Characteristics of Frequent General Practice Users among Middle-Aged to Elderly Australian Men and the contribution of Bodily Pain

This thesis is submitted in partial fulfilment of the Honours degree of Bachelor of Psychological Science

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Contents

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Abstract

Background: It is well established that men's health care use, needs and preferences differ to that of women. Identifying the characteristics of men who frequently use health care may provide useful insight for developing strategies that address the health needs of men whilst optimising their service use. Emerging research has demonstrated clear links between chronic health conditions and increased health care use among men. Less is known about how bodily pain factors may contribute to men's help-seeking behaviours. **Aims:** To (a) explore the characteristics of frequent general practice (GP) use in middle-aged to elderly Australian men, and (b) quantify the contribution of bodily pain to frequent GP use. **Method:** Data were extracted from the Men Androgen Inflammation Lifestyle Environment and Stress (MAILES) longitudinal cohort study. Covariates were classified using the Andersen Behavioural Model (ABM) of Health Services Use. Hierarchical binary logistic regression analyses were used to develop a predictive model of frequent GP use. **Results:** Of the 1904 men (*M age*=59.6 years), 664 (35%) classified as frequent users of general practice, defined as ≥5 visits per year. Older men (*OR*=1.06), and men with multimorbidity (*OR*=2.05), diagnosed depression (*OR*=1.98) and bodily pain interference (*OR*=2.14) were significantly more likely to be frequent users. Men who were partnered (*OR*=0.73) or employed (*OR*=0.43) were significantly less likely to be frequent users. After controlling for predisposing characteristics, enabling resources and need factors, bodily pain factors were found to make a unique contribution to frequent GP use. **Conclusion:** Men are predominantly driven to frequently visit the doctor on a 'needs' basis, potentially signifying missed opportunities for preventative health care. Pain risk assessments and screening tools may be useful to optimise existing treatment management and to identify pain before it begins to interfere with daily life.

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no materials 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.

September 2022

Contribution Statement

In writing this thesis, my supervisor and I collaborated to generate the research questions and measures of interest, using a pre-existing dataset from the Men Androgen Inflammation Lifestyle and Stress (MAILES) cohort study. I conducted the literature search, completed the data analysis and wrote up all aspects of the thesis.

The Characteristics of Frequent General Practice Users among Middle-Aged to Elderly Australian Men and the contribution of Bodily Pain

Overview

In Australia, men have higher accounts of life-threatening health adversities, such as obesity, cancer, cardiovascular disease and suicide, with the median lifespan being six years below that of women (Australian Institute of Health and Welfare, 2019a; AIHW; 2022). Men's poorer health outcomes have been evidenced in most developed countries (Mansfield et al., 2005; Rovito et al., 2017). Earlier commentary tends to attribute these health disparities to men's lower engagement with health care compared to women (Addis & Mahalik, 2003; Hale et al., 2010); framing men as reluctant users of health care.

While men's help-seeking behaviours may contribute, recent research has highlighted the lack of consideration towards men's needs and preferences in current practice and policy (Galdas, 2013; Robertson et al., 2008). Practical matters such as time constraints due to work and family commitments, inconvenient clinic locations and feminine primary care environments have been recognised as barriers impeding men's use (Caperchione et al., 2012; Galdas, 2013). As a result, men who frequently attend health care services represent a relatively smaller grouping (Witty et al., 2011). Despite this, men with frequent use may offer new insight into the drivers of men's health care access from a different perspective, which may further highlight where current practices are falling short.

General Practice

In an Australian context, general practice (GP) use is a particularly important maker of health care utilisation as the predominant role of the practitioner is to manage the overall health of the patient (Ng et al., 2020). General practitioners are considered the entry-level to the health care system, as well as the gatekeepers to other/specialist health services through referral (Gordon et al., 2022). General practice services are either bulk-billed or subsidised by

the Australian Medicare Benefits Schedule (MBS; Department of Health and Aged Care, 2019) as a way of enhancing accessibility to health care for all Australian citizens. General practitioners are the most visited health providers in Australia where most Australians will see a general practitioner at least once in a given year (AIHW, 2019b). Between 2020-21, 81% of Australian males had seen a GP in the preceding year (AIHW, 2022).

Frequent General Practice Use

The average number of visits to the general practitioner per capita appear to be increasing annually in the general Australian population (ABS, 2021), as well as in Australian men (Britt et al., 2016; NPS MedicineWise, 2018). Part of this increase may be attributed to the rise of frequent attenders. Reports by The National Health Performance Authority in 2012-13 classified 35.3% of the Australian population as above average (6+ visits) users of GP services (AIHW, 2015). Similarly, a study by Wright et al. (2018) found 31% of their Australian sample attended a GP between 4 and 11 times in the 12-month period. Individuals who frequently use health care have been shown to have high incidences of illness, psychological problems and social issues, placing undue burdens on health care systems (de Waal et a., 2008; Vedsted & Christensen, 2005). In a GP setting, frequent attendance has been associated with increased costs and enhanced workload for practitioners (Vedsted & Christensen, 2005). From a patient perspective, frequent GP use may suggest they are not receiving adequate or appropriate treatment (Bellón et al., 2008). Hence, the importance of identifying the characteristics of frequent users does not lie solely with patient outcomes, but also with the wellbeing of health care providers and the overall functionality of the wider health care system (Maruster et al., 2021).

Men and Health Care Use

Available literature focusing on the features of men who *do* go to the doctor have highlighted the association between chronic conditions and increased service use, suggesting

that men become 'responsible' users of health care when given a diagnosis. For example, a large-scale Australian study (*N*=13763) by Schlichthorst et al. (2016) found that men with comorbidities or on pain medication were more likely to have visited a GP in the last 12 months. Another recent analysis by Ng et al. (2020) found that Australian men with chronic conditions comorbid with cardiovascular disease were more likely to have 10 or more GP visits in the preceding year, compared to other multimorbidity patterns. Of the total sample, 33.8% of men with comorbid anxiety and depression symptoms also had 10 or more annual visits to the GP. For common conditions such as depression and cardiovascular disease, men have also been shown to exhibit similar patterns of use to women once diagnosed (Wang et al., 2013).

Pain

Another potential health-related factor which may be common in men who use health care frequently is pain. Individuals with complex health profiles, such as multimorbidity, have been shown to experience increased levels of pain (Morrisey et al., 2014; Peng et al., 2020). Pain also plays a significant role in several male-specific conditions, such as prostate cancer and prostatitis (Keogh, 2015). Further, a growing body of research has demonstrated that individuals with depression and anxiety commonly experience somatic symptoms, including medically unexplained pain (Agüera-Oritz et al., 2010; Keogh et al., 2006). For example, a study of US patients with a diagnosis of major depression (*N*=573) found that 67% of the sample had complained of general aches and pains (Bair et al., 2003). Men have also been shown to somatise emotional problems, especially depression, more than women (Holden et al., 2006; Martin et al., 2013).

There is much debate around whether pain is a symptom of disease or a condition itself (Clauw et al., 2019; Treede et al., 2019). Classifying pain is not straightforward in that the pathophysiologic mechanisms, duration and severity may differ across individuals (Raja

et al., 2020). Regardless of its origins, pain is a widespread problem with projections that one in five adults suffer from some degree of body pain globally (Goldberg & McGee, 2011). In Australia, recent ABS data revealed a total of 68.2% of men experienced bodily pain and a further 58.4% of men stated their bodily pain interfered with work (ABS, 2022). Given the prevalence and diversity of pain experience, exploring the role of pain may be particularly relevant in the context of men who use health care.

Pain and Health Care Use

Much of the research about pain and health care use tends to focus on clinically significant chronic or musculoskeletal pain. These studies have identified clear links between pain factors and increased service use (Emilson et al., 2020; Jonsdottir et al., 2015; Lentz et al., 2020; Mann et al., 2016). Although diagnosed pain-related conditions may directly increase health service use through treatment and condition management, the influence of pain broadly on men's patterns of help-seeking is not well understood. In terms of pain management, men have reported the use of distraction-type or avoidant approaches (Keogh & Eccleston, 2006), as well as alcohol and pain-medication use as coping strategies (Brennan et al, 2011). Some literature is inclined to suggest that the expression of pain may conflict with the influences of traditional masculine roles (Bernardes & Lima, 2010); however, there is currently no empirical evidence to suggest that masculinity directly determines rates of health care attendance. Nevertheless, whether pain contributes to health care utilisation among men, to any extent, requires further clarification.

