

Designing a faecal incontinence instrument using survey data



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Background

- The *Continence Outcomes Measurement Suite (COMS) Project* recommended a number of instruments/scales for the assessment of incontinence in research, specialist and community settings. These scales included the King's Health Questionnaire, the Urogenital Distress Inventory (6) and the Incontinence Severity Index for urinary incontinence. There was an interim recommendation for the Wexner Faecal Continence Grading System for faecal incontinence.
- The inclusion of a number of these incontinence scales in the 2004 SAHOS was recommended by the COMS project and this is reported on in *Measuring Incontinence in Australia (2006)*

Measuring Incontinence in Australia (Hawthorne)

- Provided prevalence estimates, SF-36V2 norms and examined performance of the Multi-attribute utility measures
- Identified various problems with the incontinence measures included – Incontinence Severity Index, Urogenital Distress Inventory-6, the Wexner Faecal Continence Grading Scale and some additional items examining faecal incontinence
- Recommended a study be undertaken to examine further the psychometric properties of these instruments and to revise the measures based on these analyses
- As part of the current study *Refining Continence Measurement Tools* this particular paper examines the performance of the faecal incontinence items included in the 2004 SAHOS survey. A report of this project will be available shortly

2004 SAHOS

- South Australian Health Omnibus Survey is a 'user-pays' population health survey

Conducted April/June 2004 (13 participating organisations)

DoHA focus was

- To examine incontinence in the population (Urogenital Distress Inventory, Incontinence Severity Index, Wexner Faecal Continence Grading Scale)
- To report on 5 key health related quality of life/multi-attribute utility instruments (AQoL, HUI3, SF-6D, 15D, EQ-5D)
- To report population norms for the new SF-36 Version 2

- The study methods:

Sampled all locations throughout SA with 1,000+ inhabitants

Sampling from ABS collectors' districts, using a random starting point and every 4th dwelling

Response rate: 72%

- 4,700 households selected, 3015 interviews

2004 SAHOS

- Weighted data based on probability of selection and 2001 ABS Census to achieve representativeness
- However, in this secondary analysis un-weighted survey data was used to examine item properties for adults, aged 18 years and over
- The sample comprised a total of 1202 males and 1713 females
- Should be noted that incontinence prevalence in the 75+ age group is probably underestimated as this survey only includes those in community residence
- This paper refers to Classical Test Theory analyses; Modern Test Theory (IRT) analyses will be reported elsewhere

Faecal incontinence items included in survey (Wexner Items)

- In the past 4 weeks: Do you leak, have accidents or lose control with a liquid stool?
- In the past 4 weeks: Do you leak, have accidents or lose control with a solid stool?
- In the past 4 weeks: Do you leak, have accidents or lose control with gas (flatus or wind)?
- In the past 4 weeks: Do you need to wear a pad to protect your underwear from stool?
- In the past 4 weeks: Do bowel or stool leakage cause you to alter your lifestyle?

0=never, 1=rarely, 2=sometimes, 3=often/usually, 4=always

Other faecal items

- In the past 4 weeks: How do you describe your usual bowel pattern? (normal, constipated, diarrhoea, alternating)
- In the past 4 weeks: How many bowel movements do you have in a week? (seven categories)
- In the past 4 weeks: Do you experience an urgent need to have a bowel movement that makes you rush to the toilet?*
- In the past 4 weeks: Do you leak stool if you don't get to the toilet in time?*
- In the past 4 weeks: Does stool leak so that you have to change your underwear?*

