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Toileting Disability in Older People Residing in Long-term Care or Assisted Living Facilities

A Scoping Review of the Literature

Jasper Yeung ◆ Allyson Jones ◆ Gian S. Jhangri ◆ William Gibson ◆ Kathleen F. Hunter ◆ Adrian Wagg

ABSTRACT

For purposes of this review, we defined toileting disability as a result of practices, procedures, or conditions that result in an individual requiring assistance using the bathroom. This scoping review synthesizes existing knowledge of extrinsic and/or intrinsic factors that might lead to or be associated with toileting disability and identified knowledge gaps related to toileting disability in older adults residing in long-term care or assisted living facilities. A search of 9 electronic databases and the gray literature identified 3613 articles. After exclusions and screening of the full text of 71 articles, 7 remaining eligible articles mapped research activity and identified knowledge gaps in this area. Only 1 study used toileting disability as the primary outcome; it was present in 15% of older adults without dementia living in long term-care facilities (a subgroup that comprised 34% of all residents). The other 6 articles examined factors and treatment of overall activities of daily living (ADL) performance as their primary outcome; in these, toileting disability was added to other difficulties, yielding a summary ADL outcome score. No study reported the incidence, distribution, or factors that affect toileting disability in long-term care; findings of this scoping review suggest a rich research agenda for future investigation.

KEYWORDS: Activities of daily living, Fecal incontinence, Frail, Institutionalized, Long-term care, Older, Scoping review, Toileting, Toileting disability, Urinary incontinence.

INTRODUCTION

Toileting is a fundamental activity of daily living (ADL). Successful toileting requires both physical and cognitive abilities.[1] In accordance with the disablement process model,[2] we defined toileting disability as practices, procedures, or disease conditions that result in an individual requiring physical assistance using the washroom to urinate and/or defecate in a timely manner. More than 60% of older long-term care residents require assistance with toileting, and loss of independence when toileting may create an additional caregiving and cost-related burdens for these individuals.[3,4]

We found few studies identifying specific aspects of functional status such as toileting; instead, the majority of studies we reviewed measured functional status using overall ADL performance instruments that assess multiple activities such as dressing, bathing, transferring, and eating.[5-8] These studies found correlations with functional status and a variety of factors such as cognitive impairment, depression, multiple comorbid conditions, body mass index, and vision impairment. Sociodemographic and behavioral factors were also associated with functional decline in community-living elderly people.[7] This scoping review focused on the extent that these factors are associated with toileting disability.

We assert that the growing cohort of older people living with multiple comorbid conditions and chronic disability will likely result in an increased prevalence of toileting disability requiring care. Toileting disability also presents challenges for older people and their caregivers associated with health-related quality of life. Identifying potentially modifiable factors associated with toileting disability may assist in its prevention or management. Given the apparent lack of knowledge of factors affecting toileting disability in older adults in residential care, we conducted a scoping review to identify themes and gaps in the epidemiology, as well as factors associated with toileting disability in long-term care residents 65 years or older. Specifically, our review addressed the (1) definition of toileting disability, (2) outcome measures used for toileting disability, and (3) epidemiology and factors associated with toileting disability in residents of long-term care and assisted living facilities.

Jasper Yeung, BSc, *School of Public Health, University of Alberta, Edmonton, Alberta, Canada.*

Allyson Jones, PhD, *Faculty of Rehabilitation Medicine, University of Alberta, Edmonton, Alberta, Canada.*

Gian S. Jhangri, MSc, *School of Public Health, University of Alberta, Edmonton, Alberta, Canada.*

William Gibson, PhD, *Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, Canada.*

Kathleen F. Hunter, PhD, *Faculty of Nursing, University of Alberta, Edmonton, Alberta, Canada.*

Adrian Wagg, MB BS, FRCP(Lond), FRCP(Edin), FHEA (MD), *Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, Canada.*

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Correspondence: *Adrian Wagg, MB BS, FRCP(Lond), FRCP(Edin), FHEA (MD), Faculty of Medicine and Dentistry, University of Alberta, 1-108 Clinical Sciences Bldg, 11350 83rd Ave, Edmonton, AB T6G 2P4, Canada (wagg@ualberta.ca).*

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As the breadth and depth of available literature on this topic were uncertain, both long-term care and assisted living facilities were included.

