can influence each other.

Another strength of the study was using the MCD-I in measuring masculinity, which conceptualised masculinity ideals for Australian men with a chronic condition (Chambers et

al., 2016). As masculinity traits can differ across cultures and region (Lease et al., 2013), by using the MCD-I that was developed in Australia, focusing on the older men, which is closely related to the sample used in this study, allowing the findings of the study to be more valid and less bias. In addition, the MCD-I was developed based on modern masculinity, which takes into consideration men's emotion (Occhipinti et al., 2019).

4.3 Limitations of the Current Study

4.3.1 Generalisability

Although an extensive sample was used in the current study, some groups were overly represented. The majority of the sample participants were older, married, and retired men, resulting in the external validity of the study, which may be limited to this demographic. Thus, further research has to be done targeting other male populations.

As the present study used existing data, some important variables that could potentially affect the results were not collected, such as sexual preference. Sexual preference plays a role in help-seeking behaviour which can influence the level of medication adherence, as people who are non-heterosexual are more reluctant to seek help due to discrimination and victimisation (Fredriksen-Goldsen et al., 2014). In addition, non-heterosexual adults are more likely to experience chronic stressors, which can affect an individual's physical health over the lifespan, making them more prone to multimorbidity (Juster et al., 2009). As men with different sexual preference have different rates of seeking help, the results of the current study can be slightly inapplicable to men with certain sexual preference. As a result, future research should examine the impact of sexual orientation on help-seeking behaviour and medication adherence, as well as specify the targeted sexual preference group that they are investigating.

4.3.2 Limitation of the Measures

In the present study, the number of medications taken was used as the proxy measure of medication adherence, which may not be an accurate indicator of medication adherence due to various reasons. For instance, each participant was required to take a different amount of medication prescribed, and some medication can be used to treat two chronic conditions simultaneously (Huber et al., 2013). Furthermore, the use of a medication may contraindicate with the use of another medication, which may possibly lead the patients to neglect the less important one (Costa et al., 2015). Other than that, some medications require a higher dosing frequency per day to be effective (Richter et al., 2003). Dosing frequency also has an impact in adherence rate as older adults are more likely to adhere to once-a-day medication than twice-a-day medication (Ingersoll & Cohen, 2008). However, the current study did not consider any of these factors. As a result, having to take a lesser amount of medication does not necessarily align with less adherence.

Due to the nature of the data collected, the present study did not take into account medications that were prescribed versus over-the-counter medications. The type of medication included in this study consists of supplements and prescribed medications. Some participants claim to take supplements such as multivitamins to treat high blood pressure and high cholesterol, which leads the current study to include supplements as one of the options for the type of medication taken. Therefore, future research can focus on the number of medications prescribed and the number of medications that the individuals are consuming, to understand better whether individuals are adherent to medications that they are required to consume.

4.3.3 Self-Report Measures

The current study collected data through self-report measures, which possibly leads to social desirability bias, as participants may not want to disclose certain information. As a

result, participants in the current study could respond in a manner that portraits their positive traits, such as over reporting ‘good behaviour’ and under reporting ‘bad behaviour’ (Paulhus, 2002). Furthermore, masculinity is a sensitive construct. Participants might want to impress the researcher by selecting responses that correspond to the ideal masculinity traits, hence resulting in skewed and false answers.

4.3.4 Distribution of the Data

The results of the current study, however, have to be taken with caveats, because not all assumptions were met. For instance, the assumption of normality for medication adherence was not met. The data for medication adherence was skewed, as there were fewer people taking seven to eight medications, which results in the distribution to be positively skewed. Although the current study used the Central Limit Theorem (CLT) to assume normality, the results can be slightly inapplicable, as the sample used may not be drawn for a normally distributed population. Even though the current study could transform the data to fit the assumption of normality better, transformed data could result in data being hard to interpret, as well as generating an inaccurate estimate of the original data (Feng et al., 2014). As a result, although the findings of the current study are still applicable, it has to be taken with caveat.

4.3.5 Cross-Sectional Study

The findings of the present study were not able to establish a cause and effect relationship due to the fact that this is a cross-sectional study. Instead, this study can solely comment on whether variables are associated. Hence, it can be difficult to draw conclusions on the basis of the results found in this research. Therefore, it is difficult for this study to determine whether the predictor variables (age, perceived need, and actual need) or medication adherence came first. This is because the current study was only able to examine whether there is an association between variables instead of establishing a cause and effect.

Although the cross-sectional study can be carried out relatively quickly as data are collected at a single point of time, a cross-sectional study is not able to analyse behaviour over an extended period of time. As a result, the present study is unable to understand the factors that affect medication adherence in the long run. In addition, factors that influence medication adherence may alter over time, which will most likely cause the findings of the current study to be less relevant in the future.

4.4 Theoretical and Practical Implications

Firstly, the results of the current study helped to improve the limited knowledge of factors influencing medication adherence by using the Andersen Behavioural Model. While most research investigating the relationship between masculinity and medication adherence was done in the United States, this study was conducted in Australia, hence enabling the findings of the current study to be applied to Australian men. As a result, professionals are able to provide treatments that are more appropriate for Australian men as findings of the current study are based on Australian men.

Secondly, the present study indicated that older men have better medication adherence than younger men. This could be the fact that younger men are more likely to have a full-time job, which possibly results in them to neglect the intake of medication. Hence, professionals could provide age-appropriate health assessments and medication towards patients in a different age group. For instance, professionals can prescribe a medication that has a lower dosing frequency to younger men, so that it will not cause an inconvenience for them to consume the medication a few times a day. Another suggestion for health professionals could be prescribing a multi-purpose drug to younger men, allowing them to receive a similar effect from the medications while taking less amount of medication.

Thirdly, the present study has demonstrated that self-assessed health status has an impact on medication adherence. Therefore, professionals should take into consideration of

how individuals view their own health when prescribing medication, for better catering of their needs. For instance, professionals can ask the individuals how they would rate their own health before prescribing medication, as the current study has found that people who self-rated highly on health status have better adherence to medication. Thus, when prescribing medications to individuals who poorly self-assessed their health status, professionals can ask for their opinion on whether they are comfortable with the number of medications prescribed and whether they would take the prescribed medications.

4.5 Recommendations for Future Research

Firstly, even though the literature has shown that sexual preference can influence an individual's behaviour for seeking help, the current study did not collect the participants' sexual preference. On that account, the influence of sexual preferences on medication was unable to be investigated. Consequently, future research could collect participants' sexual preferences, in order to investigate how medication adherence differs between people with different sexual orientations.

Secondly, the reason masculinity lost significance with medication adherence after putting it in the model could be explained by the fact that older men were overly represented in this study as masculinity was known to be low in older men. Moreover, the work status and education level of the participants in the present study were not evenly distributed, which could cause them to not have a significant effect on medication adherence. There were a few groups in this study that were overly represented, such as men aged 60 to 69, married, and retired, causing the findings of this study to be more applicable to this population. Therefore, further research should aim to ensure the number of participants demographic characteristics in each group (age, work status, education level, annual income) are similar, without one

group being over-represented and another group being under-represented, to ensure maximal external validity.

Thirdly, as mentioned above, the measure of medication adherence might not be an accurate representation of medication adherence because the number of medications taken does not necessarily indicate better adherence. Some medications can be used to treat two chronic conditions simultaneously, while some chronic conditions require multiple medications (Huber et al., 2013). Thus, future research could use different methods to measure adherence, such as interviewing patients and family, counting pills, or checking rates of prescription refill records, depending on the nature of the study.

Fourthly, although this study has accounted for many variables, but there are still many other variables out there that were not considered, such as cost, dosing frequency, side effects, and patients' beliefs (Egan et al., 2003; Vermeire et al., 2001). Having a lower cost, lesser dosing frequency, and minor side effects can allow a person to be more adherent to medication. Furthermore, evidence has shown poor understanding of medication can also lead to poor adherence as the patients do not understand the aftermath of poor adherence (Brown & Bussell, 2011). This has been further supported by the survey of Medicare beneficiaries, as respondents have reported that they do not think some medicine were necessarily needed. The survey has also found medicines that are not covered by insurance can lead to lower adherence, as the cost of medication can be a burden to some people (Kennedy et al., 2008). Thus, it would be of interest in future research to examine the influence of patients' beliefs and characteristics of medication in terms of their medication adherence rate.

