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Influencers of Health Related Quality of Life in People with Faecal Incontinence

Stephanie L Inat[1], Tiffany K Gill[2] and Jodie C Avery[3]*

[1]*Medical Intern, The Queen Elizabeth Hospital, Australia*

[2]*Senior Research Fellow, Adelaide Health and Medical School, The University of Adelaide, Australia*

[3]*Research Fellow, Adelaide Health and Medical School, The University of Adelaide, Australia*

*Corresponding author: *Dr. Jodie Avery, Research Fellow, Adelaide Health and Medical School, The University of Adelaide 5005, Australia, Tel: +61-8-8313-1217*

Abstract

Background: Faecal Incontinence (FI) is a common debilitating condition that, significantly decreases health-related quality of life (HRQoL). However, there is uncertainty about its prevalence and the factors that modulate the relationship between FI and HRQoL, which reduces the efficiency and effectiveness of clinical and public-health interventions.

Objective: To assess the prevalence of FI, its risk factors, and determine which factors influence the FI - HRQoL relationship.

Design: Data was taken from the 2004 representative cross-sectional population South Australian Health Omnibus, n = 3015 men and women aged 15 and over. The main outcome measures were the prevalence and severity of FI, urinary incontinence (UI), other comorbidities and various demographic variables. The SF-36v2 Quality of Life questionnaire was also administered.

Results: Prevalence of FI was found to be 1.7% (95% CI: 1.3-2.2%). Univariate analysis found increased reporting in females, those aged 55 and over, separated/divorced, with annual household income < $A30,000 and economically inactive, to be associated with increased reporting. Comorbid UI, depression and obesity also conferred greater risk. HRQoL was decreased in FI compared to those without. Respondents aged over 55 years, being economically inactive and having comorbid depression were associated with significantly more negative HRQoL scores (p < 0.05). Severity of symptoms, gender, annual income and comorbid UI were not associated with any significant difference in HRQoL. Nor were marital status, education status, country of birth, area of residence, comorbid diabetes or Body Mass Index.

Conclusions: FI results in a decreased HRQoL, most extreme with increased age, unemployment and those with comorbid depression. Future research is needed to further explore and validate these relationships in order to guide public health interventions and resource allocation.

Keywords

Faecal incontinence, Quality of life, Cross sectional survey, Depression

Introduction

Faecal Incontinence (FI), defined as the involuntary loss of solid or liquid stool, is a common debilitating condition that significantly impacts an individual's physical and psychological quality of life [1]. It has diverse medical and surgical causes, with its most significant risk factors being diabetes, vascular disease, increasing age and obesity [2,3]. With between 2.2% and 24% of the western population affected, the great burden of FI motivates targeted public health interventions to improve societal health and wellbeing [4-6]. To effectively and efficiently implement such interventions, the accurate population prevalence of FI and its precise relation to quality of life must be understood.

There is wide variability in FI's population prevalence according to the population surveyed, such as the age and sex, as well as the particular questions asked, with some studies calculating it being as high as 24% [4-6]. Previous data from the 1998 South Australian Health Omnibus Survey. However, underreporting and a

