The challenge of managing continence care in residential aged care settings: Recommendations for research and practice

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Keywords
incontinence, residential aged care, continence interventions

Abstract
Incontinence-related problems are a major reason for placement in residential aged care facilities. Data from the Residential Classification Scale indicates that 86% of people in residential aged care facilities in Australia are dependent on others for bladder management, 77% require some support with bowel management and 78% require some support with toileting. In this paper, we present an overview of the literature on the issues that need to be considered for the management of incontinence in residential aged care settings. Based on this literature, we make recommendations for research and practice. Although residential care facilities are mandated to provide continence care, there is little research evidence on which to base care or to evaluate the effectiveness of current practices. Further research is required to address this gap in information to ensure delivery of residential aged care that meets the requirements of the Aged Care Act 1997.

The problem of incontinence
Urinary incontinence is commonly defined as the complaint of any involuntary leakage of urine (Abrams, Cardoza, Fall et al., 2002). Faecal incontinence is described as the involuntary loss of flatus, liquid or solid stool that is a social and hygienic problem (Norton & Kamm, 2002). Problems with continence are not confined however to the management of urinary and faecal incontinence, because individuals may experience a range of other problems related to bladder and bowel function. These include constipation, urgency, diurnal frequency and/or nocturia (Yates, Day & Harvey, 2001; Fonda, Benvenuti, Cottenden et al., 2002).
Incontinence-related problems are a major reason for placement in residential aged care facilities (Pearson, 2003). Data from the Residential Classification Scale (RCS) indicates that 86% of people in residential aged care facilities in Australia are dependent on others for bladder management, 77% require some support with bowel management and 78% require some support with toileting (Australian Government Department of Health and Ageing, Residential Classification Scale Statistics, 2003). But very little attention or research has been directed towards continence care for the frail elderly in residential care, despite incontinence having a deleterious effect on quality of life. For example, nocturia is known to disrupt sleep and cause daytime sleepiness and has a negative impact on quality of life. Moreover, it has been identified as a risk factor for falls (Fonda et al., 2002). In this paper, we present an overview of the literature on the issues that need to be considered for the management of incontinence in residential aged care settings. Based on this literature, we make recommendations for research and practice.

**Search strategy**

The search strategy used in this review included articles from Cinahl and Medline databases, government policy documents, guidelines produced by the International Continence Society in collaboration with The World Health Organisation (Abrams Andersson, Artibani et al., 2002) and the Cochrane Database of systematic reviews. This latter search identified 10 systematic reviews that described behavioural interventions for the management of urinary incontinence (see Appendix 1) and 13 randomised controlled trials that described behavioural interventions that had been tested amongst older adults in residential aged care (see Appendix 2).

**The economic impact of incontinence in residential aged care**

It is difficult to determine the overall costs of incontinence because some costs are hidden, such as the impact on an individual's quality of life. More direct costs, by contrast, are easier to calculate and include laundering, staff time, product usage, investigation and treatment of the problem, and the treatment of health-related complications, such as pressure sores, urinary tract infections and constipation. There is limited contemporary published data on the costs of managing incontinence specific to individuals in residential care. A Canadian study reported that incontinence management costs add C$9971 to the yearly cost of care per individual (Borrie & Davidson, 1992). More recently, an Australian study estimated the costs of incontinence care in a population of patients admitted to rehabilitation and neurological wards averaged A$49 per patient per day or A$17,885 per person per year (Morris, Dunkley, Allen et al., 2002). Direct costs in residential aged care facilities will vary according to residents' dependency levels, staffing levels and the skill mix of staff members employed in the facilities.

In 2000–2001, the Australian Government provided $3.9 billion for residential aged care services (Australian Institute for Primary Care, 2001). There is no specific data on the proportion of this funding being spent on promotion and management of incontinence in residential aged care. However, it is estimated that in Australia, expenditure associated with continence aids in this setting was A$41.6 million per annum (Dunn, Paterson, Kowanko et al., 2001).

Under the current funding system for continence care in residential aged care facilities funds are allocated according to the resident's level of dependence (Australian Government Department of Health and Ageing, 2002). The concern with this system is that linking increased funding to higher care needs associated with incontinence may inadvertently act as a disincentive to identifying and treating those whose incontinence is potentially reversible (Hunt, 1999) and/or to proactively managing incontinence and maintaining continence. This system does not accommodate improvements and variations in residents' status and raises questions about facility proprietors' motivation to admit that residents have become less dependent. Clearly, questions remain about whether this is the best way to fund continence.
management or the level of funding required to provide adequate continence care.