4.6 Conclusions

The number of people with chronic conditions in Australia has been accelerating for the past decade (Australian Health Ministers' Advisory Council, 2017). Despite having more

people diagnosed with chronic conditions, the rate of medication adherence remains the same, with approximately 50% of patients not taking their medications as prescribed (Liestyo & Santella, 2003; Pharmaceutical Society of Australia, 2006). Unfortunately, little research has been done using a theoretical framework to understand medication adherence. Thus, the current study addresses how different factors can influence medication adherence while accounting for other predictor factors, which then contribute to the knowledge of factors that influence the rate of adherence. In addition, the current study has suggested the socioeconomic status influences patients' medication adherence behaviour, which allows professionals to prescribe medication more mindfully while considering the patients' socioeconomic status. Furthermore, the current finding has shown men in different age groups have different levels of medication adherence, which enable professionals to prescribe age-appropriate medication, in order to fulfil the needs of patients in different age groups.

In addition, the current study found that how individuals perceive their health status and the number of chronic conditions they have can influence their rate of medication adherence. People who perceived themselves as having better health and people with more chronic conditions have a higher level of adherence. Furthermore, the present study not only provides a significant contribution to the existing literature regarding factors that influence Australian men's medication adherence behaviour but also suggest crucial directions for future research.

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Appendix A

Florey Adelaide Male Ageing Study (FAMAS) 2015 Follow-Up Questionnaire Package

Questionnaire

Florey Adelaide Male Ageing Study (FAMAS) - Follow Up - 2015

Dear Study Participant

We are seeking your valuable help once again with our study, by completing this questionnaire.

Parts of this questionnaire may be similar to other questionnaires you have completed for us in the past. As part of the study, we are looking at changes over time and so we need to ask the same or similar questions each time.

If you would prefer to complete this survey online, please go to www.surveymonkey.com/r/FAMAS2015 ***and enter the logon details provided in the accompanying letter.***

Your answers will remain strictly confidential. Results of the study may be published in a medical journal, but no information that may lead to the identification of any individual will be released.

We realise that the questionnaire is long. It should take approximately ***30-45*** *minutes to complete.* ***However we would really appreciate you taking the time to respond as best you can.*** *Please complete and return it in the next 2 weeks if at all possible.* ***If you have any problems with this questionnaire, please contact us on ☎ 8313 4723***

Please read the following instructions before answering the questions.

Please complete all the questions as per the instructions by placing a tick in the box that most closely corresponds to your answer.

When you have completed the questionnaire, please insert it in the reply-paid envelope provided, for return to the

Florey Adelaide Male Ageing Study,

c/o Freemasons Foundation Centre for Men's Health (University of Adelaide),

254 North Tce, Adelaide SA 5005.

Was this questionnaire forwarded to you because the address on the envelope we sent to you was incorrect?
If so, please write your correct address below.

_____

_____

_____

Please provide us with your email address(es) if you have one.

_____

_____

A. GENERAL HEALTH AND WELL BEING

These first questions ask for your views about your health, how you feel and how well you are able to do your usual activities. If you are unsure about any question, please give the best answer you can.

A1	**In general, would you say your health is:**	**(tick ONE box only)** ☐ 1 Excellent ☐ 2 Very good ☐ 3 Good ☐ 4 Fair ☐ 5 Poor
A2	**Compared to one year ago, how would you rate your health in general now?**	**(tick ONE box only)** ☐ 1 Much better now than one year ago ☐ 2 Somewhat better now than one year ago ☐ 3 About the same as one year ago ☐ 4 Somewhat worse now than one year ago ☐ 5 Much worse now than one year ago

The following questions are about activities you might do during a typical day. Please tell us if your health now limits you a lot, limits you a little or does not limit you at all in these activities:

A3	**Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all
A4	**Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all
A5	**Lifting or carrying groceries?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all
A6	**Climbing several flights of stairs?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all
A7	**Climbing one flight of stairs?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all
A8	**Bending, kneeling or stooping?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all

(cont'd) During a typical day, please tell us if your health now limits you a lot, limits you a little or does not limit you at all in these activities:

A9	**Walking more than one kilometre?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all
A10	**Walking several hundred metres?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all
A11	**Walking 100 metres?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all
A12	**Bathing or dressing yourself?**	**(tick ONE box only)** ☐ 1 Yes, limited a lot ☐ 2 Yes, limited a little ☐ 3 No, not limited at all

The following four questions ask you about your physical health and your daily activities.

A13	During the past four weeks, how much of the time have you ... **Had to cut down on the amount of time you spent on work or other activities as a result of your physical health?**	**(tick ONE box only)** ☐ 1 All of the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A14	During the past four weeks, how much of the time have you ... **Accomplished less than you would like as a result of your physical health?**	**(tick ONE box only)** ☐ 1 All of the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A15	During the past four weeks ... **Were you limited in the kind of work or other activities as a result of your physical health?**	**(tick ONE box only)** ☐ 1 All of the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time

A16	During the past four weeks, how much of the time have you ... **Had any difficulty performing the work or other activities as a result of your physical health (for example, it took extra effort)?**	**(tick ONE box only)** ☐ 1 All of the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time

The following few questions ask you about your emotions and your daily activities.

A17	During the past four weeks, how much of the time have you had to ... **Cut down on the amount of time you spent on work or other activities as a result of any emotional problems such as feeling depressed or anxious?**	**(tick ONE box only)** ☐ 1 All of the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A18	During the past four weeks, how much of the time have you ... **Accomplished less than you would like as a result of any emotional problems?**	**(tick ONE box only)** ☐ 1 All of the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A19	During the past four weeks, how much of the time... **Did work or other activities less carefully than usual as a result of any emotional problems?**	**(tick ONE box only)** ☐ 1 All of the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A20	During the past four weeks ... **To what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours or groups?**	**(tick ONE box only)** ☐ 1 Not at all ☐ 2 Slightly ☐ 3 Moderately ☐ 4 Quite a bit ☐ 5 Extremely

The next few questions ask about pain.

A21	**How much bodily pain have you had during the past four weeks?**	**(tick ONE box only)** ☐ 1 None **(Please go to Ques A23 →)** ☐ 2 Very mild ☐ 3 Mild ☐ 4 Moderate ☐ 5 Severe ☐ 6 Very severe

A22	During the past four weeks ... **How much did pain interfere with your normal work (including both work outside the home and housework)?**	**(tick ONE box only)** ☐ 1 Not at all ☐ 2 Slightly ☐ 3 Moderately ☐ 4 Quite a bit ☐ 5 Extremely

These questions are about how you feel and how things have been with you during the past four weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

A23	How much of the time during the past four weeks ... **Did you feel full of life?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A24	How much of the time during the past four weeks ... **Have you been very nervous?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A25	How much of the time during the past four weeks ... **Have you felt so down in the dumps that nothing could cheer you up?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A26	How much of the time during the past four weeks ... **Have you felt calm and peaceful?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A27	How much of the time during the past four weeks ... **Did you have a lot of energy?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time

A28	How much of the time during the past four weeks ... **Have you felt downhearted and depressed?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A29	How much of the time during the past four weeks ... **Did you feel worn out?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A30	How much of the time during the past four weeks ... **Have you been happy?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A31	How much of the time during the past four weeks ... **Did you feel tired?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time
A32	During the past four weeks ... **How much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc)?**	**(tick ONE box only)** ☐ 1 All the time ☐ 2 Most of the time ☐ 3 Some of the time ☐ 4 A little of the time ☐ 5 None of the time

How true or false, is each of the following statements for you?

A33	**"I seem to get sick a little easier than other people."**	**(tick ONE box only)** ☐ 1 Definitely true ☐ 2 Mostly true ☐ 3 Don't know ☐ 4 Mostly false ☐ 5 Definitely false

A34	**"I am as healthy as anybody I know."**	**(tick ONE box only)** ☐ 1 Definitely true ☐ 2 Mostly true ☐ 3 Don't know ☐ 4 Mostly false ☐ 5 Definitely false
A35	**"I expect my health to get worse."**	**(tick ONE box only)** ☐ 1 Definitely true ☐ 2 Mostly true ☐ 3 Don't know ☐ 4 Mostly false ☐ 5 Definitely false
A36	**"My health is excellent."**	**(tick ONE box only)** ☐ 1 Definitely true ☐ 2 Mostly true ☐ 3 Don't know ☐ 4 Mostly false ☐ 5 Definitely false