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Figure 1: Flow chart of HOS sample.
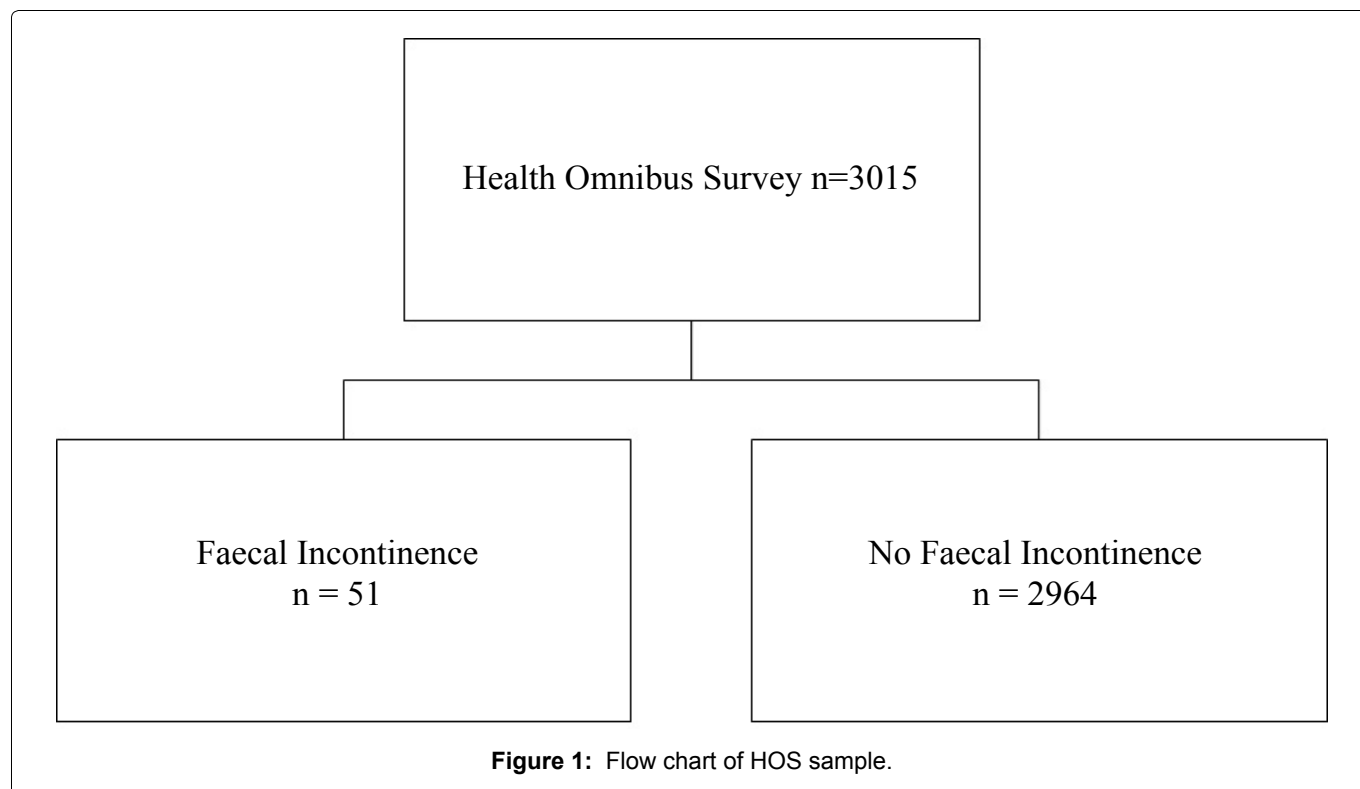
deficient in appropriate screening means prevalence is likely significantly underestimated, with as much as two thirds of those with FI never having discussed their symptoms with a doctor [2,3]. There is though, consistent, cross-cultural research that FI significantly impacts the lives of those affected. Although there are various physical problems arising from pain, hygiene and restrictions of activity, it is the psychological disturbances which have the greatest impact and many individuals reporting reduced self-confidence, constant embarrassment and social anxiety, further exacerbating withdrawal and isolation [3,7,8]. Indeed, those with FI are four to five times more likely to also have psychiatric disorders such as anxiety and depression [9]. When evaluating health related quality of life (HRQoL) using the SF-36 version 2 (SF-36v2), FI was found to impact all eight dimensions [10], and in a study that compared HRQoL among patient with benign anorectal disorders, FI was found to have the greatest negative impact [10,11].

However, in comparison to the well researched Urinary Incontinence (UI), little is known about the relationship between FI and HRQoL. Only a few studies have explored which factors actually modulate the impact, and findings from these have been controversial and inconsistent. A recent study by Mundet, et al. found gender to have the greatest influence on HRQoL, with the impact being significantly greater for females [12]. However, other studies have shown no difference between genders [13,14] or that males may actually have lower HRQoL with FI [13]. Similar discrepancies exist when comparing disease severity and age which either share a positive or non-existent relationship [15,16]. Other factors that have been investigated for

a relationship with HRQoL include frequency, comorbid anxiety or depression, and medical comorbidities such as concurrent UI, however, these studies too are limited. Finally, some determinants such as marital status, employment status and household income have not previously been assessed, but have been found to mediate HRQoL in other chronic conditions [7,12,16,17]. With these protective and exacerbating factors governing the FI-HRQoL relationship being unknown, the ability of clinicians and public-health practitioners to tailer interventions is greatly inhibited.

