



NARRATIVE REVIEW

Interventions for Treating Urinary Incontinence in Residential Care: A Narrative Review

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Abstract

Background: Urinary incontinence (UI) is highly prevalent in elderly people residing in nursing homes. Care staff often lack the knowledge and management skills to effectively care for and treat residents with UI. The implementation of standardised treatment interventions at the individual or nursing home level can help to successfully manage and reduce UI in elderly residents.

Aim: Review intervention studies evaluating the effectiveness of different treatment interventions in managing and improving UI in residential care.

Data sources: MEDLINE and PubMed were searched from 2005-2019 using selective search strategies, detailing interventions and randomised controlled trials (RCTs) in residential care and nursing homes, focusing on elderly people. Pharmacological and surgical interventions were excluded. The search was limited to studies published in the English language.

Methods: A narrative review of studies aimed at reducing UI and improving continence in nursing home residents.

Results: 10 studies were identified that reported on interventions to improve continence care, and reduce UI with behavioural and conservative approaches for residents and/or educational training for staff. Assessment of UI varied widely in each study from recording of prompt voiding and frequency, electronic devices, diary assessment, support and motivation from care staff, to quality of life. None of the studies could be compared on intervention effectiveness in terms of outcome and assessment.

Conclusions and implications: Even though all studies reported some sort of improvement of UI, no comparisons can be made between studies. A core outcome set would be of great benefit to standardise the assessment and allow comparison of intervention effectiveness of UI in elderly.

Keywords

Urinary incontinence, Nursing homes, Elderly, Interventions, Randomised controlled trials

Abbreviations

UI: Urinary Incontinence; PV: Prompt Voiding; RCT: Randomized Controlled Trial; NH: Nursing Homes; QOL: Quality of Life; FIT: Functional Incident Training; NICE: National Institute of Healthcare and Clinical Excellence

Introduction

Nursing home residents are often frail elderly people with physical or emotional limitations that restrict their capacity to care for themselves [1]. Nursing home residents often have impaired functional decline, mobility, strength, endurance, cognition and physical activity [1].

One common issue is urinary incontinence (UI), the involuntary loss of urine that is a social or hygienic problem [2]. UI is a common indication for nursing home admittance, with a prevalence ranging from 50-84% among nursing home residents [3]. A UK study from 2004 including 16,043 nursing home residents reported that 72% were not fully urine continent [4]. Similar figures from the USA were 77% and from France 62% [5].

The cost associated with the management of UI in nursing homes is substantial; both institutionally and personally related to staff time, assistance, appliances and laundry expenses [2,6]. Specifically related to UI service costs, yearly estimates from the UK are £743 million [7].



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Current treatment practices and knowledge of UI lacks evidence and guidance approaches [8]. According to UK research, nursing staff do not have professional nursing qualifications particularly in residential care facilities, and continence knowledge, management and treatment practices are inadequate [9,10]. Furthermore, few nursing homes provide care from allied health care professionals such as occupational therapists, pharmacists and physiotherapists [11] which may improve care in relation to urinary tract infections or risk of falls due to frailty [12]. UI also has emotional consequences such as depression, embarrassment, frustration and misery [13]. The incidence of UI is likely to grow considering the increasing aging population in the developed world. An Australian report by Pearson [14] found that up to 125,000 elderly living in nursing homes suffer UI and this number is expected to double by 2030. The implementation of evidence based interventions and successful treatment methods and approaches is crucial for effective UI care.

This narrative review will focus on the effectiveness of interventions to reduce UI in elderly people residing in nursing homes. Interventions take place at the individual or nursing home level. An overview of interventions, their efficiency and evaluation are presented below.

Interventions

Nursing home residents depend on staff for daily living tasks such as dressing, grooming and moving [15]. While care staff provide minor assistance when it comes to continence care [16]. Various treatment preferences are available for UI. Conservative management, i.e. behavioural changes, lifestyle modification, pelvic floor retraining, and use of mechanical devices, is widely accepted as the initial approach for treating UI [17]. UI is not a chronic condition and nursing home residents can benefit from behavioural therapies such as prompted voiding, timed voiding and habit training in combination with light moderate exercises [18,19]. The European Association of Urology recommends a stepwise approach in relation to the management of UI, with the initial phase addressing underlying medical or cognitive issues, progressing to lifestyle modifications, behavioural therapy, and mechanical devices [20]. Examples of different interventions according to intervention group is provided below.