METHODS

Our scoping review used the methods described by Arksey and O'Malley[9] and expanded by Levac and colleagues.[10] A scoping review takes into account evidence from all research reports, regardless of quality, in order to synthesize available knowledge, map research, and identify gaps. Usually, the review process follows a number of prescribed steps. Levac and colleagues[10] refined the method in order to balance feasibility with breadth and comprehensiveness of the scoping process. They used an iterative approach to study selection and data extraction; they also incorporated a numerical summary and qualitative thematic analysis in reporting results. The method also considers the implications of findings to policy, practice, or research. Ideally, a consultation with stakeholders is a required knowledge translation component.

Search Strategy

Inclusion criteria were (1) residents of either a long-term care facility or an assisted living facility, (2) a reported mean age of residents 65 years or older, and (3) examination of factors related to the loss of independent toileting (see Supplemental Digital Content 1, available at: http://links.lww.com/JWOCN/A52). Long-term care facilities, also known as nursing homes, institutional care, and residential care, provide care and accommodation services for people with complex health needs.[11] Assisted living facility combines accommodation services with other supports for a wider range of people but not those with highly complex and serious health care needs.[11] Exclusion criteria were (1) single case reports, multiple case series, conference abstracts, and (2) studies with samples of 10 or fewer participants. Studies published from 1960 to October 15, 2018, were included so as to capture as wide a data set as possible. The review was limited to studies published in the English language.

The search strategy was developed and implemented with a University of Alberta health sciences librarian for 9 electronic databases (MEDLINE, CINAHL, EMBASE, PubMed, PsycINFO, SCOPUS, Web of Science, COCHRANE, and Abstracts in Social Gerontology). A separate search strategy was developed with the health sciences librarian that used Google Advanced Search for gray literature. The time allotted for gray literature search was 1 hour or until saturation was reached, whichever came first. Saturation was defined as not identifying new literature to include in analysis for 30 minutes or 5 consecutive search pages, whichever came first. The predefined time limit/saturation was set as a pragmatic limit while allowing a comprehensive search to be performed. All identified articles were uploaded to Covidence, a Cochrane technology platform that allows the review team to collaborate over the Internet and screen simultaneously.

Selection of Articles

Prior to screening, 2 reviewers (J.Y., W.G.) conducted a preliminary interobserver agreement test by screening the titles and abstracts of 50 randomly selected articles with predefined inclusion criteria. An interobserver agreement score of 0.9 (Cohen's κ coefficient) was achieved, which exceeded the suggested minimum threshold of 0.8.[12] (See Supplemental Digital Content 1, Kappa Agreement and Inclusion Criteria, available at: http://links.lww.com/JWOCN/A52.) If minimum interobserver agreement score of 0.8 (Cohen's κ coefficient) was not achieved, the inclusion criteria were to be clarified and the process repeated. In the event of disagreement, a third reviewer (A.W.) arbitrated. A high agreement score suggested that the predefined inclusion criteria were clear and robust without ambiguity.[13]

After removing duplicates, 2281 titles and abstracts were independently reviewed by 2 reviewers (J.Y., W.G.). Following title and abstract review, 71 articles were included for full test review (Figure). Reference lists of these articles were hand searched for other relevant articles, but no further articles were retrieved. The number of articles identified and selected at each stage is summarized in the Figure.

RESULTS

Four of the 7 studies[14-17] were conducted in the United States and the others were conducted in Singapore,[18] Switzerland,[19] and Brazil.[20] The majority (5 of 7)[14-16,19,20] were cross-sectional, 1 was a cohort study,[17] and 1 was a case-control study.[18] Six studies were conducted in long-term care,[14,15,17-20] and 1 was conducted in an assisted living setting.[16] Sample sizes ranged from 103 participants[14] to 17,331 participants.[19]. Females represented the majority of the sample, ranging from 67%[19] to 83%[21] across all studies (Table 1).