Pain Definition

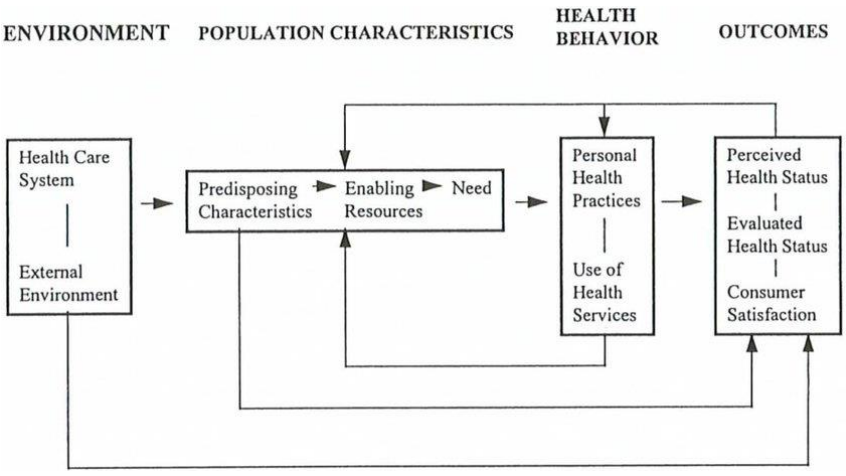
The current definition by the International Association for the Study of Pain (IASP, 2020) describes pain as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage". In this definition, pain is accepted as a subjective, personal experience with biological, psychological and social

variation. As aforementioned, pain can present in a variety of ways. Hence, considering pain solely as a condition may exclude or neglect other experiences of pain that do not fit clinical criterion. Alternatively, bodily pain as conceptualised by the IASP definition may better capture the incidence of pain in a given population.

The Andersen Behavioural Model of Health Services Use

Men's relationship with their health and subsequent service use is complex and a variety of demographic and sociocultural factors may also contribute to the forming of these patterns. The Andersen Behavioural Model (ABM) of Health Services Use (Andersen, 1968) is a popular theoretical framework used to explain covariates associated with health service use. It has been applied to research of various subgroups of men: including men with hypertension in the United States (Hirshfield et al., 2018), men who are HIV-positive in China (Lin et al., 2022), and African American men from Indiana who visit the dentist (Stapleton et al., 2016). Since its first development, the model has undergone several revisions for adaption across various different groups and contexts; however, the 1973 and 1995 editions remain the most commonly reported (Willet et al., 2018). As depicted by the model in Figure 1, the uptake of a health service is predicted by an individual's *predisposition* to utilise health services, the *enabling* resources that facilitate and provide access to such services, and the overall *need* for health care access (Andersen, 1995).

Figure 1: The Andersen Behavioural Model (ABM) of Health Services Use (Andersen, 1995)



When the relative effects of each component of the model are compared, need factors have been recognised as the strongest drivers for health care utilisation in studies of men (Hirshfield et al., 2018; Lin et al., 2022). A recent systematic review (*n*=10) of the general population found that increased need factors were associated with higher use of health care across all of the 10 studies, whereas predisposing and enabling factors evidenced mixed effects (Hajek et al., 2021). Other studies have also noted inconsistent effects of predisposing characteristics and enabling resources; however, they are believed to differ especially across socioeconomic status (Lindamer et al., 2012; Stein et al., 2012; Schomerus et al., 2013).

The following subsections will explore the efficacy of the ABM, in the context of frequent general practice use among men. Due to a paucity of research focused on men, for some commonly studied variables considered within the ABM, literature of the wider- and international population will also be reviewed.

Predisposing Characteristics

Predisposing characteristics represent an individual's predisposition to utilise health services when a medical need presents (Andersen, 1995). These characteristics are based on personal attributes including demographic factors such as gender and age, and social factors like marital status and education level (SoleimanvandiAzar et al., 2020).

Age. Numerous studies have found an association between older age and increased use of health services in the broader population (Hing et al., 2006; Liu et al., 2014; Mustonen et al., 2019). Older people tend to experience unique physical and general health decline as they age, resulting in a heightened need for medical care (Atella et al., 2018; Reciherd et al., 2015). Moreover, multimorbidity and pain are more prevalent in elderly populations, further increasing this demand (Morrisey et al., 2014; Willet et al., 2018). In the context of men, several studies have reported increased health care use among older men (Harrison et al., 2019; Holden et al., 2006; Robertson et al., 2012). However, a contradicting finding by

Schlichthorst et al. (2016) reported that, while odds of visiting a GP increased with increasing age, older men were less likely to visit a GP compared to younger men when age was categorised.

Marital Status. A substantial amount of literature supports a significant association between marital status and health service use in the wider population; however, the direction of this association appears to differ across cultures (Babitsch et al., 2012). Data about Western heterosexual men suggest that partnered men are significantly more likely to visit a GP compared to unpartnered men (Doherty & Kartalova-O'Doherty, 2011; Holden et al., 2006; Schlichthorst et al., 2016). For these men, marriage has also been shown to improve mental health, general health, overall life satisfaction and can even increase life expectancy (Jia & Lubetkin, 2020; Manzoli et al., 2007; Simon, 2002). These factors, combined with women's tendency to advocate for health regulation and preventative care (Thoits, 1992), may suggest that partnered men are more willing to engage with health care services than unpartnered men.

Education. Higher education tends to be associated with a greater likelihood to utilise health services in the general population (Frølich et al., 2019; Hammer et al., 2013; Montiel et al., 2022). Higher education has also been shown to increase self-rated health and even increased lifespans, compared to individuals with lower education (Raghupathi & Raghupathi, 2020). However, the explanations for these associations are not clear. In men, higher education has also been shown to increase health service use (Doherty & Kartalova-O'Doherty, 2011; Schlichthorst et al., 2016). Contrarily, in two studies that focussed on increased GP use among men, no significant association between higher education and frequent use was reported (Holden et al., 2006; Ng et al., 2020).

Enabling Resources

Following an individual's predisposition to use health care, enabling resources

are the facilitating factors of health service access (Travers et al., 2020). They often encompass socioeconomic factors such as employment status, income and health insurance (SoleimanvandiAzar et al., 2020).

Employment Status. Employment disparities in health care utilisation have been noted in research, though the direction of this relationship tends to differ across studies. Generally, unemployed people have been shown to have higher incidences of mental illness and poorer health than the employed and thus, present a greater need for health care (Brand, 2015; Norström et al., 2019). Among men, significant associations between increased GP consultation and unemployment or retirement have been noted (Ng et al., 2020; Wallman et al., 2004). However, Schlichorst et al. (2016) found increased odds of consulting with a GP among men who were in employment; though, this was only present in the younger age group (18 to 34 years).

Income. Income is understood to be one of the most significant determinants of health care utilisation in broader populations and international studies (Geitona et al. 2009; van der Heyden et al., 2003). Among men, the relationship varies. Ng et al. (2020) identified low-income earners as frequent users of GP services, whereas Schlichthorst et al. (2016) reported reduced odds for regular GP check-ups among 35 to 55-year-old Australian men who experienced financial difficulties. Generally, income-related health disparities and financial barriers have been shown to impede service use, despite the imminent need for health care (Pharr et al., 2011). However, these financial barriers are recognised to differ depending on socioeconomic status and the context of the health care system (Walker et al., 2004).

Need Factors

Need factors reflect the health status of the individual (Travers et al., 2020). These factors are often the medical reason for health service use and for many individuals, they may

cooccur. According to Andersen (1995), need factors are either perceived by the individual or evaluated by the health care professional.

Multimorbidity. Clear associations have been reported between multimorbidity and increased health care utilisation in the broader population (Bähler et al., 2015; Cassell et al., 2018; Palladino et al., 2016; Quinaz Romana et al., 2020; Zulman et al., 2015). In Australia, multimorbidity is often managed in general practice (Willet et al., 2018), which may directly relate to increased engagement with such services. Among the few male-specific studies, men with multimorbidity have been shown to use health care more frequently than those with one or no chronic conditions (Ng et al., 2020; Robertson et al., 2012).