Support for Residents by Care Staff

Prompt voiding

Prompt voiding (PV) is a behavioural therapy reminding residents to use the toilet. Randomised clinical trials show this individualised UC treatment approach can significantly reduce the volume and frequency of UI among nursing home residents [21,22], while also im-

proving self-initiated toileting [23,24]. In two systematic reviews, positive effects of PV on continence outcomes were noted well and above that of standard care in elderly NH residents [24,25].

National Institute of Healthcare and Clinical Excellence (NICE) guidelines promote the use of prompted and timed [21,26-28] voiding in residents with poor cognitive functioning and those too feeble to urinate without help. This includes frequently asking residents if they require assistance to void and instigate their toileting habits through support and positive reinforcement [24]. An intervention evaluating the effect of using PV implemented by care staff in 5 nursing homes in Hong Kong [27], showed that the delivery of a long-term post-void intervention (6 months), can have positive effects on outcomes including wet episodes per day, incontinence rate per day, and total continent toileting per day when compared to the control group. More importantly, the intervention group showed a decrease of 9% in incontinence rate post-intervention.

In a study by Schnelle and colleagues in the US [29], care staff received training to implement PV with residents as an effective means of UI care but difficulties persisted in maintaining this approach over time [21,28]. In this Randomised Controlled Trial (RCT) only 52 of 486 residents were eligible to participate due to inability to provide consent, nursing home relocation and death, which highlights some of the challenges of implementing interventions in this particular setting. All care staff received training (educational and applied practice) to prompt the intervention group every 2-2.5 hours. A significant difference was observed after three months in relation to total continent toileting/day, with frequency in the intervention group being substantially higher at (5.2) times compared to the control (0.7) times, but no other significant differences were observed. However, at 6 months, significant differences were still observed specifically in relation to the number of wet episodes/day, incontinence rate/day and total continent toileting/day. While most other international studies of PV on UI lasted for 8 to 13 weeks [23,30] this study found that the PV program could be sustained (and even improve) when observed for longer.

Resident interventions

A study in Japan developed an individualised care strategy that centred on decreasing the size of diaper pads, promoting more frequent toilet use, and providing plentiful meals and appropriate fluid intake [31]. The study aimed to promote a better quality of life (QOL) for residents by addressing all five areas they felt were important for individualised care. These outcomes included promoting total meal intake, increasing fluid intake, encouraging urination in a toilet, increasing residents' out of bed time and reducing the length of time

in wet diapers. The programme trained one principal staff member from each NH facility, who would in turn communicate the strategy to other members of staff. Findings from the intervention showed that a quarter of residents improved while half showed no improvement. Although this study demonstrated improvements in UI care for some, many nursing home residents may have multiple comorbidities and other chronic conditions in combination with UI that affect their QOL. Therefore, while addressing UI is essential [32] reducing UI alone may not be enough to significantly impact residents' QOL especially when other comorbidities are present.

Results are similar to research in four veteran nursing homes where the Functional Incidental Training (FIT) approach was implemented [33]. FIT is an individualized training program that combines prompted voiding with low-intensity endurance and strength workouts, primarily designed for frail nursing home residents. The outcome, Functional Independence Measure (FIM), assessed mobility, sit to stand exercises, independence in locomotion and toileting. External research staff were involved in the delivery of the FIT approach and significant effects for all measures of endurance, strength and UI were observed, but not for toileting or locomotion according to the FIM. The intervention group displayed a significant reduction in wet episodes (54% to 25%) compared to the control group who demonstrated a slight increase (41% to 50%). During the 8 week cross-over the intervention group declined in all measures, which was attributed to the intensity of the programme which was offered 4 times per day, 5 days a week [33].