As part of the National Continence Management Strategy, the Australian Government has committed funding to the development of a framework for evaluating the costs of continence conditions across a range of settings (Australian Government Department of Health and Ageing, 2004). This type of framework will assist in determining actual costs of care and, more importantly, provide guidelines for adequately funding continence care.

Management options for older adults in residential care

General principles of treatment

The aim of continence management is to achieve a number of outcomes, including: improved control over bowel or bladder function (achieving social continence); a reduction in the severity or frequency of symptoms; a reduction in the level of bother; increased understanding of the condition; and improved coping ability. More attention should be given to improving sufferers’ knowledge of their symptoms because this may enhance their adaptation to the condition especially when the condition is irreversible (Young, O'Connell & Murphy, 2000).

The management of incontinence in a residential aged care population is often complicated because the condition usually coexists with other conditions, such as reduced mobility, reduced ability to undertake activities of daily living (Pearson, 2003) and cognitive impairment. For example, determining a resident's preferences for continence care can be difficult when they are cognitive impaired and in these situations treatments used are often those preferred by healthcare professionals. In a study on treatment choices, residents indicated a preference for using pads rather than active night-time toileting. Smith (1998) noted that the values and assumptions of the professional healthcare workers did not necessarily match those of the individual concerned. It was noted that residents became anxious and agitated with the night-time toileting program that the staff had implemented in an attempt to reduce rates of incontinence. Another study found that, when asked about preferences for continence management, significantly more residents and family members preferred medication over pads, whilst nurses expressed a preference for toileting programs (Johnson, Ouslander, Uman et al., 2001).

All current guidelines for the assessment and management of incontinence recommend an individualised assessment be undertaken to identify any potential modifiable or reversible factors that could lead to a reduction in the severity of incontinence or, at least, to a reduction in symptoms (Abrams, Andersson, Artibani et al., 2002; Button, Roe, Webb et al., 1998; Fantl, Newman, Colling et al., 1996; Norton & Kamm, 2002). This principle applies equally to individuals who are frail and elderly, because it has been found that even in this group, continence symptoms are often transient or reversible (Brocklehurst, Dickinson & Windsor, 1999; Gautam, Jamieson & Donald, 1999).

Although an appropriate assessment is important, the type of information that is collected by health care professionals and the timeframe for collecting data to establish individuals’ elimination patterns vary. Given the invasiveness of some types of data collection procedures, the value and appropriateness of extensive assessment, including clinical investigations such as urodynamics procedures, need to be empirically established.

Initially, treatment of incontinence is directed towards remedying any reversible causes, such a lack of fluid and fibre intake, inappropriate laxative or medication use, dietary intolerances, gut stimulants such as caffeine, underlying urinary tract infections, constipation and delirium (Brocklehurst et al., 1999; Norton & Kamm, 2002). Consensus guidelines recommend minimally invasive treatment with the least potential for adverse complications and medication side effects (Fantl et al, 1996).

Another issue relating to incontinence in residential aged care settings is that some elderly incontinent individuals do not have an underlying physiological abnormality of bladder and bowel function (Fonda...
et al., 2002; Yu, Rohner, Kaltreider et al., 1990). Rather, their incontinence is caused by a lack of resources and contextual factors such as the layout of the environment or the accessibility of toilets (Yu et al, 1990; Ouslander et al, 1995). This highlights the need to address the management of incontinence not only from a treatment perspective, but also from an organisational and management perspective.

Treatment options
There are a number of treatment or management options for urinary or faecal incontinence. These range from lifestyle and environmental modifications, containment measures and complementary therapies to more treatment-based approaches such as behavioural interventions or surgical and pharmaceutical options. Each type of treatment has some strengths and limitations in its use in the residential aged care population. Clearly, it is important to have an understanding of the efficacy of each treatment option when used in this population as well as taking into account the invasiveness of the treatments and the impact it has on the quality of life of individuals.