Only one study defined toileting disability and used it as an outcome.[16] Toileting disability was operationally defined by Talley and colleagues[16] as experiencing difficulty with or requiring human or mechanical assistance when toileting. Thus, a resident was considered to have toileting disability if there was an affirmative reply to the question, "Does the resident currently receive any assistance using the bathroom?"

Three of the 7 studies examined the level of toileting independence[14,15,17] as one of their outcomes, but a definition was not provided. The other 3 studies[18-20] measured toileting independence separately during their assessment, but these scores were subsequently combined with scores for other tasks (eg, dressing, bathing, transferring, and eating) to produce a summary ADL score, which was used as the primary outcome. Given that only one study attempted to define toileting disability, there is no clear consensus on how it might be defined.

Measures of toileting ability/disability ranged from a single question to multi-item instruments. Toileting ability was evaluated dichotomously using a "yes"/"no" response in 3 studies,[14,16,20] a 4-point Likert scale in 3 studies,[17-19] and a 5-point scale in another study.[15] Three studies extracted data from the long-term care charts reviewed by trained researchers.[14,15,18] One study collected toileting performance from interviews at the facility with facility staff members.[16] The other 3 used performance-based measures to evaluate toileting disability; 2 studies used the standardized assessment tool RAI-MDS (Resident Assessment Instrument–Minimum Data Set),[17,19] and 1 study used the Katz Index of Independence in ADL instrument.[20]

A variety of measurements were used to assess toileting ability; we found no clear consensus on which measure was best. Six of the 7 studies investigated disability with ADL as a summation of difficulties with other ADL tasks. Considered collectively, information specific to toileting was scarce. Talley and colleagues[16] evaluated toileting disability using a single question answered by the nursing staff. Marx and colleagues[14] collected data from the Maryland Appraisal of Patient Progress

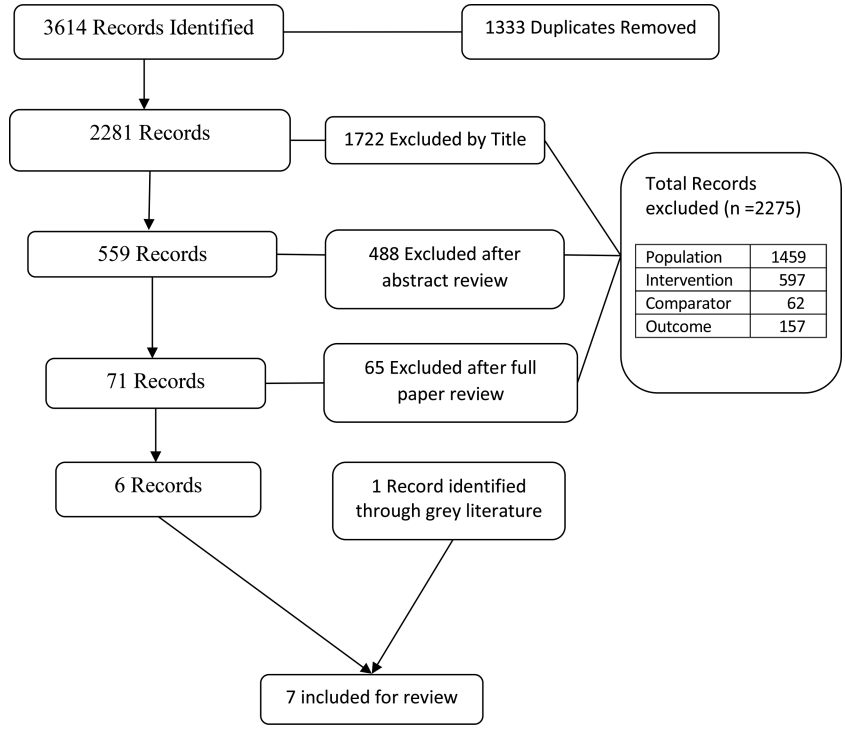

Figure. Flowchart of inclusion and exclusion of articles.