Education of staff

A cluster RCT carried out in twelve Austrian nursing homes [34], trained nursing staff on implementing guidelines to promote conservative management of UI among female residents. The intervention in this cluster RCT trained the chief nurse or staff member and provided materials addressing UI management recommendations, questionnaires about UI and quality of life and bladder diaries [26,34]. Data was collected at baseline and follow-up at 6 and 12 weeks [35]. The main outcome measure was residents' daily experience of UI. This was self-reported by residents using an Austrian version of the "International Prevalence measurement of care problems" [35]. Results showed a decrease in daily UI as well as continence aids. This intervention demonstrated how conservative therapies can be effective, well-tolerated and safe for nursing home residents struggling with UI.

A unit based educational program to promote urinary continence was conducted in nursing homes in Norway [36]. The intervention was carried out with 33 residents and focused on creating a greater awareness in evaluating frequency of leakage, volume of leakage, residual urine, urine analysis, toilet training, prompted voiding, bladder training, counselling support, and cor-

rect use of adaptive equipment. Results from this study found a reduction in average incontinent pad weights and in maximum incontinent pad weights.

External Training of Healthcare Professionals

Training intervention

The previously mentioned education programme for staff from Vinsnes and colleagues examined the effects of FIT [18] in a Norwegian nursing home where the intervention group showed a significant reduction in leakage compared to the control group. The intervention was led by two occupational therapists and a physiotherapist from outside of the NH facility, limiting the burden on care staff but increasing cost.

In a study carried out in the Netherlands, 20 nursing homes were randomised into a group based behavioural exercise programme to reduce or prevent UI or standard care to improve bladder, pelvic floor muscle and physical functioning of elderly women. Interestingly, participants in the control group showed similar improvements in UI through attention and monitoring using bladder diaries, functioning as an indirect intervention in its own right.

Multicomponent interventions

A cluster RCT to assess feasibility, acceptability and sustainability of a group exercise [37] included a mobility program led by trained physiotherapists and intended continence promotion, pre/post mobility training through prompted voiding, and fluid consumption [33], and enhance physical functioning with light strength, balance, flexibility and endurance movements [38]. The staff education training consisted of two-hour workshops on mobility and continence care [39]. The intervention resulted in less incontinence measured at six weeks, while the Rivermead Mobility index scores also moderately improved. This intervention is different to previous studies because it targets both staff (providing UI education) and residents (group mobility training) in a combined effort to promote continence in UK nursing homes.

Assessment of Outcome

Recording of prompting and frequency

Many nursing homes rely on manual UC assessment by care staff which consists of asking residents about their incontinence patterns or physically checking their incontinence pads and clothes every few hours [40]. Habit training, prompt voiding and timed voiding are widely acknowledged as the customary toileting assistance methods provided by care staff [24,41]. However, manual assessments are demanding on staff and invasive for elderly people, coupled with staff shortages and a high turnover of staff, result in poor assessment and management practices [42], which may be a reflection of the lack of a person centred approach

in UC management [43]. Care staff may feel incapable of delivering personalised care plans when looking after a high volume of patients daily, and the strain and pressure can lead to feelings of powerlessness, where toileting schedules and incontinence pads are commonplace [44].

Weighting pads

An RCT in Hong Kong [27] used prompt voiding to manage UI and participants wore pre-weighted disposable absorbent pads. Assessment included timed material checks for wetness and weighing every 2-2.5 hrs throughout the day. It was found that out of the four main outcome indicators (wet episodes per day, incontinence rate per day, self-initiated toileting per day and total continent toileting per day), the intervention group displayed significant differences, a decrease of (9.1%) in incontinence in relation to wet episodes per day, incontinence rate per day, and total continent toileting per day at 6 months post-intervention. Similarly, a substudy of a Nordic multicentre study used 24 hr pad weighting to measure UI. The weight pre-intervention, at 3 months and post-intervention, were compared and showed no significant differences. Improvements in UI were observed as UI increased in the control group receiving standard care. Research by Lai & Wan [27] assessed the effect of an individualised care strategy for UI in elderly NH residents but failed to accurately calculate percentage of wetness episodes as the weight of pads was 'felt' as a measure to determine wetness, thus displaying inaccuracy and unreliability of measures.