B. CHRONIC CONDITIONS

B1	**Have you ever been told by a doctor that you have any of the following conditions?**	**(tick ALL that apply)** ☐ 1 Heart attack ☐ 2 Stroke ☐ 3 Angina ☐ 4 Transient ischaemic attack/mini-stroke ☐ 5 Atrial fibrillation ☐ 6 Kidney/renal disease ☐ 7 High blood pressure ☐ 8 High cholesterol ☐ 9 A smoking-related lung condition? (Chronic Obstructive Pulmonary Disease [COPD], Chronic Obstructive Airways Disease [COAD], emphysema or bronchitis) ☐ 10 Parkinson's disease ☐ 11 Asthma ☐ 12 Enlarged prostate / Benign prostatic hyperplasia (BPH) ☐ 13 Diabetes ☐ 14 Hyperthyroidism (overactive thyroid) ☐ 15 Hypothyroidism (underactive thyroid) ☐ 16 Osteoarthritis ☐ 17 Osteoporosis ☐ 18 Gout ☐ 16 None of the above ☐ 99 Don't know
B2	**In the last 12 months, have you been told by a doctor that you have any of the following conditions?**	**(tick ALL that apply)** ☐ 1 Anxiety ☐ 2 Depression ☐ 3 Insomnia ☐ 4 A stress-related problem ☐ 5 Any other mental health problem ☐ 6 NONE ☐ 99 Don't know

B3 **Impotence means being unable to get and keep an erection that is rigid enough for satisfactory sexual activity. How would you describe yourself?**

(tick ONE box only)

- ☐ 1 Always able to get and keep an erection good enough for sexual intercourse
- ☐ 2 Usually able to get and keep an erection good enough for sexual intercourse
- ☐ 3 Sometimes able to get and keep an erection good enough for sexual intercourse
- ☐ 4 Never able to get and keep an erection good enough for sexual intercourse
- ☐ 5 Refused

OTHER CHRONIC ILLNESSES

B4 **Are you <u>now</u> suffering from any other chronic illness?**

- ☐ 1 No **(Please go to Ques C1 Cancer →)**
- ☐ 2 Yes *(please specify below)*

C. CANCER

C1	**Have you ever been told by a doctor that you have cancer?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No **(Please go to Ques D1 Alcohol→)**

C2 **Have you ever been told by a doctor that you have any of the following? (tick ALL that apply)**	**What treatment did you receive? (tick ALL that apply)**					**In what year were you diagnosed with this cancer?**
	Chemo-therapy	Radio-therapy	Surgery	Other	None	
☐ 1 Skin cancer (not melanoma)	☐	☐	☐	☐	☐	
☐ 2 Melanoma	☐	☐	☐	☐	☐	
☐ 3 Bladder cancer	☐	☐	☐	☐	☐	
☐ 4 Prostate cancer	☐	☐	☐	☐	☐	
☐ 5 Bowel cancer	☐	☐	☐	☐	☐	
☐ 6 Kidney cancer	☐	☐	☐	☐	☐	
☐ 7 Lung cancer	☐	☐	☐	☐	☐	
☐ 8- Non-Hodgkin's Lymphoma	☐	☐	☐	☐	☐	
☐ 9 Pancreatic cancer	☐	☐	☐	☐	☐	
☐ 10 Other cancer *Please specify*_____	☐	☐	☐	☐	☐	

D. ALCOHOL

D1	**Have you ever tried alcohol?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No **(Please go to Ques E1 Smoking →)**
D2	**Have you ever had a full serve of alcohol?** (e.g. a glass of wine, a whole nip of spirits, a glass of beer, etc.)	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No **(Please go to Ques E1 Smoking →)**
D3	**Have you had an alcoholic drink of any kind in the last 12 months?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No **(Please go to Ques E1 Smoking →)**
D4	**In the last 12 months, how often did you have an alcoholic drink of any kind?**	**(tick ONE box only)** ☐ 1 Every day ☐ 2 5 to 6 days a week ☐ 3 3 to 4 days a week ☐ 4 1 to 2 days a week ☐ 5 2 to 3 days a month ☐ 6 About 1 day a month ☐ 7 Less often ☐ 8 No longer drink **(Please go to Ques E1 Smoking →)**
D5	**On a day that you have an alcoholic drink, how many standard drinks do you usually have?** A Standard Drink is equivalent to a schooner of full strength beer, a glass of wine or a nip of spirits.	**(tick ONE box only)** ☐ 1 20 or more drinks ☐ 2 16 to 19 drinks ☐ 3 13 to15 drinks ☐ 4 11 to 12 drinks ☐ 5 9 to 10 drinks ☐ 6 7 to 8 drinks ☐ 7 5 to 6 drinks ☐ 8 3 to 4 drinks ☐ 9 2 drinks ☐ 10 1 drink ☐ 11 Half a drink

D6 **Please record how often in the last 12 months you have had each of the following number of standard drinks in a day?**

Please mark one response for each row below.

Please ensure that you have marked a response for each amount, even if your answer is "Never" for that row.

	Every day	5 to 6 days a week	3 to 4 days a week	1 to 2 days a week	2 to 3 days a month	About 1 day a month	Less often	Never
20 or more standard drinks a day	☐	☐	☐	☐	☐	☐	☐	☐
11 to 19 standard drinks a day	☐	☐	☐	☐	☐	☐	☐	☐
7 to 10 standard drinks a day	☐	☐	☐	☐	☐	☐	☐	☐
5 to 6 standard drinks a day	☐	☐	☐	☐	☐	☐	☐	☐
3 to 4 standard drinks a day	☐	☐	☐	☐	☐	☐	☐	☐
1 to 2 standard drinks a day	☐	☐	☐	☐	☐	☐	☐	☐
Less than 1 standard drink per day	☐	☐	☐	☐	☐	☐	☐	☐
None	☐	☐	☐	☐	☐	☐	☐	☐

D7 **At the present time, do you consider yourself to be ...?**

(tick ONE box only)

- ☐ 1 A non-drinker
- ☐ 2 An ex-drinker
- ☐ 3 An occasional drinker
- ☐ 4 A light drinker
- ☐ 5 A social drinker
- ☐ 6 A heavy drinker
- ☐ 7 A binge drinker
- ☐ 99 Refused

D8 **In the last 12 months have you increased or decreased your overall alcohol consumption?**

(tick ONE box only)

- ☐ 1 Increased
- ☐ 2 Decreased
- ☐ 3 Stayed the same
- ☐ 99 Refused

E. SMOKING

E1	Do you currently smoke?	(tick ONE box only) ☐ 1 Yes ☐ 2 No (Please go to Ques E3 →) ☐ 3 Occasionally
E2	How many cigarettes do you usually smoke a day?	(tick ONE box only) ☐ 1 Enter number of cigarettes _____ ☐ 2 Less than one ☐ 3 Only smoke cigars or pipes ... PLEASE GO TO QUES E6 →
E3	Have you ever smoked regularly (that is, at least once a day)?	(tick ONE box only) ☐ 1 Yes ☐ 2 No (Please go to Ques F1 Physical Activity →)
E4	How many cigarettes did you usually smoke a day?	(tick ONE box only) ☐ 1 Enter number of cigarettes _____ ☐ 2 Less than one ☐ 3 Only smoke cigars or pipes
E5	How old were you when you last gave up smoking?	(tick ONE box only) ☐ 1 Enter age _____ ☐ 2 Can't remember
E6	How many years have you smoked/did you smoke daily?	(tick ONE box only) ☐ 1 Enter years _____ ☐ 2 Less than 1 year ☐ 3 Can't remember
E7	At what age did you first start smoking daily?	(tick ONE box only) ☐ 1 Enter age _____ ☐ 2 Can't remember

F. PHYSICAL ACTIVITY

The next few questions are about any physical activities that you may have done in the last week.

F1	**In the last week, how many times have you walked continuously, for at least 10 minutes, for recreation, exercise or to get to or from places?**	**(tick ONE box only)** ☐ 1 Enter number of times _____ ☐ 2 None **(Please go to Ques F3 ↓)** ☐ 99 Don't know
F2	**What do you estimate was the total time that you spent walking in this way in the last week?**	**(tick ONE box only)** ☐ 1 Enter number of hours _____ **OR** ☐ 2 Enter number of minutes _____ ☐ 99 Don't know
F3	**This question excludes household chores or gardening. In the last week, how many times did you do any vigorous physical activity which made you breathe harder or puff and pant?** (e.g. tennis, jogging, cycling, keep fit exercises)	**(tick ONE box only)** ☐ 1 Enter number of times _____ ☐ 2 None **(Please go to Ques F5 →)** ☐ 99 Don't know
F4	**What do you estimate was the total time that you spent doing this vigorous physical activity in the last week?**	**(tick ONE box only)** ☐ 1 Enter number of hours _____ **OR** ☐ 2 Enter number of minutes _____ ☐ 99 Don't know
F5	**This question excludes household chores or gardening. In the last week, how many times did you do other more moderate physical activities that you have not already mentioned?** (e.g. lawn bowls, golf, gentle swimming, etc.)	**(tick ONE box only)** ☐ 1 Enter number of times _____ ☐ 2 None **(Please go to Ques F7 ↓)** ☐ 99 Don't know
F6	**What do you estimate was the total time that you spent doing these activities in the last week?**	**(tick ONE box only)** ☐ 1 Enter number of hours _____ OR ☐ 2 Enter number of minutes _____ ☐ 99 Don't know
F7	**Do you use an activity/fitness tracker?**	**(tick ALL that apply)** ☐ 1 Fitbit ☐ 2 Garmin ☐ 3 Samsung ☐ 4 Polar ☐ 5 Nike ☐ 6 Other *(please specify)*_____ ☐ 7 None