(MAPP) charge nurse reports to classify a resident as independent/needs some assistance or completely dependent. Ang and colleagues[18] reviewed case records to determine resident toileting ability (among the 5 ADLs considered) as independent, need assistance, need bedpan/urinal/commode, incontinent, or unknown. Cases were considered to have functional decline when there was deterioration in 2 or more of the 5 ADLs, while controls were those without functional decline. Toileting was only a component of functional decline and was not examined separately. Breuer and colleagues[15] relied on clinical charts to collect data on ADL performance; independence in toileting scores ranged from 1 to 5, with higher levels indicating a greater degree of dependence. Burge and colleagues[19] used the Minimum Data Set (MDS) ADL long form scales. All 7 task scores were coded from 0 (independent) to 4 (totally dependent). Toileting was not examined individually in this study. Wang and colleagues[17] also used the MDS to examine how cognition influences the relationship between associated factors and ADL. They calculated a total ADL score (aggregated from 7 MDS items). Following factor analysis, they chose 3 variables (personal hygiene, toileting, and eating) as outcome variables representing early, middle, and late ADL loss. Individual tasks were rated from 0 (totally independent) to 4 (totally dependent). The relationship between degree of cognitive impairment and toileting and how this was moderated by facility characteristics was reported in the results. Wang's group noted that for residents with low cognition, the staffing, structure, and process had little effect on maintenance of toileting ability and other ADL.

Finally, Mattos and colleagues[20] used Katz's ADL scale to evaluate toileting, along with 5 other items representing ADL. A score of 0 or 1 was attributed to each item based on how independent the individual is when performing toileting. Individuals who were unable to perform 1 or more activities without help were considered ADL dependent. Because of this conceptualization, toileting was not discussed in the results; rather, it was summated with the other 5 ADL items and the outcome variable was operationally defined as ADL dependent or independent.

The only study that measured prevalence of toileting disability reported 15% of 2395 older adults without dementia and living in assisted care facilities having toileting disability.[16] No other studies documented the prevalence, incidence, or distribution of toileting disability for other older adult subpopulations and/or in other settings. We categorized factors associated with toileting disability using the International Classification of Functioning, Disability and Health (ICF) disablement model (Table 2).[2]

We examined studies for evidence of toileting disabilities and various body functions. Breuer and colleagues[15] reported an inverse relationship between serum levels of androstenedione and toileting independence in males ($r = -0.4$, $P = .015$).[15] They also found a direct relationship between toileting independence and serum levels of 2 hormones, estrone and dehydroepiandrosterone (DHEA) ($r = 0.115$, $P = .007$; $r = 0.231$, $P = .037$, respectively) in women.[15] Vision and hearing impairments were also associated with toileting disability.[14,16] Marx and colleagues[14] observed that 47% of long-term care residents with low vision (n = 24), in comparison with 19% of residents with good vision (n = 10), were dependent on caregivers for toileting ($\chi^2 = 9.07$, $P < .01$). Having more physical impairments such as walking, standing, sitting, stooping, reaching, and grasping also increased the odds of toileting disability.[16] Every 1-unit increase in the physical impairment score (0-6; calculated based on the number of items where the resident had any level of difficulty with the activity) resulted in a 27% increase in the odds of having toileting disability.[16] Urinary incontinence associated with toileting disability included bladder incontinence in 2 studies[16,17] and fecal incontinence in 1 study.[16]