Electronic devices

Yu and colleagues [42] considered manual UC assessment too labour intensive and intrusive on patients and care staff, while disparity and ambiguity in the assessment and treatment of UC, resulted in difficulty in delivering individualised care plans for residents living in nursing homes [42]. To record UI events in nursing homes a tele-monitoring system was used. The initiation of a wetness episode was monitored by placing a sensor in a continence aid. All voiding episodes were available at any time during the 72-hour assessment period. Based on the timing and frequency of the episodes, a continence consultant produced an individualised UC care plan for each elderly person including a toileting schedule, distributing appropriate continence aids, and time to change aids. The six outcome measures included weight of urine voided into the continence aid, number of prescribed toileting events, number of actual toileting events, number of successful toileting events, secondary measure of the rate of successful toileting and adherence to care plans by staff were all evaluated using the tele-monitoring system. After 12 weeks significant improvements on UC functioning were observed on all outcome measures with the exception of number of successful toileting events, which remained unchanged. Overall, the study showed that an effective UC

tele-monitoring system can prove effective in reducing UC in elderly people in nursing homes, while increasing care staff compliance and awareness of the importance of UC care in these settings.

Comprehensive Care - Support and Motivation

An individualised care strategy was carried out by Tanaka, et al. [31] and trained one senior staff member in each of the 17 nursing homes. Outcome measures included changes in fluid volume intake, time spent in wet pads, size of pads and urination behaviour.

Diary assessment

As part of the initial assessment of UI, NICE guidelines advocate the use of bladder diaries [26]. Keeping a UI diary for a 3-day period to include a mixture of leisure and work days, has shown to improve UI, particularly with the use of an electronic diary. The electronic diary demonstrated greater proficiency in terms of being more efficient, less obtrusive and easy data collection and analysis [45,46]. Bladder diaries are composed of information on pad usage, fluid consumption, incontinence episodes, the feeling of urgency and level of UI. Many studies have assessed patients' accuracy and preferences in completing paper versus electronic bladder diaries for voiding dysfunction [45,47] and found that 94% of patients preferred using an electronic diary to a paper diary. Electronic diaries can collect symptoms in real-time, thus providing a more accurate indication of symptoms [45]. Similar findings were observed in a computerised voiding diary study [47] which showed a greater compliance among patients using a compu-void diary compared to a written diary. Patients recorded incontinence episodes and voiding events significantly more frequently in the compu-void diary, 94% of patients expressed a strong preference for the electronic diary.

Quality of Life/Quality of Care

Research has shown that care staff tend to overlook the seriousness of UI in elderly residents, particularly if the individual has other comorbidities considered more urgent, thus failing to actively intervene with the factors that contribute to their UI [48]. This creates an array of misperception including disregarding symptoms and delays in providing toileting assistance [49]. There is much evidence to suggest that the impact of UI is poorly understood and neglected by healthcare professionals working in nursing homes [50,51]. To achieve quality UI care, staff need to be aware of each patients' individualised symptoms, type of UI and the effect it is having on their day-to-day life [50]. Staff need to consider the residents' best interests when completing an initial assessment and throughout the treatment process [52]. Compliance to intervention assessment and quality of UI care is often challenging for care staff [53]. A national audit in England, Wales, and North-

ern Ireland aimed to assess the quality of continence care in elderly and 74% of nursing homes provided basic provision of care but discrepancies in the organisation of services and management and assessment of continence care were observed [54]. It is often unclear what constitutes appropriate continence care [54,55]. In a qualitative study of UI in nursing homes [41] the main theme was “protecting residents’ dignity” with one care staff stating “*my biggest thing is as long you’re able to maintain their dignity, that person is clean and not wet, that’s quality care*”. UI is often considered irreversible resulting in the management and maintenance of care rather than the prevention and reduction of UI in residents under their care.

Challenges

Incontinence can prove challenging due to additional processes of care in nursing homes such as restraint use, insufficient laxative prescribing, and restricted toileting accessibility [56], with some staff assuming UI is an intentional act [57].