* Response categories as for Wexner Scale

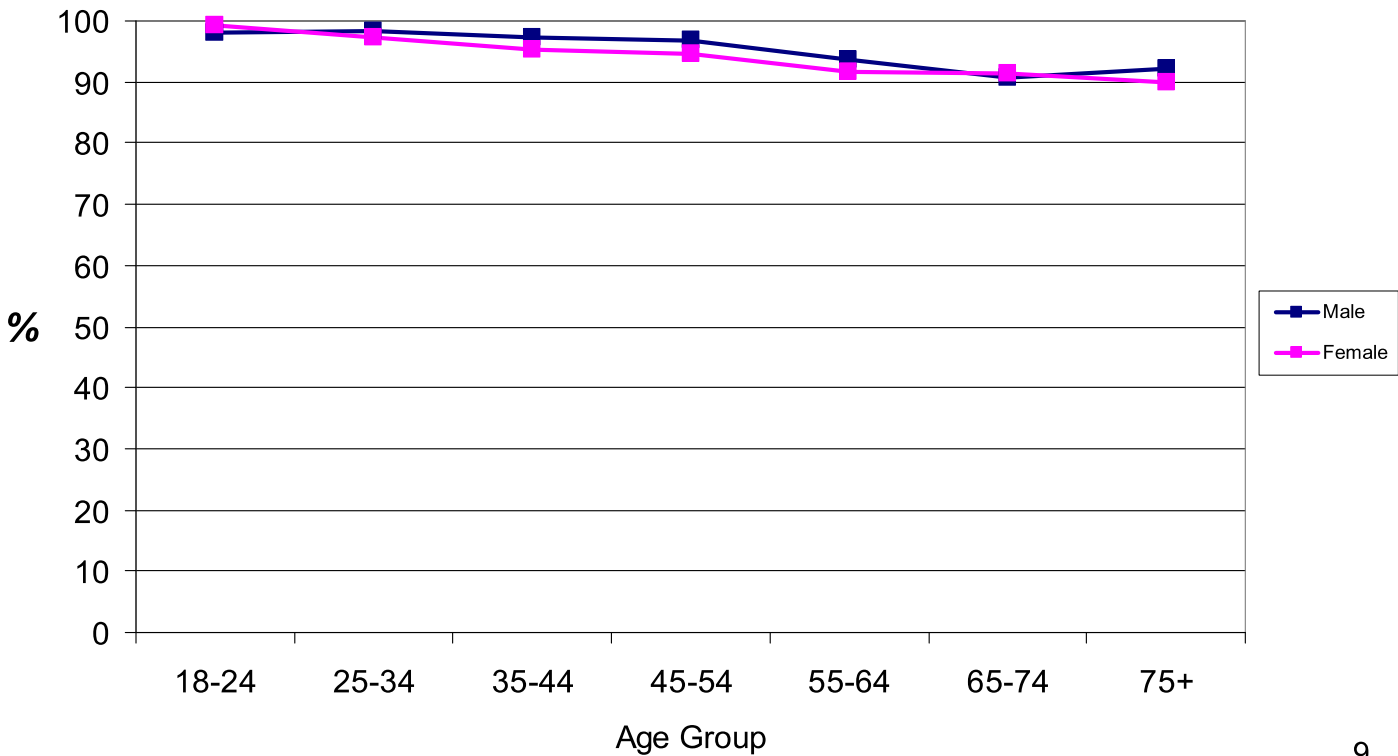
Descriptive statistics: Wexner FCGS

Wexner FCGS	N	Mean	SD	Range
Females	1713	0.94	1.77	0 - 18
Males	1202	0.65	1.28	0 - 10
Total	2915	0.82	1.59	0 - 18

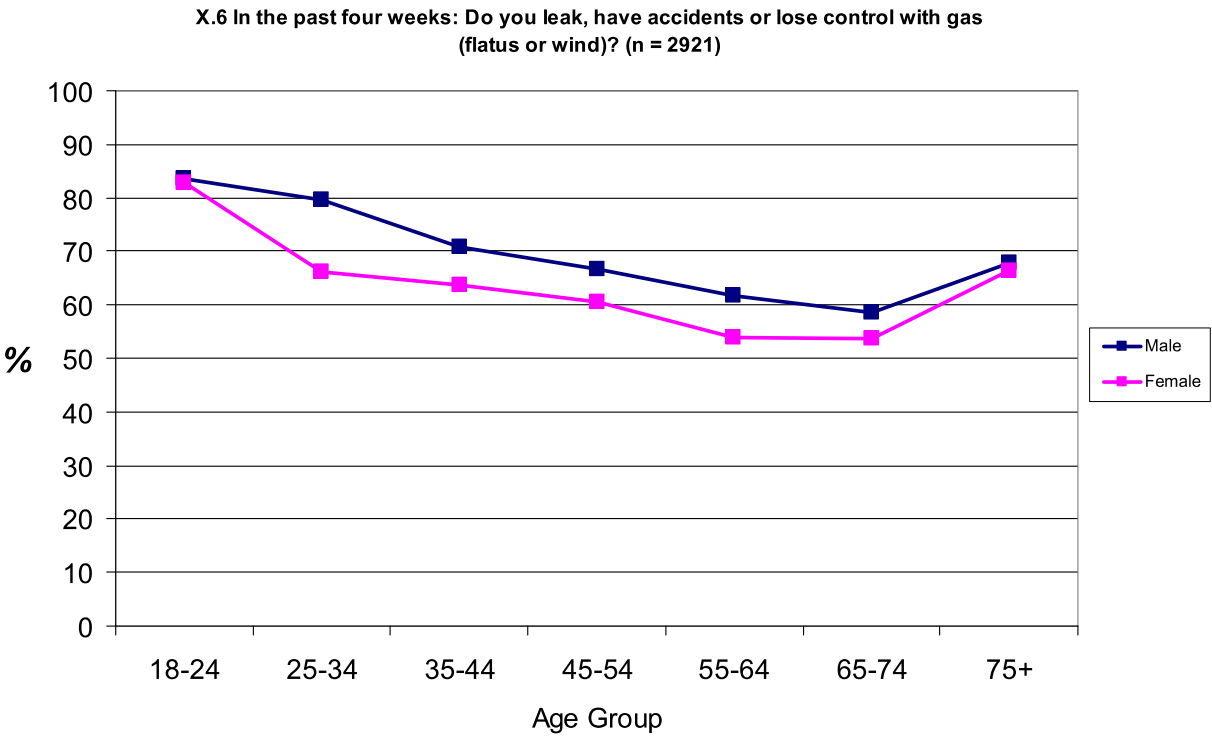
Note: maximum score on Wexner FCGS is 20