To overcome these limitations in literature, this paper presents population data from the 2004 Autumn South Australian Health Omnibus Survey (SAHOS) and aims to assess the prevalence of FI in Australia, its risk factors and investigate the magnitude of and how different contributing factors influence HRQoL in this population. We hypothesised that females, younger age, with comorbid depression and increased severity would be associated with lower HRQoL scores in individuals with FI, whilst controlling for usual social and demographic variables.

Materials and Methods

Data were collected through the Autumn 2004 South Australian Health Omnibus Survey (SAHOS), a validated, reliable, user pays survey, conducted annually since 1990 [18]. The survey uses a clustered, self-weighting, systematic and multistage area sample of metropolitan and country areas with populations of more than 1000. Data are weighted by five year age groups, sex, and area (metropolitan Adelaide and rural/remote South Australia) to the most recent Australian Bureau of Statistics Census or Estimated Residential Population

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Table 1: STROBE Statement-Checklist of items that should be included in reports of *cross-sectional studies* [20,35].

	Item No	Recommendation	
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	✓
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	✓
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	✓
Objectives	3	State specific objectives, including any prespecified hypotheses	✓
Methods			
Study design	4	Present key elements of study design early in the paper	✓
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	✓
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	✓
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	✓
Data sources/ measurement	8[*]	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	✓
Bias	9	Describe any efforts to address potential sources of bias	✓
Study size	10	Explain how the study size was arrived at	✓
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	✓
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	✓
		(*b*) Describe any methods used to examine subgroups and interactions	✓
		(*c*) Explain how missing data were addressed	✓
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	✓
		(*e̲*) Describe any sensitivity analyses	✓
Results			
Participants	13[*]	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	✓
		(b) Give reasons for non-participation at each stage	✓
		(c) Consider use of a flow diagram	✓
Descriptive data	14[*]	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	✓
		(b) Indicate number of participants with missing data for each variable of interest	✓
Outcome data	15[*]	Report numbers of outcome events or summary measures	✓
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	✓
		(*b*) Report category boundaries when continuous variables were categorized	✓
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done--eg analyses of subgroups and interactions, and sensitivity analyses	✓
Discussion			
Key results	18	Summarise key results with reference to study objectives	✓
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	✓
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	✓
Generalisability	21	Discuss the generalisability (external validity) of the study results	✓
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	✓

for South Australia and probability of selection within the household size to provide population estimates. Interviews are conducted face-to-face with those aged fifteen years or over who were last to have their birthday in the household [19]. Complete methods for the survey have been described in detail elsewhere [18]. From May until August 2004, 3015 interviews were conducted across South Australia, representing a response rate of 72%. The large sample size facilitates a high level of confidence that the results and trends noted from the survey are applicable to the South Australian population as a whole. At the time of writing, the 2004 survey was the most recent collection of data which contained questionnaires relevant to addressing our research aim. This survey adhered to the STROBE guidelines (see Table 1) [20]. Ethical approval for the methodology of the survey was given by the University of Adelaide Human Research Ethics Committee (Figure 1).

Variables

Demographic information was collected in the survey on gender, age, marital status, country of birth, educational attainment, work status, annual household income (HHI) and area of residence. Height and weight information was asked to calculate body-mass index (BMI), which was calculated by dividing weight in kilograms by the squared height in meters.

Respondents were considered to have FI if they answered "yes" to leaking or having accidents or losing control with solid or liquid stools more than once per month, similar to how the presence of UI is determined [21]. Severity of FI was assessed using the Wexner Faecal Incontinence Scale (WFIS) which considers consistency of stool (solid, liquid or gas), requirement of a pad, influence on lifestyle and frequency of symptoms, giving scores ranging from 0 to 20, with 0 indicating complete continence and 20 indicating complete incontinence [22]. The authors of the WFIS did not clarify which values would differentiate mild, moderate and severe disease, and different studies have classified these differently [23,24]. Using a modified method of the Wexner scoring, we determined a score less than 10 to indicate mild FI, 10-15 moderate, and greater than 15 severe for those with faecal incontinence [25]. The presence of UI reflected its definition by the International Continence Society, and was determined by positive responses to either or both of losing urine when unintended (i.e. when coughing, sneezing or laughing), or if they had ever suddenly felt the urge to

go to the toilet, but accidentally wet themselves before reaching it [21]. Comorbid depression was determined using the Primary Care Evaluation of Mental Disorders Questionnaire Patient Health Questionnaire (PRIME - MD PHQ), and considers depression present with scores of 5 or above [26]. Whether respondents had been diagnosed with Diabetes by a doctor was also asked. HRQoL was assessed using the Short Form 36 version 2 (SF-36v2) with respondents reporting their health over the last four weeks. Standard interpretation and scoring methods for the SF-36v2 were used [27].