Tak and colleagues [19] highlighted many challenges they encountered in their “incondition” program. Although their feedback was generally positive in terms of acceptability and satisfaction in promoting individual improvement, substantial numbers of participants dropped out. The main reasons for dropout were absence of motivation and other chronic conditions [58,59]. Other challenges included clarity on UI diagnosis at the outset, work environment and atmosphere [60]. An ethnographic study reported that the organisational values and beliefs in combination with admission policies, time orientation, institutional turmoil, staff collaboration and joint decision-making influences UI care. Similar observations were made by Ostaszkiwicz [61] who showed that continence management was supported and influenced by a structured work environment, frail dependent residents, highly demanding care, employee constraints and the poorly appraised nature of the work involved. Furthermore, Lai & Wan [27] described challenges in their study related to sample size, and poor supervision of nursing home staff to ensure sufficient delivery of the intervention. When compared to previous studies [62], only 191 participants out of 965 deemed eligible were included, and Lai and colleagues could only recruit 52 participants out of 465 residents. The low enrolment was mainly due to the attitudes of the caregivers who felt the intervention would not be sustainable as the residents were very old, frail and had UI for many years. Interestingly, the prevalence of UI among the Chinese population is substantially lower (44.4%) compared to the US (75.8%) which may also explain part of the low enrolment. Another challenge related to the administration of the screening tool to assess for percentage of wetness, was considered by family members to be too invasive and un-

comfortable, as a result obtaining informed consent proved challenging.

The Norwegian physical training program [18] discussed how their study could improve. The dropout for participants was high partly because of participant’s death that may be related to the high frailty score set for inclusion [1]. Further, this training program was based on physical activity and assisted daily living techniques which residents may have felt was too demanding especially since the programme was not specifically tailored to “frail elderly residents with UI” but to all residents, perhaps. Lai & Wan [27] encountered challenges in accessing patient records from NH facilities to record present and past illnesses and frequency of incontinent episodes. They also reported concern in relation to a lack of urologist evaluations in any of the 17 NH facilities. This has been echoed in other studies where urologist evaluations have been non-existent [63,64]. The more recent Austrian RCT [34] focused solely on female residents which reached a poor sample size (381) compared to national database numbers (950), resulting in reduced power and potentially false positive findings [65]. Had they included male residents this may have been avoided and would have increased the generalisability of results? Further, these authors assessed the main outcome measure (daily UI) using self-report by residents. While it is important to understand patient experiences and viewpoints of their care and treatment, this may not be the most reliable representation for assessing daily UI in elderly women. Additionally, authors relied on nurses’ clinical assessment for the diagnosis of dementia/cognitive impairment; perhaps an objective clinical diagnosis would prove more efficient.

Guidelines/Policy

Current international recommendations for UI management advocate an initial assessment for each resident by a specialised healthcare professional to establish the type, cause and severity of each individual’s UI symptoms, underlying causes, and implementation of conservative management techniques to reduce, prevent and/or treat incontinence [66]. Guidelines are available across many countries including Japan [67], USA [68] and France [69]. These guidelines are widely available but often lack uptake and assessment [70,71]. However, in England and Wales uptake and implementation is much better probably due to the provision by the National Institute of Healthcare and Clinical Excellence (NICE) [26], of web-based materials available to support implementation of UI guidelines, including guidance for patients, providers and clients of health care services [72].

Quality of continence care can be more easily assessed with readily available auditable measures of performance [54]. The UK has set the trend in evalu-

ating the quality of service provision in adults with UI in primary, hospital and nursing home care by using a feedback approach which has demonstrated notable improvements in UI care up until 2010 [73,74]. Reports from the UK 2001 National Service Framework: Older People (2001), and the Department of Health publication Good Practice in Continence Services called for the implementation of a cohesive continence service, however the delivery of services in this area has been unpredictable and inconsistent [75,76]. Poor adherence to quality assurance measures has similarly been identified in the Netherlands by Dutch GPs [77]. The NHS Commissioning Board will implement a number of prospective 'commissioning for quality and innovation' (CQUIN) proposals on continence care for practice by indigenous officials [78]. Additionally, the government's 18-week scheme has recognised the demand for regulations such as high-quality services, care routines centred on residents symptoms, service renovation, and heightened responsiveness of service provision. The EAU advocates that elderly residents with UI are supported by healthcare professionals in rehabilitation programs that include prompt voiding, and where possible a voiding diary for a course of 3-7 days to assess for