Anxiety and Depression. Although there has been a modest increase in the utilisation of mental health services for men in Australia overall (Harris et al., 2015), men are largely seen as reluctant to seek help predominantly for their mental health-related problems (Gulliver et al., 2010; Seidler et al., 2016). However, in cross-sectional studies, associations between anxiety and depression symptoms with increased primary care use have been noted among men (Hawkins et al., 2019; Martin et al., 2021; Ng et al., 2020). These patterns have also been observed among both depression and anxiety symptoms in the general population (Farrer et al., 2018; Saini et al., 2019). Additionally, when anxiety and depression exist comorbidly with one another or with another physical morbidity, they have also been recognised to increase health care use (Egede et al., 2002; Newman et al., 2018).

Bodily Pain. In the broader population, pain intensity (Lentz et al., 2020) and 4-week change in pain intensity (Lentz et al., 2018) have been linked to increased use of services for diagnosed pain-related conditions. Pain interference with life and pain-related disability have also been associated with increased pain-related health service use (Blyth et al., 2004; Jonsdottir et al., 2015; Lentz et al., 2018; Lentz et al., 2020). While research surrounding men's pain and service use is limited, qualitative research by O'Brien et al. (2005) found that

men commonly endured their pain and were reluctant to consult with a medical professional unless until the pain surpassed an 'acceptable threshold' or they were seriously injured. However, this mentality mainly affected younger men.

Current Study

Exploring the characteristics of men who frequently utilise general practice may offer valuable insights in terms of the underlying health and service needs of men, and whether current practices are adequately responding to these needs. This may be especially important in the face of men's poorer health outcomes, compared to women. Recent studies have highlighted that men show active engagement with health services upon chronic disease diagnoses, however, the extent to which pain interacts with these conditions and help-seeking behaviours in general requires clarification. Given these knowledge gaps, this study builds on previous literature of male help-seeking behaviours through the lens of a unique subset of men who defy the stereotypes claiming men as disengaged with their health. This research contributes to an important area aiming to ultimately optimise men's health service use to benefit both men as the consumers and the functionality of the providing health care systems.

Project Aims

This study has four aims:

1. Examine the characteristics of frequent users (versus low users) of general Practice (GP) in a sample of middle-aged to elderly urban-dwelling men.
2. Using the Andersen Behavioural Model (ABM) of Health Services Use (Andersen, 1995), investigate the association of predisposing characteristics, enabling resources and need factors with frequent GP use in men. Thus, it is hypothesised that:
    - When considered comparatively, *need factors* (multimorbidity, anxiety, depression, bodily pain severity and interference) will contribute to frequent

GP use over and above predisposing characteristics (age, marital status, education level) and enabling resources (employment status, income).

- Due to the inconsistent literature available about men's health care utilisation, a *combination* of the reviewed variables within the ABM will predict frequent GP use.

3. Determine the contribution of bodily pain to frequent GP use among men. Thus, it is hypothesised that:
    - *Bodily pain factors* (bodily pain severity and interference) will contribute to frequent GP use over and above predisposing characteristics (age, marital status, education level), enabling resources (employment status, income) and need factors (multimorbidity, anxiety, depression).
4. If bodily pain factors contribute uniquely to frequent GP use, explore the health characteristics of men with bodily pain severity and interference who are frequent GP users.

Chapter 2: Methods

Study Design

MAILES Dataset. Data were extracted from the Men Androgen Inflammation Lifestyle Environment and Stress (MAILES) cohort study. The MAILES study involves longitudinal data collection on a comprehensive range of demographic, biometric, physical health, psychosocial, quality of life and health-service usage information about men (Grant et al., 2014). The data pool consists of a combined cohort of participants from the Florey Adelaide Male Ageing Study (FAMAS) and the North West Adelaide Health Study (NWAHS). The first wave (MAILES1) was initiated between 2002-06, consisting of FAMAS Wave 1: 2002-05 and NWAHS Wave 2: 2004-06 men. MAILES1 involved questionnaire distribution and clinical data collection, which continued to occur at major stages approximately every 5-years from baseline. A full description of the cohort profile and the harmonisation process are detailed in Grant et al. (2014).

The Present Study. This study used data from the second wave (MAILES2), containing data from the FAMAS Stage 2: 2007-10 and NWAHS Stage 3: 2008-10 cohorts.

Participants and Procedures

The MAILES study represents a sample of 2569 community-dwelling men, aged 35 to 80 years at baseline (MAILES1; FAMAS Wave 1: 2002-05 and NWAHS Wave 2: 2004-06). Using telephone numbers from the Electronic White Pages, residential households were contacted to assess for eligibility. Participants were eligible if they were: 1) male; 2) aged 35 to 80 years at recruitment; and 3) apart of a household with a landline telephone listed in the Electronic White Pages. Participants were excluded if they were: 1) non-English speaking; 2) unable to understand the study or had physical or mental conditions which disabled their communication abilities and capability to attend clinics; and 3) resided outside the study zone or in an aged care facility. The initial recruited sample were described as middle to elderly-

aged Caucasian men residing in the North-West Adelaide region (Grant et al., 2014). Of the men at baseline, approximately 50% were aged 45 to 64 years, 66% were born in Australia, 74% were married or living with a partner, 48% were employed full-time and 52% completed a certification at the trade/diploma level (Grant et al., 2014).

Participants from the baseline population of both the FAMAS and NWAHS cohorts were contacted approximately 5 years after their respective clinic visits and were invited to the next stage of data collection, representing MAILES2. Within the duration between MAILES1 and MAILES2, 99 died, 39 could not participate due to illness, 141 completely withdrew before being initiation of MAILES2, 169 refused participation due to personal reasons and 77 were untraceable due to lost contact details (n=525; Grant et al., 2014). Thus, 2038 participants from baseline remained at MAILES2.

MAILES2 consisted of a Computer Assisted Telephone Interview (CATI) and questionnaire surveys, as well as a biomedical examination during a clinic visit. A total of 1,904 participants (93.5%) completed questions relating to self-reported general practice utilisation, representing the final sample size for this study.

Measures

Demographics. Participant date of birth was collected at baseline (MAILES1) and age (continuous) was calculated and transferred across each subsequent wave. Marital status, highest education level completed, employment status and household annual income variables were collected at MAILES2.

Frequent General Practice Use. Data for general practice use were collected via a self-reported health service utilisation questionnaire. Participants were asked the number of times they visited a general practitioner the past 12 months in South Australia. The frequency of GP visits was categorised into two groups: low use (below average; 0-4 visits) and frequent use (~above average; 5+ visits). Frequent use was based on the National Health

Performance Authority classification system by the Australian Government (National Health Performance Authority, 2015).

Anxiety. Anxiety was assessed using a self-reported question, "Have you been told by a doctor or mental health professional (MHP) that you have anxiety (in the last 12 months)?". Answers were either "Yes" or "No".

Depression. Depression was assessed using a self-reported question, "Have you been told by a doctor or a mental health professional (MHP) that you have depression (in the last 12 months)?". Answers were either "Yes" or "No".

Multimorbidity. Chronic disease data were collected through a self-reported questionnaire. Participants were presented with a list of chronic conditions (cardiovascular disease, asthma, diabetes, osteoarthritis, rheumatoid arthritis) and asked, "Have you ever been told by a doctor that you have any of the following conditions?". Answers ranged from "Yes" to "No". For FAMAS participants, prostate cancer was also included in this list. However, for NWAHS participants, data about prostate cancer was extracted from a text response to the question "Have you had any major health events in the past 5 years?". For both cohorts, diabetes was further verified through biomedical measures, including fasting blood glucose (≥7.0 mmol/L) and/or HbA1c ≥6.5 (Ng et al., 2020). Obesity was classified by measured waist circumference (≥100 cm) at the clinic visit. Answers concerning each condition were summed and then dichotomised to define the multimorbidity variable, where number of conditions ≥2 indicated multimorbidity (Yes) and number of conditions <2 determined no multimorbidity (No).