In Australia, the management of incontinence also needs to comply with criteria established by the Australian Government Department of Health and Ageing and outlined in the Residential Care Manual (2002). Within this framework, a continence program is based on an individualised continence assessment and the development of an appropriate care plan that extends beyond just using pads and toileting regimes. Other care options include environmental and lifestyle modifications, containment measures, complementary therapies, behavioural approaches, biofeedback/pelvic floor muscle exercises/electrical stimulation, bladder training, toileting assistance programs, and surgical and pharmaceutical interventions.

Environmental and lifestyle modifications
Particular attention should be given to minimising environmental barriers that hinder the maintenance of continence. These barriers are bed height, distance to the toilet, adequacy of lighting at night and communication aids, such as hospital buzzers and signage. Individualised lifestyle factors may also increase the risk of incontinence. Such factors include obesity (Halstedahl & Hunskaar, 1998; Kuh, Cardoza & Hardy, 1999) and excessive caffeine or fluid intake (Dowd, Campbell & Jones, 1996; Griffiths, McCracken, Harrison et al., 1993; Tomlinson, Dougherty, Pendergast et al., 1999). Strategies that are directed toward modifying these and other risk factors may improve or resolve incontinence.

Containment measures
The most common form of management of incontinence in residential aged care settings is the use of body worn absorbent disposable pads or pants. Other continence aids include bedpads, body worn absorbent reusable pads and pants, catheters, body worn urine collection devices, handheld urinals, bedpans and/or commodes. The choice of aid needs to be individualised and based on a range of factors, including cost, resources, personal preference and type of incontinence.

Containment of faecal incontinence is a particular challenge because few incontinence products are designed to adequately cope with this condition (Norton et al, 2002). One aid that can be used for the management of faecal incontinence is an anal plug (Norton & Kamm, 2001), but it has limited use in healthy older adults and even less in the frail elderly. A systematic review on the effectiveness of continence aids, including pads, revealed a paucity of high quality research in this area (Dunn, Paterson, Kowanko et al., 2002). Consequently, it is difficult to make recommendations about the exact type of aids that should be used to manage incontinence. Clearly, this is an area that requires further research, because the cost of incontinence aids is considerable.

Complementary therapies
Complementary therapies can also be used to prevent and treat incontinence. For example, urinary tract infection is cited as a risk factor for urinary incontinence (Resnick, 1988). Cranberry juice or agents that alter the pH of urine have been claimed to reduce this risk (Jepson, Mihaljevic & Craig, 2005). It is important to note, however, that the
efficacy of these agents in the residential aged care population has not been established (Jepson et al, 2003). Further, although treatment of symptomatic urinary tract infection is broadly recommended, the assumption that urinary incontinence in the frail elderly population will be resolved with treatment of the infection is questionable (Ouslander, 1990; Boscia, Kobasa, Abrutyn et al., 1986).

**Behavioural approaches**

Behavioural approaches represent an attractive first option in the management of urinary or faecal incontinence in frail older adults. Behavioural interventions for urinary incontinence are diverse and may include biofeedback, pelvic floor muscle exercises with or without biofeedback and/or electrical stimulation, bladder training, and toileting assistance programs (i.e. prompted voiding, habit retraining and timed voiding). Similarly, behavioural interventions for faecal incontinence include biofeedback, pelvic floor muscle training and modification of fluid and/or dietary intake.

In promoting behavioural interventions for urinary incontinence, The Agency for Healthcare Research and Quality acknowledges that many behavioural approaches rely on the person being treated having intact cognition and being able to assist with their own care (Fantl et al., 1996), while other approaches are passive and rely on caregivers. Passive approaches are more suitable for individuals with cognitive and motor deficits (Fantl et al., 1996), although a combination of approaches should be considered depending on each individual's health status.

**Biofeedback, pelvic floor muscle exercises and electrical stimulation**

Three common interventions for the treatment of urinary and faecal incontinence in the general population are biofeedback, pelvic floor muscle training and electrical stimulation. Pre-requisites for these types of treatments include normal sensory awareness, the ability to discriminate and contract the appropriate muscles, intact cognition and good motivation, conditions that may not always exist in frail elderly populations. Consequently, the extent to which these treatments are appropriate for such populations remains questionable. With limited research evidence to support the use of these three interventions, this is especially relevant. The invasiveness of components of these interventions and the way they affect individuals, many of whom are cognitively impaired, demands that they be used with caution.