Statistical analysis

Statistical analyses were conducted using SPSS version 20.0. Univariate analyses were used to assess prevalence and calculate risk factor, odds ratios and statistical significance ($p < 0.05$) determined to assess prevalence and risk factors. Multivariable logistic regression analysis was used to explore the association between of these variables. HRQoL was assessed by generating means for the higher order summary scores of the SF36v2, the Mental Component Summary (MCS) and Physical Component Summary (PCS), and analysis of variance was conducted to determine whether the means between groups were significantly different. Missing data was not included in the analyses.

Results

Demographics and prevalence

Of the 3015 individuals interviewed, n = 1480 (49.1%) were male and n = 1535 (50.9%) were female. Those aged 65 years and over comprised 18.3% of the sample (n = 552). This is representative of the South Australian population. In total, n = 51 (1.7%, CI: 1.3-2.2%) reported FI.

Risk factors for incontinence

Table 2 displays the severity results gained from the Wexner Faecal Incontinence Scale by sex. 61.1% of those with faecal incontinence experienced "Mild" incontinence and 38.9% experienced moderate to severe faecal incontinence. Table 3 examines the prevalence of FI according to demographic variables and comorbidities. Univariate analysis demonstrated female gender to be associated with an increased likelihood of FI (OR = 2.4, CI: 1.32-4.49, p = 0.004), as did age 55 and over (OR = 5.48, CI: 2.35-12.78, p < 0.001). Marital status was also a significant predictor of FI, with those separated/divorced were most likely to report FI

Table 2: Severity of faecal incontinence according to the Wexner Faecal Incontinence Quality of Life Scale.

Severity	Male	Female	Overall
	n (%)	n (%)	n (%)
Mild (< 10)	10 (32.8)	21 (67.2)	31 (61.1)
Moderate (10-15)	4 (24.6)	13 (75.4)	18 (35.0)
Severe (> 15)	0	2 (100.0)	2 (3.9)

Table 3: Prevalence and odds ratio of faecal incontinence, by demographic variables.

Variable	n (%)	OR (95% CI)	p
Gender			
Male	15 (1.0)	*1.00*	
Female	36 (2.4)	2.40 (1.32-4.49)	***0.004***
Age			
15-34	6 (0.7)	*1.00*	
35-54	11 (1.0)	1.60 (0.61-4.22)	0.340
55+	33 (3.5)	5.48 (2.35-12.78)	***< 0.001***
Marital Status			
Married/de facto	27 (1.5)	*1.00*	
Separated/divorced	12 (4.6)	3.22 (1.65-6.47)	***0.001***
Widowed Never married	12 (1.3)	0.92 (0.46-1.82)	0.801
Education Status			
Post school education	22 (1.5)	*1.00*	
No post school education	29 (1.9)	1.26 (0.72-2.21)	0.416
Household Income			
≤ $ 30,000	28 (3.0)	*1.00*	
≥ $ 30,001	17 (1.0)	0.32 (0.18-0.59)	***< 0.001***
Country of Birth			
Australia	37 (1.7)	*1.00*	
Other	14 (1.8)	1.09 (0.58-2.02)	0.798
Employment Status			
Employed	14 (0.8)	*1.00*	
Economically inactive	37 (2.8)	3.40 (1.83-6.33)	***< 0.001***
Area			
Metropolitan	37 (1.8)	*1.00*	
Country	14 (1.5)	0.86 (0.46-1.61)	0.641
Total	51 (1.7)		

95% CI: 95% Confidence interval; OR: Odds ratio; $p <= 0.001$, Chi^2 test.

Table 4: Prevalence and odds ratio of faecal incontinence, by comorbidities.

Variable	n (%)	OR (95% CI)	p
Urinary Incontinence (UI)			
No UI	14 (0.7)	1.00	
UI	37 (4.3)	6.77 (3.66-12.52)	***< 0.001***
Depression			
No depression	35 (1.3)	1.00	
Depression	16 (4.0)	3.10 (1.70-5.34)	***< 0.001***
BMI			
Underweight/Normal	19 (1.6)	1.00	
Overweight	11 (1.2)	0.76 (0.36-1.61)	0.480
Obese	19 (3.8)	2.47 (1.29-4.71)	***0.006***

95% CI: 95% Confidence interval; OR: Odds ratio; $p <= 0.001$, Chi^2 test.