Bodily Pain. Bodily pain data were collected using the bodily pain subscale in the Short Form 36 Health Survey Questionnaire (SF-36: Ware et al., 1994). The SF-36 is a robust and widely recognised quality-of-life and health status measure (Burholt & Nash, 2011). The SF-36 relies on self-reporting across eight domains of health, including the two-item bodily

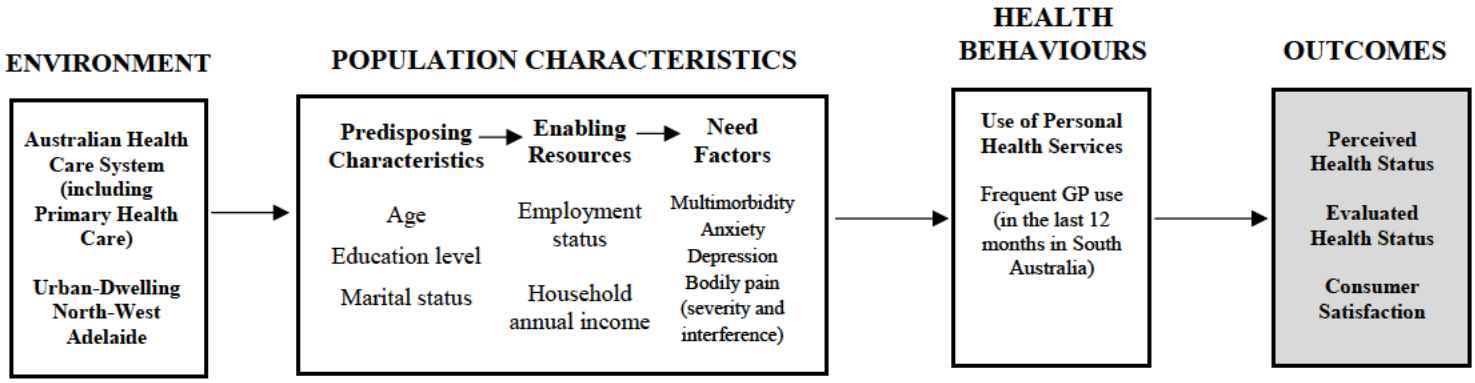
pain (BP) scale. The first item assesses pain severity in the past 4 weeks: “How much bodily pain have you had during the past 4 weeks?”. Item options are on a 6-point Likert scale ranging from 1 = None to 6 = Very severe. The second item assesses pain interference in the past 4 weeks: “During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?”. Item options are on a 5-point Likert scale ranging from 1 = Not at all to 5 = Extremely. Raw scores were used to categorise participants into groups of no bodily pain presence (1=None) or any bodily pain presence (>1/None), and no bodily pain interference (1=Not at all) or any bodily pain interference (>1/Not at all), as guided by the ABS (2022). Good internal consistency was observed across the two bodily pain items ($\alpha = .86$).

Theoretical Framework

This study adopted The Andersen Behavioural Model (ABM; 1995) to conceptualise the factors associated with health care utilisation among this sample of men. The study variables were selected and grouped in accordance with the model (predisposing characteristics, enabling resources and need factors), representing the predictors associated with a health behaviour. The 1995 version of the ABM also includes an environmental component. Environmental factors represented the wider context with which the individuals resided, including the health care system and their external environment. Data collected in this study were within the context of the Australian health care system, specifically focussing on primary care, where all participants resided in the metropolitan North-West of Adelaide. Thus, these environmental factors were held constant. The final components of the model are the outcomes: the ‘health behaviour’ (whether or not the health service was used), and ‘outcomes’ (perceived and evaluated health status, consumer satisfaction). This study did not assess beyond the health behaviour component of the model that is represented by frequent GP use.

As shown in Figure 2, the model suggests a causal pathway between the three core factors (predisposing characteristics, enabling resources, need factors) which ultimately results in the uptake of a health service (Chen & Gu, 2022). Although the model appears to be ordered sequentially, each variable within the three core factors can act independently on the outcome variable and influence usage.

Figure 2: The Andersen Behavioural Model (ABM) of Health Services Use (Andersen, 1995) with included study variables



Statistical Analysis

All analyses were conducted using IBM SPSS Statistics, Version 28.0.1.0 (142). Tabachnick and Fidell (2007) suggest that data missing at a rate greater than 5% should be assessed for randomness. Missing data (mean 6.14% across all variables and controls) were analysed using Little's Missing Completely at Random (MCAR) test (Little, 1988). The test showed a non-significant result $\chi^2(df = 1) = .010$ ($p > .05$), confirming data to be missing completely at random. In accordance with Jakobsen et al. (2017), the outcome variable was not imputed and missing cases were excluded for complete case analysis. Missing predictor data were imputed using Multivariate Imputations by Chained Equations (MICE; van Buuren & Groothuis-Oudshoorn, 2011). The MICE algorithm handles missing data through a principled method by generating multiple imputations based on information from non-missing data of other variables (Azur et al., 2011). Except for the variable age that had no

missing data, five imputations were generated for each missing predictor variable. Complete case analysis was applied for the statistical analysis with the imputed dataset, based on the participants who completed the self-reported GP use questionnaire (N=1904).

Descriptive statistics of continuous (means, standard deviations) and categorical (frequencies, percentages) variables across the two GP use groups (low versus frequent) were generated with the imputed data to summarise the nature of the data. Welch's independent samples *t*-tests and chi-square tests of independence were calculated to compare the demographic and population characteristics between the two groups. As age violated the assumption of normality for a Welch's independent samples *t*-test and the assumption of symmetry for the Mann-Whitney *U* test, the age variable was transformed in order to run the *t*-test, as informed by Pallant (2020). For the purpose of interpretation of the chi-square output, categorical variables with 3 or more levels were recoded so that they were binary variables. Education was recoded such that 0 = other (up to high school) and 1 = additional studies (certification/diploma, trade/apprenticeship, bachelor degree or higher). Employment was recoded such that 0 = other (other, student, unemployed, retired) and 1 = employed. Household income was dichotomised based on receiving approximately below or above the 2009-2010 median Australian annual household income of $61,000 (ABS, 2013). Hence, 0 = up to $60,000 (below median) and 1 = >$60,000 (above median).

Next, a hierarchical binary logistic regression was conducted to predict frequent use of GP visits. Assumptions were first assessed using Q-Q plots to check for outliers and violation of normality. Violation of multicollinearity ($r \geq 0.80$) was checked using correlation matrices. All assumptions were met.

The binary versions of each categorical predictor variable and age (continuous) were entered into the regression in three blocks to produce three regression models in alignment with the ABM. Predisposing characteristics were entered in Regression Model 1.

Predisposing characteristics and enabling resources were entered in Regression Model 2. Lastly, predisposing characteristics, enabling resources and need factors were entered in Regression Model 3.

To evaluate the unique contribution of bodily pain to frequent GP use, the addition of the two bodily pain items were assessed using another hierarchical binary logistic regression. Each of the categorical predictor variables (binary) together with age (continuous) were entered into the regression in the same method as above; however, the two bodily pain variables were removed from Regression Model 3 and added in as a separate step in Regression Model 4. Regression Model 4 included predisposing characteristics, enabling resources, need factors and bodily pain factors.

Lastly, the sub-analyses involved chi-square analyses of the health characteristics (multimorbidity, anxiety, depression) of (i) men with and without bodily pain severity in the frequent GP use group, and (ii) of men with and without bodily pain interference in the frequent GP use group.

For all analyses, statistical significance of findings was achieved when $p < .05$ or when the 95% confidence intervals related to odds ratios did not contain zero.

Ethics

Ethics approval for the MAILES study was granted from the Human Research Ethics Committees (HRECs) from the Queen Elizabeth Hospital (approval number: 2010054) for the NWAHS and the Royal Adelaide Hospital HREC (approval number: 020305) for the FAMAS.

Chapter 3: Results

Participant Demographics and Characteristics

Table 1 shows the descriptive statistics for the 1904 participants. Men in the sample ranged from 38 to 85 years (*M*=59.6, *SD*=11.5) and were mostly married or in a de facto relationship (78%). The majority of men were employed (56%) or retired (37%). The most common level of education completed was a certificate or diploma (33%), or up to high school (28%). The household annual income bracket with the highest proportion of men was $20,001 to $60,000 (45%), with the majority of men in this sample receiving below the median (<$60,000) household annual income (59%). Approximately one-third of men had multimorbidity (32%). However, most men did not have diagnosed anxiety (93%) or diagnosed depression (90%). Over three-quarters of men experienced at least 'very mild' symptoms of bodily pain (77%) and almost half experienced at least 'a little bit' of interference from bodily pain (49%).