G. BODY MEASUREMENTS

G1	**What is your weight (undressed in the morning)?** ☐ Measured ☐ Not measured	**(enter ONE response only)** _____ Kilograms *(please enter a number)* **OR** _____ Stones and pounds *(please enter a number)* ☐ 99 Don't know
G2	**What is your waist circumference?** *For reference - the correct place to measure your waist is halfway between your lowest rib and the top of your hipbone.*	**(enter ONE response only)** _____ Centimetres *(please enter a number)* **OR** _____ Inches *(please enter a number)* ☐ 99 Don't know
G3	**What is your neck circumference?** *To measure your neck circumference. Place a measuring tape underneath your Adam's apple so it makes contact with your skin and conforms to your neck. To find your Adam's apple, tilt your head back and feel for a lump or protrusion. Place the tape underneath the protrusion and record the number here.*	**(enter ONE response only)** _____ Centimetres *(please enter a number)* **OR** _____ Inches *(please enter a number)* ☐ 99 Don't know

H. NUTRITION

H1 **In the last 12 months, how many serves of fruit did you usually eat per day?**

Please count 1 serve as either:
- a whole piece of fruit such as an apple, pear or banana;
- a handful of fruit such as apricots, grapes, berries or raisins; or
- 1 cup of chopped fruit, fruit salad or stewed fruit.

(tick ONE box only)

- ☐ 1 NONE
- ☐ 2 Less than 1 serve of fruit per day
- ☐ 3 1 serve of fruit per day
- ☐ 4 2 serves per day
- ☐ 5 3 serves per day
- ☐ 6 4 serves per day
- ☐ 7 5 serves per day
- ☐ 8 6 or more serves per day
- ☐ 99 Don't know

H2 **In the last 12 months, how many serves of vegetable did you usually eat per day?**

Please count 1 serve as either:
- 1 cup of salad vegetables or
- ½ cup of cooked vegetables

(tick ONE box only)

- ☐ 1 NONE
- ☐ 2 Less than 1 serve of vegetables per day
- ☐ 3 1 serve of vegetables per day
- ☐ 4 2 serves per day
- ☐ 5 3 serves per day
- ☐ 6 4 serves per day
- ☐ 7 5 serves per day
- ☐ 8 6 serves per day
- ☐ 9 7 or more serves per day
- ☐ 99 Don't know

H3	**In the last 12 months, how many eggs did you usually eat <u>per week</u>?** Please include eggs that are fried, boiled, scrambled, poached or used in omelettes.	**(tick ONE box only)** ☐ 1 NONE ☐ 2 Less than 1 egg per week ☐ 3 1 to 2 eggs per week ☐ 4 3 to 5 eggs per week ☐ 5 6 or more eggs per week ☐ 99 Don't know

The next two questions are about carbonated soft drinks. These include Coca-Cola, Pepsi, Solo, lemonade and flavoured mineral water, but <u>NOT</u> unflavoured mineral water or soda water. When answering the questions, please convert the amounts you drank into glasses using the examples given below:

375 mL can = 2 glasses *1.25 litre bottle = 7 glasses* *2 litre bottle = 11 glasses*
750 mL bottle = 4 glasses *1.5 litre bottle = 8 glasses*

H4	**In the last 12 months, how many glasses of <u>diet</u> soft drink, such as Diet Coke, did you drink <u>per day</u>?**	**(tick ONE box only)** ☐ 1 NONE ☐ 2 Less than 1 glass per day ☐ 3 1 glass ☐ 4 2 glasses (or 1 can) ☐ 5 3 glasses ☐ 6 4 glasses ☐ 7 5 glasses ☐ 8 6 glasses ☐ 9 7 glasses ☐ 10 8 glasses ☐ 11 9 glasses ☐ 12 10 or more glasses ☐ 99 Don't know

H5	In the last 12 months, how many glasses of regular soft drink, such as Coke, did you drink per day?	(tick ONE box only) ☐ 1 NONE ☐ 2 Less than 1 glass per day ☐ 3 1 glass ☐ 4 2 glasses (or 1 can) ☐ 5 3 glasses ☐ 6 4 glasses ☐ 7 5 glasses ☐ 8 6 glasses ☐ 9 7 glasses ☐ 10 8 glasses ☐ 11 9 glasses ☐ 12 10 or more glasses ☐ 99 Don't know
H6	How many glasses of fruit or vegetable juice do you usually drink per day?	(tick ONE box only) ☐ 1 NONE ☐ 2 Less than 1 glass per day ☐ 3 1 glass ☐ 4 2 glasses (or 1 can) ☐ 5 3 glasses ☐ 6 4 glasses ☐ 7 5 glasses ☐ 8 6 glasses ☐ 9 7 glasses ☐ 10 8 glasses ☐ 11 9 glasses ☐ 12 10 or more glasses ☐ 99 Don't know
H7	On average, how many glasses of energy drink (e.g. Red Bull, V, Mother) do you usually have per day?	*Please enter number of glasses* _____ ☐ 99 Don't know
H8	On average, how many glasses of sports drink (e.g. Powerade, Gatorade) do you usually have per day?	*Please enter number of glasses* _____ ☐ 99 Don't know
H9	During the last four weeks, on average, how many glasses of water do you usually have per day?	*Please enter number of glasses* _____ ☐ 99 Don't know
H10	How often do you eat meat products such as sausages, frankfurters, devon (fritz), salami, meat pies, bacon or ham?	(tick ONE box only) ☐ 1 Never ☐ 2 Less than 1 time per week ☐ 3 1 to 2 times per week ☐ 4 3 to 5 times per week ☐ 5 6 to 7 times per week ☐ 6 8 or more times per week ☐ 99 Don't know

I. MENTAL HEALTH

Following are groups of statements. Please read each group of statements carefully and select (tick) th *one statement in each group* that best describes the way you have been feeling in the PAST WEEK, INCLUDING TODAY.

I1	☐ 0 I do not feel sad ☐ 1 I feel sad ☐ 2 I am sad all the time and I can't snap out of it ☐ 3 I am so sad or unhappy I can't stand it	I2	☐ 0 I am not particularly discouraged about the future ☐ 1 I feel discouraged about the future ☐ 2 I feel I have nothing to look forward to ☐ 3 I feel that the future is hopeless and that things cannot improve
I3	☐ 0 I do not feel like a failure ☐ 1 I feel I have failed more than the average person ☐ 2 As I look back on my life, all I can see is a lot of failures ☐ 3 I feel I am a complete failure as a person	I4	☐ 0 I get as much satisfaction out of things as I used to ☐ 1 I don't enjoy things the way I used to ☐ 2 I don't get real satisfaction out of anything anymore ☐ 3 I am dissatisfied or bored with everything
I5	☐ 0 I don't feel particularly guilty ☐ 1 I feel guilty a good part of the time ☐ 2 I feel quite guilty most of the time ☐ 3 I feel guilty all of the time	I6	☐ 0 I don't feel I am being punished ☐ 1 I feel I may be punished ☐ 2 I expect to be punished ☐ 3 I feel I am being punished
I7	☐ 0 I don't feel disappointed in myself ☐ 1 I am disappointed in myself ☐ 2 I am disgusted with myself ☐ 3 I hate myself	I8	☐ 0 I don't feel I am any worse than anybody else ☐ 1 I am critical of myself for my weaknesses or mistakes ☐ 2 I blame myself all the time for my faults ☐ 3 I blame myself for everything bad that happens
I9	☐ 0 I don't have any thoughts of killing myself ☐ 1 I have thoughts of killing myself, but I would not carry them out ☐ 2 I would like to kill myself ☐ 3 I would kill myself if I could	I10	☐ 0 I don't cry any more than usual ☐ 1 I cry more now than I used to ☐ 2 I cry all the time now ☐ 3 I used to be able to cry, but now I can't even if Iwant to