Endorsement Issues

X.4 In the past four weeks: Do you leak, have accidents or lose control with solid stool? (n = 2921)



Endorsement Issues



Corrected item total correlations and Cronbach's alpha if item deleted (Wexner FCGS)

Item	Corrected – Item Total Correlation	Cronbach's Alpha if Item Deleted
X4 (Leak Solid)	0.52	0.46
X5 (Leak Liquid)	0.53	0.44
X6 (Leak Gas)	0.25	0.77
X8 (Wear Pad)	0.39	0.50
X10 (Alter Lifestyle)	0.42	0.50

Cronbach's Alpha for Wexner FCGS $r = 0.57$ (unacceptable range, Streiner and Norman 2003)

Confounded by Flatus

- Not surprising endorsement rates for liquid and solid stool leakage are low – not common in community
- Endorsement rates for flatus are much higher, but should flatus be counted as incontinence? Excluded in ICS definition
- In the Wexner all items are of equal weight in deriving the total score for incontinence. Is flatus leakage as severe a symptom as liquid or solid leakage?
- AIHW 2006 *Incontinence in Australia* – of the 1099 subjects that endorse any faecal incontinence symptom 892/1099 are only endorsing the flatus item
- Hawthorne 2006 – prevalence including flatus item = 35%; prevalence without flatus item = 8%
- 8% figure more consistent with other prevalence estimates

Correlation matrix for faecal items

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
X1 Bowel Pattern	1									
X2 Bowel Movements	-0.01	1								
X3 Urgency	0.32	0.16	1							
X4 Leak Solid	0.23	0.10	0.31	1						
X5 Leak Liquid	0.32	0.12	0.35	0.63	1					
X6 Leak Gas	0.19	-0.01	0.28	0.23	0.25	1				
X7 Leak Stool / Urgency	0.29	0.10	0.33	0.55	0.63	0.25	1			
X8 Wear Pad	0.21	0.06	0.17	0.41	0.35	0.15	0.42	1		
X9 Leak / Change Underwear	0.26	0.11	0.29	0.46	0.59	0.22	0.65	0.45	1	
X10 Alter Lifestyle	0.34	0.12	0.29	0.40	0.48	0.13	0.46	0.44	0.49	1

$X4 + X5 + X6 + X8 + X10 = \text{Wexner FCGS}$

Rotated factor matrix for the faecal incontinence items X1 – X10

		Factor		
		1	2	3
X1	Bowel Pattern	0.27	0.59	-0.12
X2	Bowel Movements	0.08	-0.03	0.95
X3	Urgency	0.20	0.70	0.33
X4	Leak Solid	0.71	0.22	0.07
X5	Leak Liquid	0.75	0.31	0.10
X6	Leak Gas	0.08	0.74	-0.08
X7	Leak Stool / Urgency	0.77	0.25	0.06
X8	Wear Pad	0.71	-0.03	-0.06
X9	Leak / Change Underwear	0.78	0.18	0.06
X10	Alter Lifestyle	0.70	0.15	0.09