Comparison Between Low and Frequent Use of General Practice

Over one-third (35%) of men in the total sample were considered frequent GP users (≥5 GP visits in the preceding year). The independent samples *t*-tests and chi-square test results comparing the demographic variables and characteristics of men with low and frequent GP use is also shown in Table 1.

Predisposing Characteristics. Men had significantly higher mean age in the frequent use group than in the low use group. A significantly smaller proportion of men were married or in a de facto relationship in the frequent use group, than in the low use group. A significantly smaller proportion of men had completed additional studies (other than up to high school) in the frequent use group, than in the low use group.

Enabling Resources. Men with frequent GP use had significantly lower rates of employment compared to the low use group. A significantly smaller proportion of men with

Table 1. Characteristics of Participants by GP Use Group and Independent Samples *t*-test/Chi-Square Results (*N*=1904)

	Low use (0–4 GP visits) (*n*=1240) (65.1%)		Frequent use (5+ GP visits) (*n*=664) (34.9%)		Total (*N*=1904)		t/X^2	*p*	Cohen's *d*/ Cramer's *V*
Participant variables	*M/n*	*SD/%*	*M/n*	*SD/%*	*M/n*	*SD/%*			
Age* (in years)	57.0	10.8	64.5	11.1	59.6	11.5	-14.03	<.001	.709
Marital status							8.44	.004	.067
Not partnered	251	20.2	173	26.1	424	22.3			
Partnered	989	79.8	491	73.9	1480	77.7			
Education level							7.61	.006	.063
Up to high school	322	26.0	212	31.9	534	28.0			
TAFE/Apprenticeship/trade	295	23.8	160	24.1	455	23.9			
Certification/diploma	423	34.1	211	31.8	634	33.3			
Bachelor's degree or higher	200	16.1	8	12.2	281	14.8			
Employment status							203.31	<.001	.327
Employed	837	67.5	222	33.4	1059	55.6			
Unemployed	26	2.1	10	1.5	36	1.9			
Retired	326	26.3	369	55.6	695	36.5			
Other	51	4.1	63	9.5	114	6.0			
Household annual income							113.72	<.001	.244
Up to $20 K	119	9.6	157	23.6	276	14.5			
$20—$60 K	508	41.0	346	52.1	854	44.9			
$60—$80 K	185	14.9	81	12.2	266	14.0			
>$80 K	428	34.5	80	12.0	508	26.7			
Below median (<$60 K)	627	50.6	503	75.8	1130	59.3			
Above median (>$60 K)	613	49.4	161	24.2	774	40.7			
Multimorbidity							128.14	<.001	.259
No	958	77.3	345	52.0	1303	68.4			
Yes	282	22.7	319	48.0	601	31.6			
Anxiety							28.46	<.001	.122
No	1180	95.2	588	88.6	1768	92.9			
Yes	60	4.8	76	11.4	136	7.1			

Table 1 (continued). Characteristics of Participants by GP Use Group and Independent Samples *t*-test/Chi-square Results (*N*=1904)

	Low use (0–4 GP visits) (*n*=1240) (65.1%)		Frequent use (5+ GP visits) (*n*=664) (34.9%)		Total (*N*=1904)		t/X^2	*p*	Cohen's *d*/ Cramer's *V*
Participant variables	*M/n*	*SD/%*	*M/n*	*SD/%*	*M/n*	*SD/%*			
Depression							35.93	<.001	.137
No	1157	93.3	563	84.8	1720	90.3			
Yes	83	6.7	101	15.2	184	9.7			
Bodily pain severity							25.71	<.001	.116
None	331	26.7	109	16.4	440	23.1			
Very mild	436	35.2	143	21.5	579	30.4			
Mild	252	10.3	168	25.3	420	22.1			
Moderate	189	15.2	172	25.9	361	19.0			
Severe	28	2.3	58	8.7	86	4.5			
Very severe	4	0.3	14	2.1	18	0.9			
Bodily pain presence (>None)	909	73.3	555	83.6	1464	76.9			
Bodily pain interference							101.87	<.001	.231
Not at all	736	59.4	233	35.1	969	50.9			
A little bit	339	27.3	202	30.4	541	28.4			
Moderately	108	8.7	134	20.2	242	12.7			
Quite a bit	47	3.8	77	11.6	124	6.5			
Extremely	10	0.8	18	2.7	28	1.5			
Bodily pain interference (>Not at all)	504	40.6	431	64.9	935	49.1			

*Continuous variable for Welch's independent samples *t*-test

frequent use earned above the median annual income (>$60,000) than in the low use group.

Need Factors. There was a significantly larger proportion of men with multimorbidity, anxiety and depression in the frequent use group, compared to the low use group. Lastly, significantly less men in the frequent use group said they experienced at least 'very mild' bodily pain severity and at least 'a little bit' of bodily pain interference, than in the low use group.

Frequent General Practice Use using the Andersen Behavioural Model

To explore the predisposing characteristics, enabling resources and need factors associated with frequent use of GP services, a hierarchical binary logistic regression was conducted (Table 2). As indicated by Nagelkerke's pseudo R^2 and the Akaike information criterion (AIC), the model which provided the best fit for the data was Regression Model 1, which included predisposing characteristics (i.e., age, marital status, education level), enabling resources (i.e., employment status, household annual income) and need factors (i.e., multimorbidity, anxiety, depression, bodily pain presence, bodily pain interference).

Regression Model 1. Age was a significant predictor for frequent use of GP services in Regression Model 1, $b = 0.06$, $p < .001$, $OR = 1.06$ (95% CI: 1.05, 1.07). This suggested that for every 1-year increase in age, men were 6% more likely to be a frequent user of GP services, when all other variables are held constant. Marital status was also a significant predictor, $b = -0.32$, $p < .05$, $OR = 0.73$ (95% CI: 0.58, 0.92), positing that men with a partner were 27% less likely to be a frequent user of GP services, holding all other variables constant.

Regression Model 2. In Regression Model 2, employment was a significant predictor of frequent use of GP services $b = -0.84$, $p < .001$, $OR = 0.43$ (95% CI: 0.33, 0.57). This suggested that, when holding all other variables constant, men who were employed were 57% less likely to be a frequent GP user. Adding employment and household income in

Table 2. Hierarchical Binary Logistic Regression for Predicting Frequent GP Use (*n*=664)

Predictor	Regression Model 1		Regression Model 2		Regression Model 3	
	b (*SE*)	*OR* (95% CI)	*b* (*SE*)	*OR* (95% CI)	*b* (*SE*)	*OR* (95% CI)
Predisposing characteristics						
Age	0.06 (0.01)	1.06** (1.05, 1.07)	0.03 (0.01)	1.03** (1.02, 1.04)	0.03 (0.01)	1.03** (1.02, 1.05)
Marital status	-0.32 (0.12)	0.73* (0.58, 0.92)	-0.23 (0.12)	0.79 (0.62, 1.01)	-0.16 (0.13)	0.86 (0.66, 1.10)
Education level	-0.17 (0.11)	0.85 (0.68, 1.05)	-0.16 (0.11)	0.85 (0.68, 1.07)	-0.11 (0.12)	0.90 (0.71, 1.13)
Enabling resources						
Employment status			-0.84 (0.14)	0.43** (0.33, 0.57)	-0.64 (0.15)	0.53** (0.40, 0.70)
Household annual income			-0.26 (0.14)	0.77 (0.59, 1.01)	-0.16 (0.14)	0.85 (0.64, 1.12)
Need factors						
Multimorbidity					0.72 (0.11)	2.05** (1.64, 2.57)
Anxiety					0.37 (0.22)	1.45 (0.95, 2.23)
Depression					0.68 (0.19)	1.98** (1.35, 2.88)
Bodily pain presence					-0.12 (0.16)	0.89 (0.65, 1.22)
Bodily pain interference					0.76 (0.13)	2.14** (1.65, 2.77)
Model summary	R^2 = 0.13 R^2 change = 0.01 AIC = 2267.79		R^2 = 0.17 R^2 change = 0.04 AIC = 2213.76		R^2 = 0.25 R^2 change = 0.08 AIC = 2082.01	

95% CI 95% confidence interval, *AIC* Akaike information criterion, R^2 Nagelkerke's Pseudo R^2 *p < .05. **p < .01

Regression Model 2 reduced the effect of marital status whilst age remained a significant predictor.