TABLE 1.
Summary of Articles Meeting Inclusion Criteria

Author (Year), Publication Year, Country	Study Design/ Facility Type	Study Objective	Inclusion Criteria	Study Population Characteristics (Where Available)	Measurement Used for Toileting	Data Type of Measure for Toileting	Primary Outcome	Findings (Related to Toileting Disability Only Where Available)
Marx et al (1992)[14] USA	Cross-sectional Long-term care	Association between low vision and ADL independence	Long-term care residents who were examined by an ophthalmologist	n = 103 (Good vision) n = 52 Male = 11 (21%) Female = 41 (79%) Age: Range = 66-98 y Mean = 84.8 y (Low vision): 86 n = 51 Male = 10 (20%) Female = 41 (80%) Age: Range = 68-97 y Mean = 86.0 y	MAPP-Maryland Appraisal for Patient Progress	2 categories (independent, some assistance/ completely dependent)	ADL dependency for 7 items	Significantly more resident with low vision were toileting dependent than those with good vision (χ^2 = 9.02, $P < .01$)
Ang et al (2006)[18] Singapore	Case-control Long-term care	Association between risk factors and functional decline	Long-term care residents from a voluntary welfare program in Singapore between Apr 2000 and Jan 2001; cannot be maximally dependent in 4 or 5 ADLs on admission	n = 106 Male = 31 (29%) Female = 72 (71%) Age: Range = N/A Mean = 75 y	Case records	5 categories (independent/ need assistance/need bedpan/incontinent/ unknown)	Functional decline measured by deterioration in 2 or more of 5 ADLs	Age (OR = 4.3, $P = .02$) and presence of dementia (OR = 3.3, $P = .04$) were risk factors for functional decline, even after adjusting for length of stay The major cause of decline was due to progression of chronic illnesses (78%) rather than development of new ones (8%)
Breuer et al (2001)[15] USA	Cross-sectional Long-term care	Link between sex hormone levels and ADL dependence across gender	Long-term care residents for whom consent was given and blood specimen was drawn for any medical reason	n = 370 Male = 64 (17%) Female = 306 (83%) Age: Range = N/A Mean = 87.4 ± 7.2 y	Nursing charts	5 scores (highest score = completely dependent)	Dependency for 4 ADL items and summary score	Males inversely related: Testosterone with dependence in transferring/eating; estrone with eating and summary ADL; androstenedione with toileting and summary ADL ($r = -0.4$; $P = .007$-$.015$) Females directly related: Estrone levels with mobility, toileting, transferring, and summary ADL ($r = 0.2$-0.3, $P = .0001$-$.01$) Trend existed between DHEA and toileting ($r = 0.231$, $P = .037$)

(*continues*)

TABLE 1.
Summary of Articles Meeting Inclusion Criteria (*Continued*)

Author (Year), Publication Year, Country	Study Design/ Facility Type	Study Objective	Inclusion Criteria	Study Population Characteristics (Where Available)	Measurement Used for Toileting	Data Type of Measure for Toileting	Primary Outcome	Findings (Related to Toileting Disability Only Where Available)
Burge et al (2011)[19] Switzerland	Cross-sectional Long-term care	Find gender-specific associations between risk factors and ADL performance	Long-term care residents living in 90 Swiss long-term care facilities who received an RAI-MDS score after NH entry from 1997 to 2007	N = 17,331 Male = 5719 (33%) Female = 11,612 (67%) Age: NR	MDS-ADL	4 scores (highest score = complete dependence)	Overall ADL score of 7 items	Toileting data were combined Gender, age, civil status, admission year, eye sight, cognitive performance scale, BMI, continence, balance, exercise, MDS Depression scale, vascular vertebral disease, Parkinson disease, psychiatric disease, cardiovascular diseases, endocrinopathies, musculoskeletal diseases, and neoplasias were associated with overall ADL performance ($P <$ .001) Gender-specific: Females with no physical activity and being admitted to an NH before 2003 had significantly poorer ADL performance than male ($P <$ .001)
Talley et al (2014)[16] USA	Cross-sectional Assisted living	Identify prevalence and factors associated with toileting disability	Long-term care adults 65 y or older, without dementia, and with potential to implement behavioral intervention	n = 2395 Male = 629 (27%) Female = 1766 (73%) Age = NR	Toileting disability (operational definition)	2 categories (resident receive assistance yes/no)	Toileting disability	Factors associated with toileting disability are reporting fair ($P =$ .03) or poor health ($P =$ .04), living in a small facility with 4 or fewer beds ($P =$ .01), living in a for-profit facility ($P =$ .009), having bowel incontinence ($P =$ .02), bladder incontinence ($P <$ .0001), an increased number of physical impairments ($P =$ .01), visual ($P =$ .05) and hearing impairments ($P =$ .01), and needing assistance with bathing ($P =$ .01), dressing ($P <$ .0001), and transferring ($P <$ .001)