I11	☐ 0 I am no more irritated now than I ever am ☐ 1 I get annoyed or irritated more easily than I used to ☐ 2 I feel irritated all the time now ☐ 3 I don't get irritated at all by the things that used to irritate me	I12	☐ 0 I have not lost interest in other people ☐ 1 I am less interested in other people than I used to be ☐ 2 I have lost most of my interest in other people ☐ 3 I have lost all of my interest in other people
I13	☐ 0 I make decisions about as well as I ever could ☐ 1 I put off making decisions more than I used to ☐ 2 I have greater difficulty in making decisions than before ☐ 3 I can't make decisions at all anymore	I14	☐ 0 I don't feel I look any worse than I used to ☐ 1 I am worried that I am looking old and unattractive ☐ 2 I feel that there are permanent changes in my appearance that make me look unattractive ☐ 3 I believe that I look ugly
I15	☐ 0 I can work about as well as before ☐ 1 It takes an extra effort to get started at doing something ☐ 2 I have to push myself very hard to do anything ☐ 3 I can't do any work at all	I16	☐ 0 I can sleep as well as usual ☐ 1 I don't sleep as well as I used to ☐ 2 I wake up 1 to 2 hours earlier than usual and find it hard to get back to sleep ☐ 3 I wake up several hours earlier than I used to and cannot get back to sleep
I17	☐ 0 I don't get more tired than usual ☐ 1 I get tired more easily than I used to ☐ 2 I get tired from doing almost nothing ☐ 3 I am too tired to do anything	I18	☐ 0 My appetite is no worse than usual ☐ 1 My appetite is not as good as it used to be ☐ 2 My appetite is much worse now ☐ 3 I have no appetite at all anymore
I19	☐ 0 I haven't lost much weight, if any, lately ☐ 1 I have lost more than 2 kilos / 5 pounds ☐ 2 I have lost more than 4.5 kilos / 10 pounds ☐ 3 I have lost more than 7 kilos / 15 pounds ☐ 4 I am purposely trying to lose weight by eating less	I20	☐ 0 I am no more worried about my health than usual ☐ 1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation ☐ 2 I am worried about physical problems and it's hard to think of much else ☐ 3 I am so worried about physical problems that I cannot think about anything else

I21	☐ 0 I have not noticed any recent change in my interest in sex ☐ 1 I am less interested in sex than I used to be ☐ 2 I am much less interested in sex now ☐ 3 I have lost interest in sex complete	**The last few questions are taken from a commonly used scale of psychological distress. If you feel unusually anxious or depressed for extended periods you should speak to a medical professional or call Lifeline (131114) or Mensline (1300 78 99 78).**

J. WORK

J1	**What is your work status?**	**(tick ONE box only)** ☐ 1 Self-employed ☐ 2 Full time employed ☐ 3 Part-time/casual employment ☐ 4 Retired ☐ 5 Unemployed **(Please go to Ques K1 Pain →)** ☐ 6 Home duties **(Please go to Ques K1 Pain →)** ☐ 7 Student **(Please go to Ques K1 Pain →)** ☐ 8 Unable to work **(Please go to Ques K1 Pain →)** ☐ 9 Volunteer **(Please go to Ques K1 Pain →)** ☐ 10 Carer **(Please go to Ques K1 Pain →)** ☐ 11 Other *(please specify)* _____ **(Please go to Ques K1 Pain →)**
J2	**What is/was your main occupation?**	***Please specify:***
J3	**How long have you been doing/did you do this type of work for?**	**(enter ONE response only)** Specify years _____ **OR** Specify months _____ ☐ 99 Don't know
J4	**On average, how many hours a week do/did you work?**	**(enter ONE response only)** Specify hours a week _____ ☐ 99 Don't know

K. PAIN

We really appreciate your help with filling out this questionnaire. The next few questions relate to any pain you have had in your joints or areas of your body in the last 7 days.

K1	**Please indicate if you have had pain or tenderness during the past 7 days in the areas listed.**	**(tick ALL that apply)** ☐ 1 Left jaw ☐ 2 Right jaw ☐ 3 Neck ☐ 4 Left shoulder ☐ 5 Right shoulder ☐ 6 Chest or breast ☐ 7 Upper back ☐ 8 Left upper arm ☐ 9 Right upper arm ☐ 10 Left lower arm ☐ 11 Right lower arm ☐ 12 Abdomen ☐ 13 Lower back ☐ 14 Left hip or buttocks ☐ 15 Right hip or buttocks ☐ 16 Left upper leg ☐ 17 Right upper leg ☐ 18 Left lower leg ☐ 19 Right lower leg ☐ 20 No pain or tenderness **(Please go to Ques L1 Urinary Health →)**

K2	**For each of the following symptoms listed, please indicate the severity of the symptom during the past 7 days.**	**(tick ONE box only)**			
		No problem	**Slight or mild problem**	**Moderate problem**	**Severe problem**
	Fatigue	☐	☐	☐	☐
	Trouble thinking or remembering	☐	☐	☐	☐
	Waking up tired (unrefreshed)	☐	☐	☐	☐

K3	**During the past 6 months have you had any of the following symptoms?**	**(tick ONE box only)**	
		Yes	**No**
	Pain or cramps in the lower abdomen	☐	☐
	Depression	☐	☐
	Headache	☐	☐

K4	**Have the symptoms in the previous 2 questions and pain been present at a similar level for at least 3 months?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No

L. URINARY HEALTH

	The following questions relate to urinary symptoms. Over the past month, please indicate how often you have you...	(tick ONE box only) Not at all	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always
L1	...Had a sensation of not emptying your bladder completely after you have finished urinating?	☐	☐	☐	☐	☐	☐
L2	...Had to urinate again less than 2 hours after you finished urinating?	☐	☐	☐	☐	☐	☐
L3	...Found you stopped and started again several times when you urinated?	☐	☐	☐	☐	☐	☐
L4	...Found it difficult to postpone urination?	☐	☐	☐	☐	☐	☐
L5	...Had a weak urinary stream?	☐	☐	☐	☐	☐	☐
L6	... Had to push or strain to begin urination?	☐	☐	☐	☐	☐	☐

		(tick ONE box only) None	1 time	2 times	3 times	4 times	5 + times
L7	Over the past month, how many times did you most typically get up to urinate from the time you went to bed at night until the time you got up in the morning?	☐	☐	☐	☐	☐	☐

		(tick ONE box only) Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
L8	If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about it?	☐	☐	☐	☐	☐	☐	☐

M. FALLS

M1	**How many falls (including slips, trips and falls to the ground) did you have in the past year?**	**(tick ONE box only)** ☐ 1 Enter number _____ ☐ 2 None **(Please go to Ques N1 Sleep ↓)** ☐ 99 Don't know
M2	**Did you suffer from a fracture as a result of a fall from a standing height or less, in the past year?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No ☐ 99 Don't know

N. SLEEP

We really appreciate the time you have taken to get this far … we are close to the end.

N1	**Do you often feel tired, fatigued or sleepy during daytime?** *For shift workers - during the period when you normally socialise or perform activities of daily living.*	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No ☐ 3 Shift worker, sleepy during other times ☐ 4 Shift worker, not sleepy ☐ 99 Don't know
N2	**Do you feel sleepy when sitting quietly during the day or early evening?** *For shift workers - during the period when you normally socialise or perform activities of daily living.*	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No ☐ 3 Sometimes ☐ 4 Shift worker, sleepy during other times ☐ 5 Shift worker, not sleepy ☐ 99 Don't know
N3	**During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?** *For shift workers - during the period when you normally socialise or perform activities of daily living.*	**(tick ONE box only)** ☐ 1 Not during the past month ☐ 2 Less than once per week ☐ 3 1-2 times per week ☐ 4 3 or more times per week ☐ 99 Don't know
N4	**Has your snoring ever bothered other people, or is your snoring louder than talking or loud enough to be heard through closed doors?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No ☐ 3 Don't snore ☐ 99 Don't know
N5	**Has anyone noticed that you stop breathing during your sleep?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No ☐ 99 Don't know
N6	**If you have a bed partner or share a room, ask him/her how often in the past month you have had legs twitching or jerking while you sleep?**	**(tick ONE box only)** ☐ 1 Not during the past month ☐ 2 Less than once per week ☐ 3 1-2 times per week ☐ 4 3 or more times per week ☐ 5 Don't have a bed partner ☐ 99 Don't know
N7	**Have you been diagnosed with sleep apnoea with an overnight sleep study?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No **(Please go to Ques N13 →)** ☐ 99 Don't know **Please go to Ques N13 →)**

N8	**Do you know your Apnea/Hypopnea Index (AHI), ie the number of times you stop breathing per hour overnight?**	**(ONE response only)** **AHI number** _____ ☐ 99 Don't know
N9	**Were you told if your sleep apnea was mild/moderate or severe?**	**(tick ONE box only)** ☐ 1 Mild/ moderate ☐ 2 Severe ☐ 99 Don't know
N10	**Where did you have your PSG (sleep test) done?**	***Please specify:***
N11	**Do you give us permission to access your AHI results?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No
N12	**Do you use treatment for your sleep apnea?**	**(tick ONE box only)** ☐ 1 No ☐ 2 Yes, Constant Positive Airway Pressure or CPAP for less than 4 hours/night ☐ 3 Yes, Constant Positive Airway Pressure or CPAP for more than 4 hours/night ☐ 4 Yes other (surgery, use oral device / mandibular advancement splint) ☐ 99 Don't know
N13	**During the last week, if I think about how I sleep ...**	**(tick ONE box only)** ☐ 1 I was able to sleep without difficulty most of the time ☐ 2 My sleep was interrupted some of the time, but I was usually able to go back to sleep without difficulty ☐ 3 My sleep was interrupted most nights, but I was usually able to go back to sleep without difficulty ☐ 4 I slept in short bursts only. I was awake most of the night ☐ 99 Don't know

O. SLEEP PATTERNS

In the last 2 weeks, have you had ....