voiding dysfunction. UI records are advised to include at least 3 days to confirm authentication of bladder diaries [79]. Although the ideal time-period for UI diary entries is disputable, the 5th ICI supports a 1 day frequency volume chart which includes a morning void and day after void as a practical tool for understanding daily voiding habits at the outset [80]. Voiding diaries are cognisant to change and considered a valid measure of UI outcome.

Outcomes Measurement

Outcome measures for UI varied widely and included fluid intake, wet time, bladder scanning, pad change frequency, self-initiated toileting, and physical functioning: Endurance, strength, mobility as well as quality of life measures (see Table 1). Even though UI was the main outcome measure in 9 of the 10 studies reviewed, this outcome was categorised and measured differently. For example, UI was assessed in terms of wet episodes per day [27], no. of daily UI events [34], self-reported Care Dependency Scale (CDS), and continence (% of wet checks) [37] self-reported using urodynamic testing and urodynamic questionnaire "Do you ever leak urine when you're not supposed to?". UI status and severity of UI

Table 1: List of Interventions and outcome measures.

Authors/article	Intervention	Outcomes
Hodl, M., Halfens, R.J.G & Lohmann (2019). [34] Effectiveness of conservative urinary incontinence management among female nursing home residents - A cluster RCT	The intervention consisted of the implementation of recommendations for the conservative management of UI among female nursing home residents which took place in 3 parts. A one hour instructional meeting after baseline measurement with each nurse manager or person responsible in the IG nursing homes. The 29 guideline recommendations for the conservative management of UI.	-Number of daily UI events -Number of UI diagnoses -use of nursing interventions between the IG and CG.
Lai, C.K.Y & Wan, X. (2017). [27] Using Prompted Voiding to Manage Urinary Incontinence in Nursing Homes: Can it Be Sustained?	The prompted voiding intervention was delivered by staff for 6 months. All staff were trained by research personnel beforehand to ensure they were able to directly deliver the intervention before initiating it. The control group received usual care.	-Wet episodes per day -Incontinence rate per day -self-initiated toileting per day -total continent toileting per day
Yu, P., Hailey, D., Fleming, R., & Traynor, V. (2014). [42] An exploration of the effects of introducing a tele-monitoring system for continence assessment in a nursing home.	Care staff trained in the use of a tele-monitoring system for continence assessment. Voiding events were recorded for each participant using the system during a 72 hour urinary continence assessment, and the data was used to prepare an individualised care plan.	-Episode of UI -No. of prescribed toileting events -No. of actual toileting events -No. of successful toileting events -Secondary - % of successful toileting visits - compliance with care plan prescription
Tak, E, CPM., Van Hespén, V.A., Dommelen, P.V., Hopman-Rock, M. (2012). [19] Does improved function performance help to reduce urinary incontinence in institutionalised older women? A multi-center randomized clinical trial.	The program consisted of weekly group training session and homework exercises for 6 months (102) Control participants received usual care (90)	-UI status -Severity of UI -Physical performance