**Bladder training**

Bladder training is classified as an active intervention and is widely used for the treatment of urinary incontinence. It is generally used for the treatment of people with urge incontinence or detrusor instability, although it is also thought to be of use for people with mixed incontinence or stress incontinence. Because the aim of the intervention is to progressively extend the intervals between voiding, pre-requisites for this intervention are similar to those for the aforementioned interventions and similar limitations
The evidence base for the management of incontinence in frail older adults

The extent to which continence care interventions for older adults in residential aged care are based on sound evidence requires critical review. There is no evidence of the potential for bladder training for frail older adults in residential aged care settings. Other forms of toileting assistance include habit retraining and timed voiding. Habit retraining is similar to prompted voiding but it requires caregivers to identify the incontinent person’s unique voiding pattern and to implement a toileting schedule that reinforces that pattern. Timed voiding, by contrast, is a toileting schedule that is fixed by time or event, and is carer-led and not individualised. Because a systematic examination of continence care practices had not been undertaken in residential aged care settings in Australia, it is unclear which, if any, of these forms of toileting assistance is practised.

Surgical and pharmaceutical interventions

While elderly and frail individuals should not be excluded from the surgical or pharmaceutical options accessible to younger and healthier individuals, the capacity of older frail adults to benefit from these approaches is often compromised by concurrent health problems and by the potential for adverse reactions. It is also important to consider the limited evidence of effectiveness of surgical and pharmaceutical interventions in this target group. One group of drugs that is excessively used by elderly people (Harari, Gurwitz, Avorn et al., 1996) and that may even cause faecal incontinence (Brocklehurst et al., 1999) is laxatives. Because there isn’t any evidence that laxatives are effective in the prevention of constipation in this age group, they should be used with caution (Petticrew, Watt & Sheldon, 1997).

Toileting assistance programs

Research-based interventions for the management of incontinence among frail older adults in residential care settings largely focus on exercise protocols that are aimed at maintaining the individual’s mobility (Schnelle, Macrae, Ouslander et al., 1995) and on toileting assistance programs. Prior to focussing on toileting assistance programs, it is important that some emphasis be directed toward improving or maintaining individuals’ mobility because this aspect is fundamental to the maintenance of continence.

Prompted voiding is a form of toileting assistance that has been developed in North America to improve bladder control in people with or without dementia using verbal prompts and positive reinforcement (Eustice, Roe & Paterson, 2004). The purpose of the intervention is to teach the person to increase self-initiated toileting (Eustice et al., 2004). Although prompted voiding is considered an effective strategy, studies report that it is inconsistently performed by usual care staff (Burgio & Burgio, 1990; Schnelle, Newman, White et al., 1993). The 2nd International Consultation on Incontinence recommended management strategies that optimise staff compliance with prompted voiding (Fonda et al., 2002). Recommended strategies in the literature include:

- the development and use of organisational policies, procedures, performance and quality monitoring processes, that are linked to financial remuneration for facilities that maintain or improve continence care (Schnelle, Cruise, Rahman et al., 1998; Schnelle et al., 1999)
- ongoing staff education, and training and skill enhancement of staff (Lekan-Rutledge, Palmer & Belyea, 1998; Remsberg, Palmer, Langford et al., 1999)
- increased staffing levels, including in administration and support (Lekan-Rutledge et al., 1998)
- alternative models of care that improve communication between employees (Lekan-Rutledge et al., 1998).

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and pelvic floor muscle exercises (with or without biofeedback) to improve continence among frail older adults in residential aged care settings. However, there are research findings relevant to this group in systematic reviews on prompted voiding, habit retraining and timed voiding. The systematic review on prompted voiding reported that there is limited evidence that prompted voiding increases self-toileting and decreases incontinent episodes in the short-term, however the long term sustainability of these benefits has not been established (Eustice et al., 2004). A single small trial suggested short-term benefits from the use of the muscle relaxant Oxybutinin (Ouslander et al., 1995). The team who conducted the systematic review cautioned that prompted voiding has definite resource implications and that these need to be considered, as do the educational and training needs of caregivers (Eustice et al., 2004).

Two other systematic reviews on timed voiding and habit retraining found insufficient evidence to support these interventions. Consistent with the findings of the systematic review on prompted voiding, these reviews reported that these interventions are also poorly sustained by staff providing the care (Ostaszkiewicz, Johnston & Roe, 2004a; Ostaszkiewicz, Johnston & Roe, 2004b). Given this situation of a lack of strong evidence on these three frequently recommended interventions, further research is required to guide practice so that scarce resources are used effectively.