(OR = 3.87, CI: 1.79-8.34, p = 0.01). A household income $A30,001 per annum or more conferred a decreased FI association compared to lower levels (OR = 0.32, CI: 0.18-0.59, p < 0.001). Employment was also a protective factor for FI compared to those who were economically inactive (OR = 3.40, CI: 1.83-6.33, p < 0.001). There was no significant difference in FI prevalence according to education status, country of birth or area of residence.

Increased FI likelihood was found in those with comorbid UI (OR = 6.77, CI: 3.66-12.52, p < 0.001), depression (OR = 3.10, CI: 1.70-5.34, p < 0.001) and obesity (OR = 2.47, CI: 1.29-4.71, p = 0.006) (Table 4).

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Table 5: Multivariate analysis of faecal incontinence.

Variable	n (%)	OR (95% CI)	p
Age			
< 55	17 (0.9	1.00	
55+	33 (3.5)	2.58 (1.20-5.55)	*0.016*
Urinary Incontinence (UI)			
No UI	14 (0.7)	1.00	
UI	37 (4.3)	4.29 (1.99-9.24)	*< 0.001*
Depression			
No depression	35 (1.3)	1.00	
Depression	16 (4.0)	2.41 (1.21-4.82)	*0.013*

95% CI: 95% Confidence interval; OR: Odds ratio; $p \leq 0.001$, Chi^2 test.

Table 6: Mental and physical component summaries for faecal incontinence.

		Mental Component Summary (MCS)		Physical Component Summary (PCS)	
	n	Mean	p	Mean	p
Overall[*]	2963	50.17		50.10	
FI unadjusted	51	39.90	*< 0.001*	44.17	*0.003*
FI[*]	51	43.46	*< 0.001*	43.46	*< 0.001*
Severity[*]					
Mild/Moderate	45	44.17		40.90	
Severe	6	44.16	0.999	32.23	0.068
Gender[**]					
Male	15	43.96		50.12	
Female	36	43.93	0.993	44.02	0.891
Age[***]					
15-55	17	43.96		45.41	
55+	33	43.93	0.088	36.95	*0.015*
Marital Status[*]					
Married/De Facto	27	45.20		40.68	
Other	24	42.99	0.529	38.99	0.586
Education[*]					
Post School	22	44.15		37.89	
No Post School	29	44.19	0.999	41.43	0.266
Income[*]					
< $ 30,000	28	42.83		37.99	
> $ 30,000	23	44.83	0.633	40.67	0.438
Country of Birth[*]					
Australia	37	43.80		39.69	
Other	14	45.18	0.729	40.45	0.829
Employment[*]					
Employed	14	52.11		48.48	
Economically inactive	37	41.18	*0.006*	36.66	*< 0.001*
Area[*]					
Metropolitan	37	42.58		39.00	
Country	14	48.44	0.131	42.33	0.366
Diabetes[*]					
No Diabetes	43	44.66		39.72	
Diabetes	8	41.58	0.523	40.82	0.796

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Urinary Incontinence (UI) *					
No UI	14	41.70		41.46	
UI	37	45.14	0.403	39.28	0.549
Depression*					
No depression	35	48.72		40.71	
Depression	16	34.48	*< 0.001*	38.15	0.447
BMI*					
Underweight/Normal	19	43.78		43.21	
Overweight/Obese	30	44.29	0.890	38.24	0.125

95% CI: 95% Confidence interval; *: adjusted for age and sex; **: adjusted for age; ***: adjusted for sex.

FI-HRQoL relationship

Multivariable analysis was conducted via logistic regression (Table 5) and showed that variables jointly identified as having an increased association with FI were age 55 and over (p = 0.016), comorbid UI (p < 0.001) and depression (p = 0.013) (model χ^2 = 14.283, df =7, p = 0.046).

HRQoL was significantly decreased in both the MCS and PCS components (representing a negative impact on HRQoL) in individuals with FI than those without (p < 0.001) (Table 6). Age greater than or equal to 55 years was associated with lower PCS scores (p = 0.015) and comorbid depression with lower MCS scores (p < 0.001). Employment status was a significant influencer of HRQoL in MCS and PCS, with those who reported being economically inactive being associated with decreased scores (p = 0.006 and p < 0.001 respectively). Severity of symptoms, gender, annual income and comorbid UI were not associated with any significant difference in HRQoL. Neither were marital status, education status, country of birth, area of residence, comorbid diabetes or BMI.