(*continues*)

TABLE 1.
Summary of Articles Meeting Inclusion Criteria (*Continued*)

Author (Year), Publication Year, Country	Study Design/ Facility Type	Study Objective	Inclusion Criteria	Study Population Characteristics (Where Available)	Measurement Used for Toileting	Data Type of Measure for Toileting	Primary Outcome	Findings (Related to Toileting Disability Only Where Available)
Wang et al (2010)[17] USA	Cohort Long-term care	Determine whether cognition moderates facility-level characteristics and individual-level impairments and ADL dependency	Long-term care residents who were admitted in 2004 and who were not comatose, bedridden, quadriplegic, or on feeding tubes	n = 4942 (High Cognition Function = MDS-COGS score of 0-4) n = 3132 Male = 957 (30.6%) Female = 2175 (69.4%) Age: Range = NR Mean = 84.1 ± 7.7 (Low Cognition Function = MDS-COGS score of 5 or higher) n = 1810 Male = 560 (30.9%) Female = 1250 (69.1%) Age: Range = NR Mean = 84.6 ± 7.4 y	MDS-ADL	4 scores (highest score = complete dependence)	3 ADL performance and summary score	Irrelevant of cognitive groups, bladder incontinence was associated with greater dependence in toileting ($P < .001$), personal hygiene ($P < .01$), and total ADL ($P < .006$) Balance dysfunction significantly predicted worse total ADL ($P < .01$), toileting ($P < .001$), and personal hygiene ($P = .003$) in the high cognition group but only worse toileting function ($P = .01$) in the low cognition group
Mattos et al (2014)[20] (gray literature) Brazil	Cross-sectional Long-term care	Assess functional capacity in institutionalized elders and associated factors	Long-term care residents 60 y or older living at the selected institutions who have been institutionalized for more than 30 d at the date of interview	n = 760 Male = NR Female = NR Age: Range = NR Mean = 76.4 ± 9.4 y Median = 76 y	Katz's ADL Scale	2 categories (independent/dependent)	Overall ADL summary score of 5 items	Difficulty in walking 400 m (adjusted OR = 7.52), lower total scores in questions related to the temporal orientation section of the cognition test (adjusted OR = 4.41), and self-reports of frequently feeling upset (adjusted OR = 0.21) were associated with ADL dependence (all results of the Wald test $P < .05$)

Abbreviations: ADL, activities of daily living; BMI, body mass index; DHEA, dehydroepiandrosterone; MDS, Minimum Data Set; MDS-COGS, MDS Cognition Scale; NH, nursing home; NR, not reported; OR, odds ratio.

TABLE 2.
Significant Factors Associated With Toileting or Overall ADL Independence[a]