O1	Difficulty falling asleep?	(tick ONE box only) ☐ 1 None ☐ 2 Mild ☐ 3 Moderate ☐ 4 Severe ☐ 5 Very severe
O2	Difficulty staying asleep?	(tick ONE box only) ☐ 1 None ☐ 2 Mild ☐ 3 Moderate ☐ 4 Severe ☐ 5 Very severe
O3	Problems waking up too early?	(tick ONE box only) ☐ 1 None ☐ 2 Mild ☐ 3 Moderate ☐ 4 Severe ☐ 5 Very severe
O4	How satisfied/dissatisfied are you with your current sleep pattern?	(tick ONE box only) ☐ 1 Very satisfied ☐ 2 Satisfied ☐ 3 Moderately satisfied ☐ 4 Dissatisfied ☐ 5 Very dissatisfied

O5	**How noticeable to others do you think your sleep problem is in terms of impairing the quality of your life?**	**(tick ONE box only)** ☐ 1 Not at all noticeable ☐ 2 A little ☐ 3 Somewhat ☐ 4 Much ☐ 5 Very much noticeable ☐ 6 Not applicable
O6	**How worried/distressed are you about your current sleep problem?**	**(tick ONE box only)** ☐ 1 Not at all worried ☐ 2 A little ☐ 3 Somewhat ☐ 4 Much ☐ 5 Very much worried ☐ 6 Not applicable
O7	**To what extent do you consider your sleep problem to interfere with your daily functioning currently?** (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.)	**(tick ONE box only)** ☐ 1 Not interfering at all ☐ 2 A little ☐ 3 Somewhat ☐ 4 Much ☐ 5 Very much interfering ☐ 6 Not applicable

P. BEING A MAN

The following is a series of statements about how men might think or feel about themselves, and about what is important for men.

	Thinking about you personally, please indicate how true each statement is.	(tick ONE box only) Not at all true (1)	(2)	Somewhat true (3)	(4)	Very True (5)
P1	Being physically strong is important to me	☐	☐	☐	☐	☐
P2	Being physically able to have sex is important to me	☐	☐	☐	☐	☐
P3	I always look for the good in situations	☐	☐	☐	☐	☐
P4	I keep my feelings to myself	☐	☐	☐	☐	☐
P5	Being able to have an erection is important to me	☐	☐	☐	☐	☐
P6	I like to take action in the face of problems	☐	☐	☐	☐	☐
P7	I like to know I am looking after my partner or family	☐	☐	☐	☐	☐
P8	Having a good level of fitness is important to me	☐	☐	☐	☐	☐
P9	I am a fighter	☐	☐	☐	☐	☐
P10	If I want to achieve something I can	☐	☐	☐	☐	☐
P11	I like to know I am capable of having sex	☐	☐	☐	☐	☐
P12	I am a positive person	☐	☐	☐	☐	☐
P13	I tend not to talk about my worries	☐	☐	☐	☐	☐
P14	I need to provide financial security for my partner or family	☐	☐	☐	☐	☐
P15	Being an active person is important to me	☐	☐	☐	☐	☐
P16	I have a forward thinking mind set	☐	☐	☐	☐	☐
P17	Being able to have sex is like being able to run	☐	☐	☐	☐	☐
P18	Being able to provide for my partner or family is important to me	☐	☐	☐	☐	☐
P19	I am optimistic about the future	☐	☐	☐	☐	☐
P20	I am a competitive person	☐	☐	☐	☐	☐
P21	My approach is to get on with things	☐	☐	☐	☐	☐
P22	It's up to me to protect my partner or family	☐	☐	☐	☐	☐

Q. MEDICATIONS

Q1	**Have you taken any medications, vitamins or supplements for most of the last 4 weeks?**	**(tick ONE box only)** ☐ 1 No **(Please go to Ques Q1 Carers →)** ☐ 2 Yes ☐ 99 Don't know

Q2	**Did you take any of the following? (tick ALL that apply)**	**Please state the medical condition that this medication is treating.**
	☐ 1 Multivitamins and minerals	
	☐ 2 Multivitamins alone	
	☐ 3 Fish oil	
	☐ 4 Glucosamine	
	☐ 5 Omega 3	
	☐ 6 Paracetemol	
	☐ 7 Codeine	
	☐ 8 Aspirin	
	☐ 9 Lipitor	
	☐ 10 Avapro, Karvea	
	☐ 11 Warfarin, Coumadin	
	☐ 12 Pravachol	
	☐ 13 Coversyl, Coversyl Plus	
	☐ 14 Lasix, frusemide	
	☐ 15 Zocor, Lipex	
	☐ 16 Cardizem, Vasocordol	
	☐ 17 Micardis	
	☐ 18 Nexium	
	☐ 19 Norvasc	
	☐ 20 Fosamax	
	☐ 21 Somac	
	☐ 22 Tritace	
	☐ 23 Caltrate	
	☐ 24 Losec, Acimax (omeprazole)	
	☐ 25 Noten, Tenormin (atenolol)	
	☐ 26 Oroxine (thyroxine)	
	☐ 27 Ventolin (salbutamol)	
	☐ 28 Zyloprim, Progout 300 (allopurinol)	
	☐ 29 Diabex, Diaformin (metformin)	

(continued over page)

☐ 30 Zoloft (sertraline)	
☐ 31 Cipramil (citalopram)	
☐ 32 Efexor (venlafaxine)	
☐ 33 None of these	
☐ 99 Don't know	

Q3 ***Please list any other regular medications or supplements (that is, those taken for most of the last 4 weeks) here and the condition that they are being taken for*** *(eg hayfever, heart disease, general health etc)*:

R. CARERS

Again, thank you for your time. We have the final two sections coming up.

R1	**Do you provide long-term care at home for a parent, partner, child, other relative or friend, who has a disability, is frail, aged or who has a chronic mental or physical illness?** (Long term care is a minimum of 6 months and may extend into years)	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No **(Please go to Ques R1 Information About You ↓)**
R2	**Do you feel your caring role has affected your physical or emotional health?**	**(tick ONE box only)** ☐ 1 No ☐ 2 Yes - minor effect ☐ 3 Yes - moderate effect ☐ 4 Yes - major effect ☐ 99 Don't know

S. INFORMATION ABOUT YOU

S1	**Which of the following best describes your current marital status?**	**(tick ONE box only)** ☐ 1 Married ☐ 2 Living with a partner (defacto) ☐ 3 Widowed ☐ 4 Divorced ☐ 5 Separated ☐ 6 Never married
S2	**What is the highest level of education you have completed?**	**(tick ONE box only)** ☐ 1 Some primary school ☐ 2 Completed primary school ☐ 3 Some high school ☐ 4 Completed high school (ie Year 12, Form 6, HSC) ☐ 5 TAFE/Apprenticeship ☐ 6 Trade certificate or diploma ☐ 7 Bachelor degree or higher ☐ 8 Other *(please specify)* _____