Regression Model 3. Multimorbidity was a significant predictor of frequent GP service use in Regression Model 3, $b = 0.72$, $p < .001$, $OR = 2.05$ (95% CI: 1.64, 2.57), suggesting that men with multimorbidity were just over two times (105%) more likely to be a frequent user GP user when all other variables are held constant. Depression was also a significant predictor, $b = 0.68$, $p < .001$, $OR = 1.98$ (95% CI: 1.35, 2.88), inferring that men with depression were 98% more likely to be a frequent GP user, holding all other variables constant. Lastly, bodily pain interference was a significant predictor, $b = 0.76$, $p < .001$, $OR = 2.14$ (95% CI: 1.65, 2.77), suggesting that men who experienced bodily pain interference were over two times (114%) more likely to be frequent GP users when all other variables are held constant. Age and employment remained significant predictors of frequent GP use in Regression Model 3.

The Contribution of Bodily Pain to Frequent Use of General Practice

To examine the contribution of bodily pain factors to frequent GP use, an additional hierarchical binary logistic regression was conducted. In accordance with the AIC and Nagelkerke's pseudo R^2, Regression Model 4 provided the best fit for the data, which incorporated predisposing characteristics (i.e., age, marital status, education level), enabling resources (i.e., employment status, household annual income), need factors (i.e., multimorbidity, anxiety, depression) and bodily pain factors (i.e., bodily pain presence and interference). Thus, it was concluded that bodily pain factors uniquely contributed to frequent GP use.

Table 3. Hierarchical Binary Logistic Regression for Predicting Frequent GP Use with Bodily Pain entered separately (*n*=664)

Predictor	Regression Model 1		Regression Model 2		Regression Model 3		Regression Model 4	
	b (*SE*)	*OR* (95% CI)	*b* (*SE*)	*OR* (95% CI)	*b* (*SE*)	*OR* (95% CI)	*b* (*SE*)	*OR* (95% CI)
Predisposing characteristics								
Age	0.06 (0.01)	1.06** (1.05, 1.07)	0.03 (0.01)	1.03** (1.02, 1.04)	0.03 (0.01)	1.03** (1.02, 1.04)	0.32 (0.01)	1.03** (1.02, 1.05)
Marital status	-0.32 (0.12)	0.73* (0.58, 0.92)	-0.23 (0.12)	0.79 (0.62, 1.01)	-0.13 (0.13)	0.88 (0.68, 1.13)	-0.16 (0.13)	1.17 (0.91, 1.51)
Education level	-0.17 (0.11)	0.85 (0.68, 1.05)	-0.16 (0.11)	0.85 (0.68, 1.07)	-0.21 (0.12)	0.89 (0.70, 1.11)	-0.11 (0.12)	0.90 (0.71, 1.13)
Enabling resources								
Employment status			-0.84 (0.14)	0.43** (0.33, 0.57)	-0.73 (0.14)	0.48** (0.36, 0.64)	-0.64 (0.15)	0.53** (0.40, 0.70)
Household annual income			-0.26 (0.14)	0.77 (0.59, 1.01)	-0.19 (0.14)	0.82 (0.63, 1.08)	-0.16 (0.14)	0.85 (0.64, 1.12)
Need factors								
Multimorbidity					0.81 (0.11)	2.25** (1.81, 2.80)	0.72 (0.11)	2.05** (1.64, 2.57)
Anxiety					0.47 (0.22)	1.60* (1.05, 2.43)	0.37 (0.22)	1.45 (0.95, 2.23)
Depression					0.75 (0.19)	2.12** (1.50, 3.07)	0.68 (0.19)	2.00** (1.35, 2.88)
Bodily pain								
Presence							-0.12 (0.16)	0.89 (0.65, 1.22)
Interference							0.76 (0.13)	2.14** (1.65, 2.77)
Model summary	R^2 = 0.13 R^2 change = 0.01 AIC = 2267.79		R^2 = 0.17 R^2 change = 0.04 AIC = 2213.76		R^2 = 0.22 R^2 change = 0.05 AIC = 2124.92		R^2 = 0.25 R^2 change = 0.03 AIC = 2082.01	

95% CI 95% confidence interval, *AIC* Akaike information criterion, R^2 Nagelkerke's Pseudo R^2 *p < .05. **p < .01

Health Characteristics of Men with Frequent Use of General Practice by Bodily Pain Factors

Bodily Pain Severity

Table 4 displays the chi-square test results comparing the health characteristics of men with and without bodily pain severity in the frequent GP use group. Men who experienced bodily pain reported significantly higher accounts of multimorbidity and depression diagnosis, compared to men without any bodily pain. There was no statistically significant difference in reports of anxiety diagnosis in men with and without bodily pain in this group.

Table 4. Health Characteristics of Participants with Frequent GP Use by Bodily Pain Severity (*n*=664)

	No bodily pain severity (*n*=109) (16.4%)		Bodily pain severity (>1/None) (*n*=555) (83.6%)		X^2	*p*	Cramer's *V*
Health characteristics	*n*	*%*	*n*	*%*			
Multimorbidity					10.38	.001	.125
No	72	66.1	273	49.2			
Yes	37	33.9	282	50.8			
Anxiety					2.17	.141	.057
No	101	92.7	487	87.7			
Yes	8	7.3	68	12.3			
Depression					4.90	.027	.086
No	100	91.7	463	83.4			
Yes	9	8.3	92	16.6			

Bodily Pain Interference

Table 5 displays the chi-square test results comparing the health characteristics of men with and without bodily pain interference in the frequent GP use group. Men who experienced bodily pain interference reported significantly higher accounts of multimorbidity, diagnosed anxiety and diagnosed depression than men without bodily pain interference.

Table 5. Health Characteristics of Participants with Frequent GP Use by Bodily Pain Interference (*n*=664)

	No bodily pain interference (*n*=233) (35.1%)		Bodily pain interference (>1/Not at all) (*n*=431) (64.9%)		X^2	*p*	Cramer's *V*
Health characteristics	*n*	*%*	*n*	*%*			
Multimorbidity					16.47	<.001	0.158
No	146	62.7	199	46.2			
Yes	87	37.3	232	53.8			
Anxiety					7.43	.006	.106
No	217	93.1	371	86.1			
Yes	16	6.9	60	13.9			
Depression					12.22	<.001	.136
No	213	91.4	350	81.2			
Yes	20	8.6	81	18.8			

Chapter 4: Discussion

Overview

Using the Andersen Behavioural Model (ABM), this study explored the characteristics of frequent general practice (GP) use among middle-aged and elderly Australian men, whilst quantifying the contribution of bodily pain to these patterns of help-seeking. Over one-third of men classified as frequent users of general practice. Overall, need factors were the strongest factor for predicting frequent GP use within the ABM. Older men and men with multimorbidity, depression and bodily pain interference were more likely to frequently use GP services. Men who were partnered and employed were less likely to be frequent users. Lastly, bodily pain uniquely contributed to frequent GP use, over and above predisposing characteristics, enabling resources and other need factors. The following chapter will elaborate on the current findings, in the context of the study's strengths and limitations, and with reference to any relevant practical, clinical and research implications.

Frequent General Practice Use

Over one-third of the men (35%) classified as frequent (approximately above average) users of general practice services in this sample of men. This percentage was almost exactly the same as that of The National Health Performance Authority report (AIHW, 2015) with 35.3% of the Australian population classifying as above average users. It was also slightly higher than that of Wright et al. (2018), with 31% of their Australian sample representing higher users. Considering the tendencies for women to have higher use of health care services in gender-comparative studies (Addis & Mahalik, 2003; Hale et al., 2010), the proportion of men in this study with frequent use reflects a particularly high percentage of men relative to the previous literature. The next subsections will highlight the specific complexities characterised by men's frequent GP use in this sample.