Workforce issues
Incontinence in frail older adults is a complex and multifactorial problem that requires skilful management and relies on the carer to have knowledge not only of incontinence, but also of the management of older adults, many of whom have cognitive impairment and behavioural problems. For example, a study found that many cognitively impaired individuals respond with acute anxiety when usual care staff attempt to provide assistance with continence care and an episode of incontinence may evoke combative and/or verbal aggression from individuals with cognitive impairment toward staff (Hutchinson, Leger-Krall & Skodol Wilson, 1996). This highlights the importance of appropriately selecting and assessing interventions and the need for well-educated individuals to work in these settings. It also illustrates the need for a management plan to be developed that focuses on treating an individual's continence problem as well as on caring for their mental state.

Contextual factors that influence the level of care provided to frail older adults in residential aged care settings include the increasing acuity of the older adults, staff ratios, staff skills mix and knowledge base, and the stability of the workforce (Australian Nursing & Midwifery Council, 2002). The main groups of staff engaged in providing accommodation and care in residential aged care settings in Australia include proprietors or managers, registered nurses, enrolled nurses, nurse assistants, personal care workers and support staff of various types. A significant finding reported by the Australian Government, Department of Education, Science and Training (2003) is that the total number of registered and enrolled nurses working in this sector has declined in recent years while the total number of persons in nursing support occupations (nurse assistants and personal care positions) has increased significantly. Personnel employed in these support positions have generally completed training to a certificate II, III or IV level in the vocational education system. The extent to which this training provides the skills and expertise necessary to address the complex needs of the older adults in residential care requires further investigation. As the recently published report by Hogan (2004) states, an ageing Australia will result in substantially increased demand for aged care services, requiring a professionally trained workforce to maintain and improve levels of service to meet future demand.

Conclusion
Incontinence is a major reason for placement in residential aged care facilities. Current guidelines for assessment and management of incontinence recommend an approach based on an individualised assessment that identifies potential modifiable or reversible factors that could lead to a reduction
in the severity of the incontinence or, at least, to a reduction in symptoms and the achievement of social continence. Because of the paucity of research findings in the area of continence care for the frail elderly, further research is required. This research should address topics including optimal methods for assessing bladder and bowel incontinence, the duration of maintaining bladder and bowel diaries, the effectiveness of different types of containment devices, the best methods for providing toileting assistance and bladder training, methods for managing bowel and bladder care for individuals with impaired cognition including dementia. It is important that this research program occurs cognisant of the older person's perspectives on these care issues.

A number of continence management strategies are supported by research, however, the findings are applicable to the general population rather than the frail elderly, commonly found in residential aged care facilities. Consequently, current practices are measured against Commonwealth standards and accreditation audits rather than against research. It is important to acknowledge that incontinence is a complex and multifactorial problem that requires skilful management. The quality of care given to older residents is influenced by contextual factors that include the acuity of residents, staff ratios, staff skills mix, stability of the workforce, ongoing staff education and training, as well as the effectiveness of communication strategies and processes between different levels of employees. Although residential care facilities are mandated to provide continence care, there is little research evidence on which to base care or to evaluate the effectiveness of current practices. Further research is required to address this gap in information to ensure delivery of residential aged care that meets the requirements of the Aged Care Act 1997.

References


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### Appendix 1. Systematic reviews of behavioural interventions for incontinence