Discussion and Conclusions

We hypothesised that female gender, younger age, comorbid depression and increased severity would result in a more negative HRQoL in those with FI. However, the only significant association was with depression. These results concur with some previous findings and disagree with others.

Influence of gender, age, severity and comorbidities

That gender does not influence HRQoL in FI aligns with findings from Bartlett, et al. 2009 [14], but contradicts the conclusions of other studies [12,13,28]. This may be explained by the small numbers in our sample, or differences in population cultures between studies, as societal beliefs about femininity and social pressures meditate the relationship between incontinence and HRQoL [12]. Other studies found younger age to be associated with worse HRQoL [12,16], contrasting to our findings, possibly due to the physiological impact of aging, decreasing physical ability and consequentially

HRQoL related to it [29]. Additionally, younger individuals may be more likely to see medical help for their symptoms earlier and thus improve their HRQoL [16].

As our measure of FI severity was determined by Wexner score, rather than individual symptoms, it is difficult to compare our findings to previous research which has found increased frequency and urgency to be significant influencers of HRQoL [7,14]. Alternatively, our results may be evidence that experiencing FI symptoms even only once a month, causes significant impact on HRQoL, and worsening severity does not increase this. Moreover, those with more severe FI may have learned to manage their condition better as has been found with UI [30]. That HRQoL was decreased in comorbid depression is consistent with findings from past research [7,12,31].

Influence of employment status and other demographic variables

A major finding was that both MCS and PCS, representing the mental and physical components of the HRQoL scale, were significantly reduced in the economically inactive. No previous studies have investigated this relationship. This may be because severe FI precludes work, as is in the case of UI [32], or that unemployment leads to a lower HRQoL independent of FI [33]. Marital status was significant in that divorced separated/divorced individuals were more likely to report FI than those in the married/de facto and widowed/never married groups. This is also the first study to assess the influence of demographic variables such as HHI, education and other comorbidities on HRQoL in FI. Although we did not have any significant results, this may be because of limitations in our methodology, and further research into the area is needed.

Limitations and strengths of study and considerations for future research

There were limitations of this study in the methods used to assess HRQoL. By only using the summary measures MCS and PCS, rather than all 8 dimensions of the SF-36v2, we could have missed certain relationships.

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This was compounded by using the SF-36v2 as opposed to the more sensitive Wexner Faecal Incontinence Quality of Life Scale [14]. Using the FI Scale raw values, rather than individual symptoms to assess severity is likely to also have hindered the detection of its influence on HRQoL, as the Wexner includes flatus incontinence in the calculation which is extremely prevalent and likely to have superficially increased the severity [10]. We acknowledge that this is an older dataset, however, this is also the most recent time that the Wexner scale had been used in association with the SF36V2 in this cross sectional survey, however the results are still very relevant today.

By using data from the SAHOS, our ability to source other desired information was restricted as only information gained from submitted surveys could be accessed. For example, diabetes was the only chronic disease we were able to analyse, as opposed to more formal methods such as the Charlatans Comorbidity Score. Having a small sample size of 51 individuals may also have influenced statistical analysis of the data. Since the majority of people with FI are not known to medical professionals [3], a strength of this study by the nature of its broad capture of participants, is that we were able to include these individuals whereas other studies recruiting from outpatient clinics or nursing homes excludes them.

Despite these limitations, this study is able to guide further research and ultimately clinical interventions and public health resource allocation into this area. This study is one of the first to look at whole of population community prevalences of FI. With Australia's aging population [34], and increased prevalence in older age groups, the number of individuals with FI will only escalate into the future. Thus, more awareness and funding must go into this area to decrease the burden on society, and improve the QoL for those with FI. Recommendations for future research would be to employ more appropriate HRQoL scales, address the definition of severity of faecal incontinence, and further explore the influence of comorbidities, education and social situation through formalized scoring systems. Additionally, increased research in community populations should be undertaken as the majority of studies are in institutional populations, amongst the elderly and women, with a dearth of research in the community, possibly due to associated stigma and under reporting.

Acknowledgements

Conflicts of Interests

Nil.

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