$X4 + X5 + X6 + X8 + X10 = \text{Wexner FCGS}$

Interpretation

- For the faecal incontinence items, Rotated Factor 1 accounted for a large proportion of the variance 40.06%, while Rotated Factor 2 and 3 accounted for 10.70% and 10.24% respectively
- Examining the item loadings on each factor the following points emerge:
- Items X4 (leak solid), X5 (leak liquid), X8 (wear pad), and X10 (alter lifestyle) from the Wexner FCGS, plus X7 (leak stool / urgency) and X9 (leak / change underwear), all load heavily on Rotated Factor 1 (weights above 0.50)

Interpretation

- Items X6 (gas), X3 (urgency) and X1 (bowel pattern) load highly on Rotated Factor 2 (weights above 0.50). This seems to reflect a collection of other symptoms like gas, urgency and erratic bowel patterns. This factor is hard to interpret, as these items do not seem to neatly fit together
- Item X2 (bowel movements) loads only on Rotated Factor 3. This item appears to define this factor almost completely
- In light of this, Rotated Factor 1 appears to represent the common factor of **faecal incontinence / soiling**. While Rotated Factor 2 could represent other bowel / stomach symptoms and Rotated Factor 3 represents the number of bowel movements.

Conclusions

- The flatus item should be removed from the Wexner FCG Scale – those that endorse it rarely endorse other faecal incontinence items. Its inclusion also confounds prevalence estimates. It is also doubted that it is providing any useful clinical information.
- Following clinical advice the additional items were included in the survey. Items concerning bowel patterns, number of motions, and one of the faecal urgency items, did not load highly on the main faecal incontinence factor.

Conclusions

The six items that loaded most highly on the faecal incontinence factor were:

- In the past 4 weeks: Do you leak, have accidents or lose control with a liquid stool? (WFCGS)
- In the past 4 weeks: Do you leak, have accidents or lose control with a solid stool? (WFCGS)
- *In the past 4 weeks: Do you need to wear a pad to protect your underwear from stool? (WFCGS)*
- In the past 4 weeks: Do bowel or stool leakage cause you to alter your lifestyle? (WFCGS)
- In the past 4 weeks: Do you leak stool if you don't get to the toilet in time?
- In the past 4 weeks: Does stool leak so that you have to change your underwear?

Redundancy?

Consider

- In the past 4 weeks: Do you need to wear a pad to protect your underwear from stool? (WFCGS)
- In the past 4 weeks: Does stool leak so that you have to change your underwear?

The pad question from the Wexner has been criticized as it may relate to patient fastidiousness (Vaizey, 1999). It may be better to exclude this item on these grounds and its similarity to the item on soiling (loadings = 0.71 and 0.78 respectively)

The final version of the 5 item Revised Faecal Incontinence Scale deletes this item

IRT Findings

As part of this study Graeme Hawthorne has also undertaken an IRT analysis of the faecal incontinence items. This reduces the solution to 4 vs. 5 items resulting from CTT considerations. The Faecal Continence Assessment Scale (FCAS) contains these items:

- In the past 4 weeks: Do you leak, have accidents or lose control with a liquid stool? (WFCGS)
- In the past 4 weeks: Do you leak, have accidents or lose control with a solid stool? (WFCGS)
- In the past 4 weeks: Do you leak stool if you don't get to the toilet in time?
- In the past 4 weeks: Does stool leak so that you have to change your underwear?

The pad item is not included and neither is the lifestyle item below

- In the past 4 weeks: Do bowel or stool leakage cause you to alter your lifestyle? (WFCGS)

Recommendations

- If the Wexner Scale is to be used the item concerning flatus should be deleted.
- Both the 5 item Refined Faecal Incontinence Scale (RFIS) and the 4 item Faecal Continence Assessment Scale (FCAS) need to be tested in clinical populations where a greater spread of incontinence symptoms will be found.
- It is thought the RFIS may be more acceptable to clinicians than the FCAS as it includes the effect of faecal incontinence on lifestyle. This remains to be ascertained.
- The 4 item FCAS or a 2 item faecal incontinence index (AIHW, 2006) based on the liquid and solid stool questions from the Wexner may be the better instruments to use in prevalence studies.