<table>
<thead>
<tr>
<th>Reviewers</th>
<th>Title</th>
<th>Authors conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazzelli, Shirran &amp; Vale, 1999</td>
<td>Absorbent products for containing urinary and/or faecal incontinence in adults</td>
<td>“The data were too few and of insufficient quality to provide a firm basis for practice. Disposable products may be more effective than non-disposable products in decreasing the incidence of skin problems and super absorbent products may perform better than fluff pulp products. However based on the available evidence, these conclusions can only be tentative” (p. 1).</td>
</tr>
<tr>
<td>Dunn Paterson, Kowanko &amp; Pretty, 2002</td>
<td>Systematic review of research into the effectiveness of continence products</td>
<td>“There is a lack of high-quality research into the effectiveness of continence products. A recurrent theme in the literature is the importance of individual assessment to find products to suit the particular needs of each consumer. This review indicates that the absence of research information about the effectiveness of continence aids and appliances makes selection difficult” (p. 129).</td>
</tr>
<tr>
<td>Eustice et al, 2004</td>
<td>Prompted voiding for the management of urinary incontinence in adults</td>
<td>“There was insufficient evidence to reach firm conclusions for practice. There was suggestive, although inconclusive, evidence of short-term benefit from prompted voiding and from adding the muscle relaxant, Oxybutinin to prompted voiding” (p. 1).</td>
</tr>
<tr>
<td>Herbison, Plevnik &amp; Mantle, 2002</td>
<td>Weighted vaginal cones for urinary incontinence</td>
<td>“Weighted vaginal cones are better than no active treatment in women with stress incontinence and may be of similar effectiveness to PFMT and electrostimulation. This conclusion must remain tentative until further larger high quality studies are carried out using comparable and relevant outcome measures. Some women treated with cones, pelvic floor muscle training or electrostimulation drop out of treatment early. Therefore cones should be offered as one option so that if women find them unacceptable they know there are other treatments available” (p. 1).</td>
</tr>
<tr>
<td>Hay-Smith et al., 2004</td>
<td>Pelvic floor muscle training for urinary incontinence in women</td>
<td>“Pelvic floor muscle training appeared to be an effective treatment for adult women with stress or mixed incontinence. Pelvic floor muscle training was better than no treatment or placebo treatments. Most trials to date have studies the effect of treatment in younger, premenopausal women. The role of pelvic floor muscle training for women with urge incontinence alone remains unclear. Methodological problems limit the confidence that can be placed in the findings of the review” (p. 2).</td>
</tr>
<tr>
<td>Hay-Smith, Herbison &amp; Morkved, 2004</td>
<td>Physical therapies for prevention of urinary and faecal incontinence in adults</td>
<td>“There is insufficient evidence to determine whether physical therapies can prevent incontinence in childbearing women, or men following prostate surgery. Further, better quality research is needed” (p. 1).</td>
</tr>
<tr>
<td>Hunter, Moore, Cody, &amp; Glazener, 2004</td>
<td>Conservative management for post prostatectomy urinary incontinence</td>
<td>“The value of the various approaches to conservative management of post prostatectomy incontinence remains unknown. There may be some benefit of offering pelvic floor muscle training with biofeedback early in the postoperative period immediately following removal of the catheter as it may promote an earlier return to continence. Long-term incontinence may be management by external penile clamp, but there are safety problems” (pp. 1–2).</td>
</tr>
<tr>
<td>Ostaszewicz et al, 2004a</td>
<td>Timed voiding for the management of urinary incontinence in adults</td>
<td>“The review found there is not enough evidence from trials on the impact of timed voiding on urinary incontinence” (p. 2).</td>
</tr>
<tr>
<td>Ostaszewicz et al, 2004b</td>
<td>Habit retraining for the management of urinary incontinence in adults</td>
<td>“Data on habit retraining are few and of insufficient quality to provide a firm basis for practice” (p. 2).</td>
</tr>
<tr>
<td>Wallace et al, 2004</td>
<td>Bladder training for urinary incontinence in adults</td>
<td>“The limited evidence available suggests that bladder training may be helpful for the treatment of urinary incontinence, but this conclusion can only be tentative as the trials were of variable quality and of small size with wide confidence intervals around the point estimates of effect. There was also not enough evidence to determine whether bladder training was useful as a supplement to another therapy. Definitive research has yet to be conducted; more research is required” (p. 2).</td>
</tr>
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### Appendix 2. Randomised controlled trials of continence interventions relevant to residential aged care populations