<p>Vinsnes, A.G., Helbostad, J.L., Nyronning, S., Harkless, G.E., Granbo, R., & Seim Arnfinn (2012). [18]</p> <p>Effect of physical Training on urinary incontinence: a randomised parallel group trial in nursing homes</p>	<p>Random allocation to training group (48) or control group (50). This individualised training program included accommodated physical activity and ADL training.</p>	<p>-UI (amount of leakage)</p>
<p>Schnelle, J.F., Leung, F.W., Rao, S.S.C., Beuscher, L., Keeler, E., Clift, J.W., & Simmons, S. (2010). [29]</p> <p>A controlled Trial of an Intervention Urinary and Fecal Incontinence and Constipation</p>	<p>The intervention consisted of toileting assistance, exercise and choice of food and fluid snacks every two hours for 8 hours per day for 12 weeks.</p>	<p>-Frequency of UI -Physical activity and mobility endurance -Food and Fluid intake</p>
<p>Tanaka, Y., Nagata, K., Tanaka. T et al., (2009). [31]</p> <p>Can an individualised and comprehensive care strategy Improve urinary incontinence (UI) among nursing home residents?</p>	<p>One senior member completed a training program and when finished educated the other care staff members in their NH facility and encouraged residents to participate also. The goals of the care strategy were to 1. complete meal intake, 2. Increase fluid intake, urinate in a toilet, spend 6 or more hours out of bed, and reduce time spent in wet diapers</p>	<p>-To complete meal intake -To take fluids up to 1500 ml/day -To urinate in a toilet -To spend over 6hr out of bed -To reduce time spent in wet diapers</p>
<p>Sackley, C.M., Rodriguez, N.A., Van den Berg, M. (2008). [37]</p> <p>A phase II exploratory cluster randomised controlled trial of a group mobility training and staff education intervention to promote urinary incontinence in UK care homes.</p>	<p>Physiotherapy-led group exercise and staff continence and mobility facilitation training.</p>	<p>-Continence - Continence status -Mobility (strength, balance, endurance and flexibility)+</p>
<p>Vinsnes, A.G. & Harkless, G.E. (2007). [36]</p> <p>Unit-Based intervention to improve urinary incontinence in Frail elderly.</p>	<p>The intervention focused on a systematic educational program aimed at improving knowledge and skill in assessment of frequency of leakage, amount of leakage, residual urine, urine analysis, toilet training, bladder training, prompted voiding, intermittent catheterization, counselling and proper use of adaptive equipment. All direct care staff received 45 minutes of training every other week.</p>	<p>-Severity of Incontinence -residual urine volumes -Urinary retention -Fluid intake amounts and frequency -Clinical symptoms of UTI- fever and pain.</p>
<p>Ouslander, J., Griffiths, P., McConnell, E., Riolo, L., Kuther, M. & Schnelle J. (2005). [33]</p> <p>Functional Incidental Training: A Randomized, Controlled, Crossover Trial in Veteran Affairs Nursing Homes.</p>	<p>FIT (Functional Incidental Training) Intervention: Prompted voiding combined with individualised, functionally oriented endurance and strength training.</p>	<p>-Endurance -Sit to Stand -Strength -Continence (% of wet checks)</p>

[81] were evaluated by 3-day bladder diaries assessing presence and severity of urine loss while Vinsnes & colleagues [36] assessed severity of UI by incontinence pad weight and pad change frequency. Frequency of UI [29] was assessed by performing physical checks on each participant every 2 hours for 10 weeks [29], and the amount of leakage [18,27] was measured using a 24 hr pad weighting test. No standardised or comparable assessment was identified in any of the papers.

Physical functioning (Endurance, strength, mobility) was measured in four of the studies reviewed. Studies used the physical performance test (PTT) [81]

observing residents walking, sit to stand exercises and light weight lifting movements [33], the River Mead Mobility Index to assess for functional mobility [37] and a physical activity and mobility endurance device for a constant record of physical movement [29]. Similar to the UI assessment, no standardised measurement of physical functioning in relation to UI was identified.

It also proved challenging to compare the (outcomes) of the interventions due to the variability in intervention time points from 6 weeks [37] to 6 months [27]. Even though positive outcomes were reported in most studies, challenges in comparing effectiveness and

efficiency remain due to the heterogeneity of outcomes.

Conclusions and Implications

UI interventions target behaviours, mainly by prompt voiding, and functional performance with fitness training, exercise and mobility programmes or by implementing a combination of behaviours and UI education for staff and residents. Some interventions involve the professionalism of qualified healthcare workers, which aim to educate staff and provide exercise training for residents. Other nursing homes carry out the intervention led by senior members of staff having received prior training and guidance from allied healthcare professionals. No valid, comparable or standardised measure to assess the outcome of UI interventions was identified, and the development of a core outcome set in this population would be timely.

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