S3	**We are interested in how income relates to lifestyle and access to health services. Before tax is taken out, which of the following ranges best describes your household's income, from all sources, over the last 12 months?**	**(tick ONE box only)** ☐ 1 Up to $12,000 ☐ 2 $12,001 - $20,000 ☐ 3 $20,001 - $40,000 ☐ 4 $40,001 - $60,000 ☐ 5 $60,001 - $80,000 ☐ 6 $80,001 - $100,000 ☐ 7 $100,001 - $150,000 ☐ 8 $150,001 - $200,000 ☐ 9 More than $200,000 ☐ 99 Don't know/not sure
S4	**Which of the following do you have?** (excluding Medicare)	**(tick ONE box only)** ☐ 1 Private health insurance - hospital only ☐ 2 Private health insurance - extras only ☐ 3 Private health insurance - hospital and extras ☐ 4 Department of Veteran's Affairs white or gold card ☐ 5 Health care concession card ☐ 6 None of these ☐ 99 Don't know/not sure
S5	**How would you best describe your family structure?**	**(tick ONE box only)** ☐ 1 A family with a child or children living with both biological or adoptive parents ☐ 2 A step or blended family ☐ 3 A sole parent family ☐ 4 Shared care parenting ☐ 5 Adult living alone ☐ 6 Adult living with partner and no children ☐ 7 Related adults living together ☐ 8 Related adults and children living together ☐ 9 Family/couples and unrelated adults/children together ☐ 10 Unrelated adults living together ☐ 11 Other *(please specify)* _____

S6	**This question is about housing. Is this dwelling ...?**	**(tick ONE box only)** ☐ 1 Owned or being purchased by the occupants ☐ 2 Rented from the Housing Trust ☐ 3 Rented privately ☐ 4 Retirement village ☐ 5 Nursing home ☐ 6 Housing supplied by employer ☐ 7 Rented through housing corporation ☐ 8 Living in accommodation not owned by occupant nor paying rent ☐ 9 Mobile home / campervan / caravan ☐ 10 Other *(please specify)* _____
S7	**Do you receive a pension or benefit?**	**(tick ONE box only)** ☐ 1 Yes ☐ 2 No (**Please go to Ques R9 →**) ☐ 99 Don't know - **Please go to Ques R9 →**)
S8	**Which pensions or benefits do you receive?**	**(tick ALL that apply)** ☐ 1 ABSTUDY / AUSTUDY/ youth / student allowance ☐ 2 Age pension ☐ 3 Bereavement Allowance ☐ 4 Carer Payment / Allowance ☐ 5 Disability Support Pension ☐ 6 Family / parenting / child care benefit ☐ 7 Mobility Allowance ☐ 8 Service or defence / War widow / Repatriation Pension ☐ 9 Sickness Allowance ☐ 10 Unemployment Benefits ☐ 11 Wife pension ☐ 12 Widow/widower pension ☐ 13 Other *(please specify)* _____
S9	**Which best describe your family's money situation?**	**(tick ONE box only)** ☐ 1 I am/We are spending more money than I/we get ☐ 2 I/We have just enough money to get me/us through to the next pay day ☐ 3 There's some money left over each week but I/we just spend it ☐ 4 I/We can save a bit every now and then ☐ 5 I/We can save a lot ☐ 99 Don't know

Thank you very much for taking the time to complete this questionnaire.
Please make sure that you have answered all the questions.

If you have any problems or questions in completing this questionnaire,
please telephone us on ☎ (08) 8313 4723.

If you would also like to help us by providing a lasting legacy
that will make a meaningful and lasting difference in the lives of others,
you can make a gift or bequest to the Florey Adelaide Male Ageing Study (FAMAS),
via The University of Adelaide.

The University is trustee of more than 400 trusts established by
gifts or bequests since its establishment in 1874.

For details on how to bestow a gift or make a bequest,
please contact the study on (08) 8313 4723

Appendix B – Descriptive Statistics of Study Participants

Table B1

Descriptive Statistics of Masculinity (MCD-I) (N=447)

Variable	*M*	Median	*SD*	Minimum	Maximum	Range
Total masculinity[a]	82.74	83	13.13	34	108	74
Strength[a]	18.09	18	3.87	9	25	16
Sexual Importance[a]	13.75	15	4.85	4	20	16
Family Responsibilities[a]	17.17	18	3.36	4	20	16
Emotional Self-Reliance[a]	6.96	7	2.02	2	10	8
Optimistic[a]	15.28	15	3.02	5	20	15
Action Based[a]	11.49	12	2.31	3	15	12

Note. M = mean; *SD* = standard deviation; MCD-I = Masculinity of Chronic Disease Inventory. Adapted from "Measuring Masculinity in the Context of Chronic Disease" by S. K. Chamber, M. K., Hyde, J. L. Oliffe, L. Zajdlewicz, A. Lowe, A. C. Wooten, and J. Dunn, 2015, *Psychology of Men & Masculinity, 17,* p. 232.

[a] The theoretical value for total masculinity, strength, sexual importance, family responsibilities, emotional self-reliance, optimistic, and action based ranged from 0 to 110, 25, 20, 20, 10, 20, and 15, respectively.

Table B2

Descriptive Statistics of Chronic Conditions of Study Participants (N=447)

Chronic Condition	***n***	**%**
Heart Attack [a]	38	8.5
Stroke [a]	10	2.2
Angina [a]	33	7.4
Transient Ischemic Attack / Mini Stroke [a]	10	2.2
Atrial Fibrillation	28	6.3
Kidney/Renal Disease	17	3.8
High Blood Pressure	227	50.8
High Cholesterol	194	43.4
Smoking Related Lung Condition (COPD, COAD, Emphysema or Bronchitis) [b]	19	4.3
Parkinson's Disease	1	0.2
Asthma	60	13.4
Enlarged Prostate/Benign Prostatic Hyperplasia (BPH)	92	20.6
Diabetes	71	15.9
Hyperthyroidism (Overactive Thyroid)	5	1.1
Hyperthyroidism (Underactive Thyroid)	6	1.3
Osteoarthritis	127	28.4
Osteoporosis	21	4.7
Gout	57	12.8

[a] Heart attack, stroke, angina, and transient ischemic attack/mini stroke are considered as coronary heart disease.
[b] COPD = Chronic Obstructive Pulmonary Disease
COAD = Chronic Obstructive Airway Disease

Table B3

Descriptive Statistics of Medication Adherence of Study Participants (N=447)

Variable	*n*	%
Number of Medications		
0	97	21.7
1	78	17.4
2	102	22.8
3	74	16.6
4	42	9.4
5	25	5.6
6	21	4.7
7	7	1.6
8	1	0.2
Types of Medication		
Multivitamins and Minerals	76	17
Multivitamins Alone	29	6.5
Fish Oil	111	24.8
Glucosamine	63	14.1
Omega 3	19	4.3
Paracetemol	109	24.4
Codeine	26	5.8
Aspirin	101	22.6
Lipitor	77	17.2
Avapro, Karvea	23	5.1
Warfarin, Courmadin	19	4.3
Pravachol	4	0.9
Coversyl, Coversyl Plus	42	9.4
Lasix, Frusemide	4	0.9
Zocor, Lipex	14	3.1
Cardizem, Vasocordol	12	2.7
Micardis	32	7.2
Nexium	32	7.2
Norvasc	2	0.4

Fosamax	3	0.7
Somac	25	5.6
Tritace	6	1.3
Caltrate	18	4.0
Acimax (Omeprazole)	10	2.2
Biten, Tenormin (Artenolol)	21	4.7
Oroxine (Thyroxine)	7	1.6
Ventolin (Salbutamol)	27	6.0
Zyloprim, Progout 300 (Allopurinol)	17	3.8
Diaformin (Melformin)	40	8.9
Zoloft (Sertraline)	6	1.3
Cipramil (Citalopram)	2	0.4
Efexor (Venlafaxine)	3	0.7
None of these above	22	4.9

Appendix C - The Number of Medication Taken for Each Education Levels and Marital Status

Table C1

Marital Status of Study Participants (N=447)

	N	*M*	*SD*	Std. Error	95% CI
Married	345	2.25	1.81	.10	[2.06,2.44]
Living with a Partner (Defacto)	33	2.06	2.01	.35	[1.35,2.78]
Widowed	13	2.62	1.50	.42	[1.71,3.52]
Divorced	27	2.04	1.79	.34	[1.33,2.74]
Separated	16	1.31	1.82	.45	[.35,.2.28]
Never Married	13	2.08	1.71	.47	[1.05,3.11]

Note. M = mean; *SD* = standard deviation; CI = confidence interval

Table C2

Highest Education Level of Study Participants (N=447) (descriptive stats of marital status vs medication adherence!!!)