<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>Intervention</th>
<th>Reported outcomes</th>
</tr>
</thead>
</table>
| Colling, Ouslander, Hadley, Eisch & Campbell, 1992 | 113 elderly nursing home residents with urinary incontinence | 12 weeks of baseline assessment followed by 12 weeks of patterned urge response toileting or usual care followed by 12 weeks of follow-up | Within group reductions in incidence and volume of incontinence.  
Within group mean change of approx. .13 in urinary incontinence frequency ratio = reduction of one episode of incontinence in 5–8 voids per person per 24-hour period.  
Between group differences not statistically significant at outcome. |
| Colling, Owen, McCreedy & Newman, 2003 | 106 homebound older adults with urinary incontinence and their caregiver | Three weeks of baseline assessment followed by 6 weeks of patterned urge-response toileting or deferred treatment followed by 6 weeks of post-intervention treatment | Within group reductions in incidence and volume of incontinence.  
Between group differences not statistically significant at outcome.  
Reductions in caregiver self-reported stress levels/caregiver burden. |
| Engberg, McDowell, Weber et al., 1997 | 124 homebound older adults with urinary incontinence | Usual care or bladder training with biofeedback-assisted pelvic floor muscle exercises & deferment techniques for cognitively intact individuals | No outcomes reported in either publications. |
| Engberg, McDowell, Donovan, Brodak, & Weber, 1997 | 29 cognitively impaired and homebound older adults with urinary incontinence. Prompted voiding (n = 9) or delayed attention-control group (n = 10) | Usual care or prompted voiding for individuals with cognitive impairment | Within group reductions in incidence of incontinence of 22%.  
Between group differences which favoured treatment and were clinically but not statistically significant at outcome. |
| Hu et al, 1989 | 133 women with urinary incontinence from 7 nursing homes | 3 month intervention of prompted voiding with 22 weeks of follow up | Reduction of 0.6 episode of incontinence per day from baseline to follow-up. |
| Jirovec, 2001 | 118 community-dwelling elders with urinary incontinence and cognitive impairment | 6 months of individualised scheduled toileting or social contact | Within group reductions in incidence of incontinence  
Between group differences not statistically significant at outcome. |
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Description</th>
<th>Intervention Details</th>
<th>Results</th>
</tr>
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<tbody>
<tr>
<td>Saltmarche, Pringle, Reid &amp; Zorzitto, 1991</td>
<td>40 elderly males with urinary incontinence from 2 nursing homes</td>
<td>Habit retraining or control</td>
<td>The experimental group did not improve significantly and the control group deteriorated. Inconsistent application of the protocol.</td>
</tr>
<tr>
<td>Schnelle et al, 1983</td>
<td>21 residents with urinary incontinence from 2 nursing homes</td>
<td>1-hourly prompted voiding or control</td>
<td>Significant reductions in incidence of incontinence for intervention group and increases in self-imitated requests for toileting assistance compared with control group.</td>
</tr>
<tr>
<td>Schnelle et al, 1989</td>
<td>126 residents with urinary incontinence from 6 nursing homes</td>
<td>1-hourly prompted voiding or delayed treatment – variable duration</td>
<td>Frequency of incontinence changed from mean of 3.85 per 12h-1.91 during treatment.</td>
</tr>
<tr>
<td>Schnelle et al, 1995</td>
<td>76 nursing-home residents with urinary incontinence</td>
<td>2-hourly prompted voiding combined with an exercise training program</td>
<td>Changes in continence status not reported.</td>
</tr>
<tr>
<td>Smith, Newman, McDowell &amp; Burgio, 1992</td>
<td>20 residents of a skilled nursing section of a life care community</td>
<td>31/2 months duration – usual care followed by pad, pant, commode &amp; feedback followed by education to staff on transfers with timed voiding five times per day, combined with verbal reinforcement and medication</td>
<td>Group rate of incontinence – 20% for treatment group compared with 80% for control group. Individual rates – between group data not reported but treatment group changed from mean 80% to 38% wet.</td>
</tr>
<tr>
<td>Surdy, 1992</td>
<td>12 nursing home residents with urinary incontinence</td>
<td>9 weeks of 2-hourly prompted voiding or 2-hourly checking and changing</td>
<td>Decrease in percent wet/increase in correct discrimination between continence and incontinence/increase in patients' self-initiated requests for toileting assistance.</td>
</tr>
<tr>
<td>Tobin &amp; Brocklehurst, 1986</td>
<td>278 residents with urinary incontinence from 30 residential homes for the elderly</td>
<td>2 months of usual care or medical assessment plus timed voiding, medication, pelvic floor exercises, antibiotics and oestrogen replacement</td>
<td>Between-group differences in daytime incontinence frequency not statistically significant at outcome; however, statistically significant reductions in the incidence of night time incontinence.</td>
</tr>
</tbody>
</table>

Terms used in this Appendix are transcribed verbatim from the original publications and hence may not reflect contemporary terminology.