The Andersen Behavioural Model of Health Services Use

Consistent with the hypothesis and previous literature (Hajek et al., 2021; Hirshfield et al., 2018; Lin et al., 2022), the first regression analysis found that need factors were the dominant factor for predicting frequent GP use in this sample of men. This was expected given that need factors reflected self-reported diagnosis of multimorbidity, anxiety and depression, as well as self-reported bodily pain factors. Logically, increased needs signify ill-health which is addressed by visiting the doctor (Babitsch et al., 2011). However, in terms of reducing both the poor incidence of health among men and the subsequent burden on the health care system, men's drive to seek medical care on a 'needs' basis may represent missed opportunities for preventative care (Schlichthorst et al., 2016). Related emerging research has also flagged the need for specialised preventive care programs among men, given their high incidences of chronic disease (Garvakovs et al., 2016).

Characteristics of Frequent General Practice Use

Predisposing Characteristics. On average, men with frequent GP use were older than men with low use. Significantly less men with frequent use were married or a in a de facto relationship. Men with frequent use also had significantly lower completion rates of higher education than men with low use.

Age. Older age was a clear significant feature of men with frequent GP use in this sample. When analysed within the ABM, age was significantly associated with frequent GP use when all other predisposing, enabling and need factors were controlled for. Consistent with previous literature, older age significantly increased the odds of being a frequent user (Harrison et al., 2019; Holden et al., 2006; Robertson et al., 2012; Schlichthorst et al., 2016). Given the general health decline and increased prevalence of multimorbidity and pain in the elderly (Atella et al., 2018; Morrisey et al., 2014; Willet et al., 2018), it is likely that older men had a greater 'need' for health care use.

Marital Status. As a predictor in the ABM, a weak, albeit association was found between marital status and frequent GP use when controlling for all other predisposing factors. The results suggested that having a partner reduced the odds of frequent use, though in the presence of enabling resources and need factors, its effects did not remain significant. Most literature shows that partnered men are found to be more likely to attend their doctor than single men (Doherty & Kartalova-O'Doherty, 2011; Holden et al., 2006; Schlicthorst et al., 2016). Given the positive effect of marriage on the overall health of heterosexual men (Jia & Lubetkin, 2020; Manzoli et al., 2007), married men may have presented less of a need for frequent health care use in the first place. Nonetheless, the results of this study may advise the consideration of men without long-term partners in health promotion strategies; however, the uncertainty of this finding warrants further investigation.

Education Level. Contrary to previous literature (Doherty & Kartalova-O'Doherty, 2011; Schlichthorst et al., 2016), higher education did not significantly predict frequent use in the ABM. Mixed evidence about educational attainment has been observed across studies of men, potentially due to the way higher education levels are defined and thus, has restricted comparability. For example, Schlichthorst et al. (2016) categorised education based on completion of secondary school, whereas this study was based on the completion of secondary vocational/tertiary studies.

Enabling Resources. Significantly less men in the frequent use group were in employment than in the low use group. Similarly, higher income was significantly less common in men with frequent use, than in men with low use.

Employment Status. Within the ABM, being employed significantly reduced the odds of being a frequent user when all other predisposing, enabling and need factors were controlled for. Although there is no evidence to directly support the direction of this relationship, employed people have been shown to have lower incidences of poor health and

mental illness than the unemployed (Brand, 2015; Norström et al., 2019). Given that employment reduced the likelihood of frequent use, the need for targeted health promotion strategies for the unemployed may still be evidenced from this finding (Holden et al., 2006).

Income. Further, higher income (above the median) did not significantly predict frequent GP use within the ABM. Whilst financial barriers have been recognised to impede use (Pharr et al., 2011), these barriers tend to differ across health care systems and socioeconomic environments (Walker et al., 2004). Economic barriers are more likely to be significant predictors in countries which run predominantly on private servicing with greater out-of-pocket costs (Sinay, 2002). At the time of data collection, South Australia bulk-billed approximately 79% of GP services, which may have reduced the importance of income in relation to greater GP use in this sample (Federal Electoral Division, 2011).

Need Factors. Multimorbidity, diagnosed anxiety and diagnosed depression were significantly more common in men with frequent GP use, than among men with low use. However, men with frequent use reported significantly lower accounts of bodily pain severity and interference, than men with low use.

Multimorbidity. When considered within the ABM, multimorbidity over-doubled (105%) the likelihood of being a frequent user, when all other predisposing, enabling and need factors were controlled for. These findings aligned with previous literature which not only reported a greater likelihood to use primary care services due to multimorbidity presence, but with significantly increased rates of engagement compared to those with one or no chronic conditions (Bählet et al., 2015; Ng et al., 2020; Robertson et al., 2012; Zulman et al., 2015). This finding was of little surprise as in Australia, multimorbidity is typically managed by the general practitioner and requires ongoing treatment (Harrison & Siriwardena, 2018).

Anxiety and Depression. As need factors in the ABM, having depression was determined a significant predictor for frequent GP use, whilst anxiety was not. Having a depression diagnosis almost doubled (98%) the likelihood of being a frequent user, when all other predisposing, enabling and need factors were controlled for. Depression symptoms have been shown to increase engagement with primary care services in men (Martin et al., 2021) and in the wider population (Farrer et al., 2018; Saini et al., 2019). Whether or not men are seeing their doctor for mental health-related reasons, it appears that men with clinically significant depressive symptoms are engaging with health care more frequently. The lack of significance found between anxiety and frequent use was also of interest. Not only does it contest previous literature which has shown increased GP use among those with anxiety symptoms based on cut-off scores (Ng et al., 2020; Saini et al., 2019), but it suggests that clinically significant symptoms of anxiety do not play a significant role in men's frequent attendance to the doctor.

Bodily Pain Severity and Interference. Within the ABM, bodily pain interference was found to be the strongest significant predictor of frequent GP use whilst bodily pain severity was not determined significant at all. Having bodily pain interference increased the likelihood of frequent use by 114%, when all other predisposing, enabling and need factors were controlled for. This result complimented previous research which found significant associations between pain-related disability and increased use of health care (Blyth et al., 2004; Jonsdottir et al., 2015; Lentz et al., 2018; Lentz et al., 2020). Of note, pain severity did not predict frequent use, contrary to the available literature (Lentz et al., 2018; Lentz et al., 2020). Thus, both of these finding suggests that the interference of men's pain on daily life and work commitments is greater than the pain itself when it comes to increased health care use.

The Contribution of Bodily Pain to Frequent General Practice Use

As hypothesised, the results of the second hierarchical logistic regression analysis found that bodily pain factors uniquely contributed to frequent GP use, over and above all predisposing characteristics, enabling resources and need factors. To the knowledge of the creator, only one study analysed pain in health care utilisation in a similar manner using the ABM (Jonsdottir et al., 2015). The study also found that pain-related variables were better predictors of chronic-pain related health care use over other sociodemographic factors in their sample of men and women (N=1586), though only pain-related need factors were included in the study. Moreover, the results of this study suggest that bodily pain factors played a distinct role in men's frequent attendance to the doctor; irrespective of whether they are attending for pain-related reasons, or even mentioning their pain at all during the visit.

Health Characteristics of Men with Frequent General Practice Use and Bodily Pain

Given both the difficulty of determining pain origin and the diversity of pain presentations (Raja et al., 2020), an isolated presence of pain in the sample may be unlikely. In light of this, analysis of the health characteristics of men with bodily pain severity in the frequent use group found statistically higher accounts of multimorbidity and depression than in men without bodily pain in the frequent use group. For men with bodily pain interference, men had higher accounts of multimorbidity, anxiety and depression, than for men without pain interference. Whilst there is no direct evidence to situate these results in the context of men as frequent attenders, pain has previously been shown to commonly present in individuals with multimorbidity (Morrisey et al., 2014; Peng et al., 2020). Therefore, the higher incidence of multimorbidity in men with frequent use and pain compared to men with frequent use and no pain, was to little surprise. Similarly, as men are more likely to somatise symptoms of depression than women (Holden et al., 2006; Martin et al., 2013), there is a possibility that men with depression in this sample were experiencing somatised pain.

Strengths

The main strength of this study is its contributions to research about men's help-seeking behaviours whilst utilising a large, representative sample from a previous high-quality cohort study. As the majority of studies tend to use gender-comparative approaches, this study explored a variety of characteristics of general practice use among men specifically, as guided and enriched by the well-established Andersen Behavioural Model (ABM) of Health Services Use (Andersen, 1995). Use of the ABM allowed for a theoretical determination of variable selection and assortment, and enhanced comparability among other numerous studies of health care utilisation.