	N	*M*	*SD*	Std. Error	95% *CI*
Primary School	24	2.17	1.58	.32	[1.50,2.83]
High School	143	2.18	1.86	.16	[1.87,2.49]
TAFE/Apprentices/Trade Certificate/ Diploma	197	2.23	1.82	.13	[1.98,2.49]
Bachelor Degree or Higher	69	2.10	1.76	.21	[1.68,2.52]
Other	14	2.21	2.01	.54	[1.06,3.37]

Note. M = mean; *SD* = standard deviation; CI = confidence interval

Appendix D – Assumptions of Multiple Linear Regression (With Total Masculinity)

Coefficients[a]

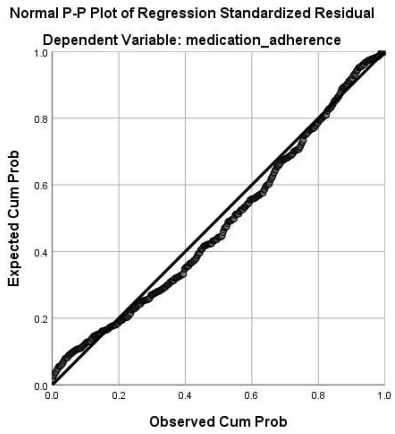
Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-3.060	.965		-3.171	.002	-4.957	-1.164		
	Age	.044	.009	.229	4.675	.000	.026	.063	.763	1.310
	Total Masculinity	-.003	.040	-.025	-.086	.932	-.082	.075	.022	45.661
	Masculinity_Strength	.006	.050	.013	.123	.902	-.092	.105	.159	6.279
	Masculinity_Sexual Importance	.018	.045	.048	.393	.694	-.071	.107	.124	8.034
	Masculinity_Family Response	-.014	.049	-.025	-.275	.783	-.111	.084	.217	4.614
	Masculinity_Optimistic	.025	.057	.042	.442	.659	-.088	.138	.198	5.047
	Masculinity_Action Based	-.047	.065	-.060	-.719	.473	-.175	.081	.265	3.773
	Perceived Need	.066	.021	.158	3.201	.001	.026	.107	.750	1.334
	Actual Need	1.028	.167	.278	6.144	.000	.699	1.357	.894	1.119

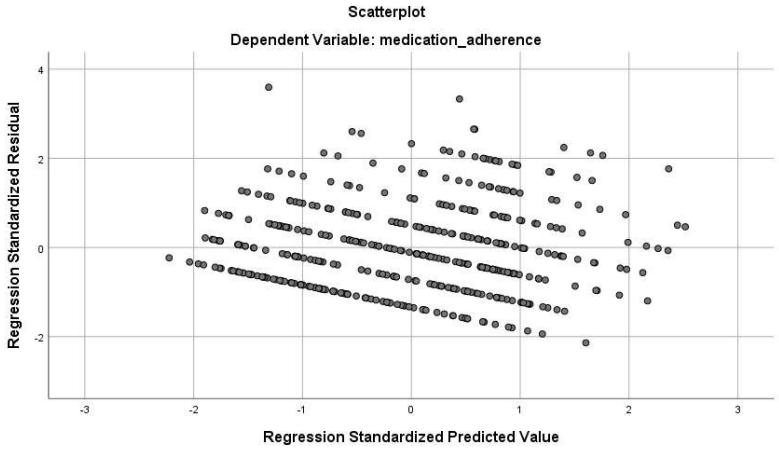
a. Dependent Variable: medication_adherence

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.3805	4.2413	2.1924	.81411	447
Residual	-3.49760	5.87525	.00000	1.61818	447
Std. Predicted Value	-2.226	2.517	.000	1.000	447
Std. Residual	-2.140	3.594	.000	.990	447

a. Dependent Variable: medication_adherence


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: medication_adherence
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: medication_adherence
Regression Standardized Residual
Regression Standardized Predicted Value
4
2
0
-2
-3
-2
-1
0
1
2
3

Appendix E – Assumptions of Multiple Linear Regression (Without Total Masculinity)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-3.065	.962		-3.184	.002	-4.956	-1.173		
	Age Group	.044	.009	.228	4.680	.000	.026	.063	.764	1.308
	MASCULINITY_STRENGTH	.003	.028	.005	.093	.926	-.052	.057	.522	1.915
	MASCULINITY_SEXUALIMPORT	.014	.020	.038	.715	.475	-.025	.054	.634	1.576
	MASCULINITY_FAMILYRESPONSE	-.017	.027	-.032	-.635	.526	-.070	.036	.725	1.380
	MASCULINITY_OPTIMISTIC	.022	.037	.036	.583	.560	-.051	.094	.475	2.107
	MASCULINITY_ACTIONBASED	-.050	.051	-.064	-.980	.328	-.151	.050	.426	2.346
	Perceived Need	.066	.020	.157	3.248	.001	.026	.106	.778	1.285
	Actual Need	1.028	.167	.278	6.151	.000	.700	1.357	.895	1.118

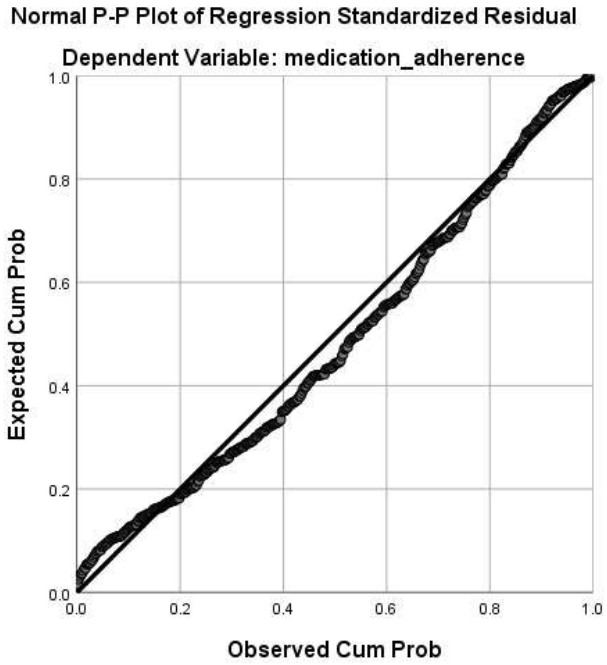
a. Dependent Variable: medication_adherence

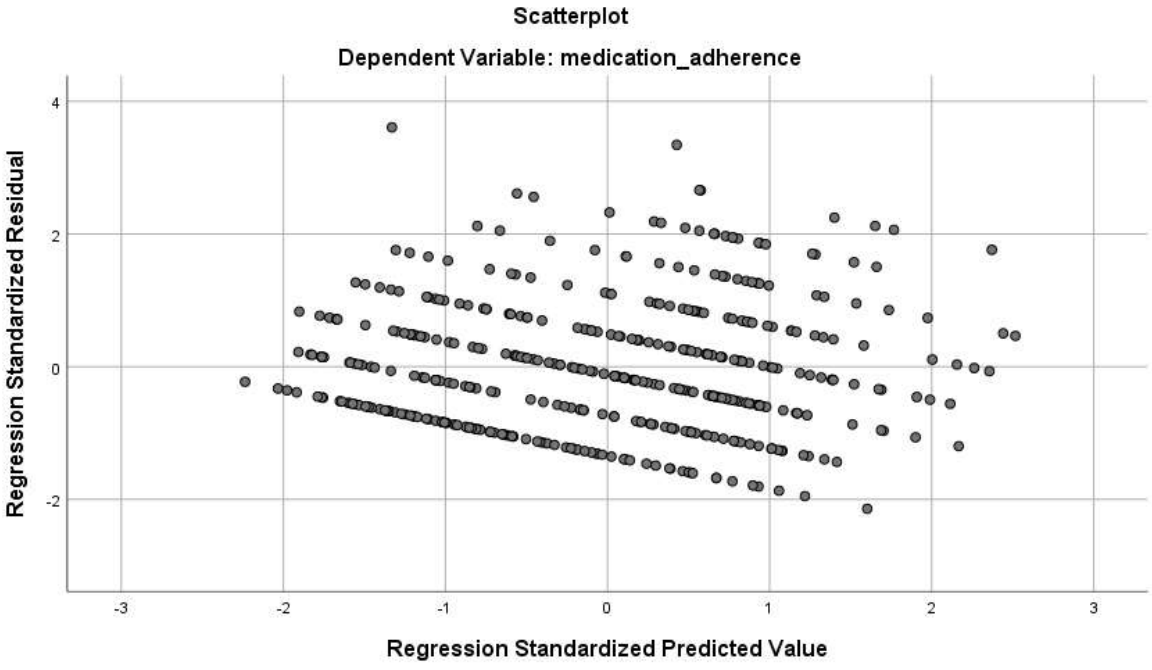
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.3720	4.2409	2.1924	.81408	447
Residual	-3.49669	5.89059	.00000	1.61820	447
Std. Predicted Value	-2.236	2.516	.000	1.000	447
Std. Residual	-2.141	3.607	.000	.991	447

a. Dependent Variable: medication_adherence

Charts


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: medication_adherence
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: medication_adherence
Regression Standardized Residual
Regression Standardized Predicted Value
4
2
0
-2
-3
-2
-1
0
1
2
3