Also, to the knowledge of the creator, this is one of the few studies which investigates the role of bodily pain in a study of health care utilisation of men, which aligns with the International Association for the Study of Pain (IASP; 2022) revised definition of pain. As mentioned, research on the influence of clinically defined chronic or musculoskeletal pain in the context of health service use is far more saturated. This study offers a more comprehensive exploration of bodily pain that is less about a diagnosis but an acknowledgement to the influence of diverse pain experiences on medical care use.

Similar to the conclusions of other related studies of men's health care use (Ng et al., 2020; Schlichthorst et al., 2016), the findings of this study contest the misconception that men do not engage with health care. Instead, they strengthen the notion that men are active in their own health, and are uniquely motivated to do so. Further to this point, this study was able to extract unique details about these motivators by exploring the frequency of general practice, as opposed to only service use (i.e., yes/no).

Limitations and Future Research Recommendations

Given the the cross-sectional design of this study, the findings should be considered in the context of several limitations. First, due to the study involving secondary analysis of

the MAILES dataset, the ability to test the developed hypotheses was constrained by the available data. Hence, several methodological limitations reflected in data collection by MAILES affected this. A major limitation was the inability to ascertain the primary reason for the participants GP use, meaning there was no way to confirm if certain need factors were the reason for health care use. Further, data about anxiety or depression diagnoses were collected via an arbitrary self-report as "told by a doctor in the past 12 months". Literature has suggested that men may underreport or suppress their anxiety and depression symptoms (Fisher et al., 2021; Sigmon et al., 2005). This often leaves men disproportionately underdiagnosed with common mental health conditions, including anxiety and depression, compared to women (Ferrari et al., 2013; World Health Organization, 2017). Hence, there is a possibility that clinically-significant anxiety or depression may have been grossly underrepresented in this sample. The distribution of Likert-type scales with well-defined cut-off scores may better capture the prevalence of anxiety and depression symptomatology in this sample. For example, the Male Depression Risk Scale-22 (MDRS-22, Rice et al., 2013), which was designed to better align with symptom presentations of depression and anxiety among men specifically.

Additionally, the collection of lifestyle and medical data for all of the selected variables relied on self-reporting. Gill and Hill (2017) identified self-reporting bias as a common key limitation of large cohort studies. For example, income has been previously identified as a private topic that may be influenced by social desirability bias (Althubaiti, 2016). Likewise, the number of visits to a GP also relied on self-reporting, which may be particularly subject to recall bias due to the length of the recall period being 12 months (Althubaiti, 2016). The use of verified medical information via access to participant's health records would be one way to address to remove this bias (Schlichthorst et al., 2016).

A final limitation concerns the lack of cultural diversity in the sample. At baseline, the sample consisted of men who were predominantly described as Caucasian and community-dwelling in the North-West area of Adelaide, South Australia. Although this study utilised a large sample size that was representative of its target population, the results are not entirely generalisable to the broader population of men, or men of other cultures and sociodemographic statuses. Cross-cultural research has been identified as an important construct to ensure the rigor of health research (Al-Bannay et al., 2014). Future research should look to use more diverse samples, as well as incorporate variables which explore culture, to enhance cultural sensitivity and increase the generalisability of findings.

Implications

In refute of the prevailing view that men fail to appropriately use health care, the findings of this study provide evidence that a substantial proportion of men not only visit their GP, but do so frequently. Hence, one of the major implications was to recognise that the burden of poor health in men should not be placed solely on the shoulders of men and their 'lack' of service use, by detecting a subgroup of men who defy this stereotype. It was found that men's frequent service use is characterised by a complex and unique interplay of sociodemographic and health status factors, providing evidence that a 'one-size fits all' approach is not viable in the context of men's service provision (Witty et al., 2018).

Men appear to actively engage with health care upon a diagnosis (Ng et al., 2020; Schlicthorst et al., 2016; Wang et al., 2013) and it no longer seems reasonable to generalise men as indifferent towards their health. However, the importance of preventative care cannot be overlooked. It is far more ideal to prevent the onset of a disease than to rely on treatment once a condition is established. Timely adherence to preventative health strategies have been shown to significantly reduce health outcome inequities (Bickham & Lim, 2015; Dickman et al., 2017). Further to this, effective health management programs have been shown to reduce

health care expenditure (Grossmeier et al., 2013; Musich et al., 2016). Interventions promoting preventative care engagement that tailor specifically to the needs and preferences of men may be a key asset to bridging the gender gaps in health outcomes, whilst relieving burden on the health care system (Merkur et al., 2013).

Despite the inability to ascertain the primary reason for health service use from this data, the findings also suggest that men's pain should be actively enquired into by practitioners. Whether or not men are mentioning pain to their doctors, pain may be especially relevant in men who present with complex health profiles, such as multimorbidity and depression. Effective management of depression and chronic conditions have been shown to reduce primary care consultation rates (Bhattacharya et al., 2016; Simon et al., 2001). Recognising the potential role of pain using general screening tools and risk assessments may further optimise these outcomes, whilst providing a way to identify pain presence before it begins to interfere with daily life.

Additionally, this study provides a clause for further research into men's pain in primary care. Attitudes to help-seeking, masculinity and gender role conformity have been previously highlighted as important features for understanding men's health usage generally (King et al., 2019; McGraw et al., 2021). Qualitative research would be especially useful to pinpoint the role of social, emotional or psychological factors related to pain-related help-seeking, whilst also providing a way to ascertain men's leading reasons for consultation.

Conclusions

Using the Andersen Behavioural Model, this study explored the characteristics of frequent general practice use among Australian men and quantified the contribution of bodily pain on these patterns of help-seeking. Key findings suggest that men were most driven by their need factors, i.e., their physical and mental health status, in relation to frequent GP use. These findings revealed important population characteristics of male frequent attenders in

which researchers, policy makers and practitioners may need to be cautious of: older men, and men with multimorbidity, depression and bodily pain interference. Further to this point, the study provided evidence for considering and screening for pain in general practice encounters with men, especially those with complex health presentations and depression. Nevertheless, further qualitative research is needed to better understand the role of pain in men's health service use patterns, perhaps from more of a sociocultural standpoint. Research of this calibre will help to inform practice and policy guidelines to provide optimal comprehensive care that meets the needs of men whilst reducing unnecessary consultation rates.

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Appendices

Appendix A: Correlation matrix of predictor variables

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Age	59.6	11.5	-									
2. Marital status[a]	0.8	0.4	-.023	-								
3. Education level[b]	0.7	0.5	-.094**	.020	-							
4. Employment status[c]	0.6	0.5	-.655**	.055*	.064**	-						
5. Household annual income[d]	0.4	0.5	-.505**	.255**	.112**	.548**	-					
6. Multimorbidity[e]	0.3	0.5	.278**	-.047*	-1.04**	-.221**	-.205**	-				
7. Anxiety[f]	0.1	0.3	.016	-.092**	-.004	-.109**	-.072**	.027	-			
8. Depression[g]	0.1	0.3	-.043	-.120**	.046*	-.080**	-.057*	.057*	.427**	-		
9. Bodily pain severity[h]	0.8	0.4	.062**	.054*	-.048*	-.101**	-.066**	.126**	.082**	.050*	-	
10. Bodily pain interference[i]	0.5	0.5	.110**	.001	-.044	-.182**	-.131**	.183**	.123**	.119*	.539**	-

[a] 0 = not partnered, 1 = partnered
[b] 0 = up to high school, 1 = additional studies (certification/diploma, TAFE/apprenticeship/trade, bachelor's degree or above)
[c] 0 = other (unemployed, retired, student, other), 1 = employed
[d] 0 = below annual median (<$60 K), 1 = above annual median (>$60 K)
[e] 0 = no multimorbidity, 1 = multimorbidity
[f] 0 = no anxiety, 1 = anxiety
[g] 0 = no depression, 1 = depression
[h] 0 = no bodily pain (=1/None), 1 = bodily pain (>1/None)
[I] 0 = no bodily pain interference (=1/Not at all), 1 = bodily pain interference (>1/Not at all)
*p <.05. **p <.01.