Risk Factors Associated With Toileting (or ADL Dependence, Inclusive of Toileting)[a]	Reference	Findings
Body structures		
Low BMI (<19), (ref: 19-24.9)	Burge et al (2011)[19,a]	Regression coefficient = 0.90, $P < .0001$
Body functions		
Gender female (ref: Male)	Burge et al (2011)[19,a]	Regression coefficient = 0.32, $P = .003$
Male specific; serum levels of androstenedione	Breuer et al (2001)[15]	Regression coefficient = −0.40, $P = .015$
Female specific; serum levels of estrone	Breuer et al (2001)[15]	Regression coefficient = 0.115, $P = .007$
Female specific; serum levels of dehydroepiandrosterone	Breuer et al (2001)[15]	Regression coefficient = 0.231, $P = .037$
Physical impairments; number of	Talley et al (2014)[16]	OR = 1.27 (95% CI, 1.06-1.54), $P < .01$
Visual impairment (even when wearing glasses)	Talley et al (2014)[16]	OR = 0.59 (95% CI, 0.35-0.99), $P = .05$
Visual impairment (ability to see)	Burge et al (2011)[19,a]	Regression coefficient = 0.55, $P < .001$
Visual impairment (presence of glasses/contact lenses)	Mattos et al (2014)[20,a]	OR = 0.45 (95% CI, 0.26-0.7), $P < .05$
Macular degeneration	Marx et al (1992)[14,a]	$\chi^2 = 4.27$, $P < .05$
Cataracts	Marx et al (1992)[14,a]	$\chi^2 = 5.16$, $P < .05$
Hearing impairment	Talley et al (2014)[16]	OR = 0.48 (95% CI, 0.27-0.85), $P = .01$
Bladder incontinence	Talley et al (2014)[16]	OR = 3.07 (95% CI, 2.01-4.67), $P < .0001$
Bowel incontinence	Talley et al (2014)[16]	OR = 2.19 (95% CI, 1.15-4.17), $P = .02$
Continence (urine and feces)	Burge et al (2011)[19,a]	Regression coefficient = 3.81, $P < .001$
Parkinson disease	Burge et al (2011)[19,a]	Regression coefficient = 1.75, $P < .001$
Vascular cerebral disease	Burge et al (2011)[19,a]	Regression coefficient = 1.58, $P < .001$
Musculoskeletal diseases	Burge et al (2011)[19,a]	Regression coefficient = 0.73, $P < .001$
Neoplasias	Burge et al (2011)[19,a]	Regression coefficient = 1.55, $P < .001$
Dementia	Ang et al (2006)[18,a]	OR = 3.4 (95% CI, 1.1-10.7), $P < .04$
Cognitive impairment	Wang et al (2010)[17], Burge et al (2011)[19]	Low cognition, toileting disability, and bowel incontinence: Coefficient = −0.11 − 0.03, $P < .01$; Low cognition, toileting disability, and bladder incontinence: Coefficient = −0.35 – −0.02, $P = .01$; Spearman's r overall ADL impairment, $r = 0.5165$, $P < .001$
Age (ref: 80-90 y)	Burge et al (2011)[19,a]	65-79 y: regression coefficient = 0.41, $P < .001$ >90 y: regression coefficient = 0.40, $P < .001$
Age (ref: 65-70 y)	Ang et al (2006)[18,a]	71-80 y: OR = 3.8 (95% CI, 1.3-11.0), $P = .02$ ≥81 y: OR = 1.3 (95% CI, 0.4-4.2), $P = .02$
Activities and participation		
Requires dressing assistance	Talley et al (2014)[16]	OR = 7.06 (95% CI, 4.43-11.24), $P < .0001$
Transferring assistance	Talley et al (2014)[16]	OR = 9.45 (95% CI, 6.04-14.80), $P < .0001$
Bathing assistance	Talley et al (2014)[16]	OR = 2.57 (95% CI, 1.22-5.42), $P = .01$
Poor balance (ref: Maintained position)	Burge et al (2011)[19,a]	Unsteady: Regression coefficient = 1.55, $P < .001$ Partial support: Regression coefficient = 4.18, $P < .001$ Dependent: Regression coefficient = 8.99, $P < .001$
Balance dysfunctions	Wang et al (2010)[17]	High Cognition Function F-test, $P < .001$ Low Cognition Function F-test, $P < .001$
Difficulty in walking 400 m (ref: Little)	Mattos et al (2014)[20,a]	Moderate: OR = 7.25 (95% CI, 2.81-18.71), $P < .05$ Impossible: OR = 39.50 (95% CI, 14.86-105), $P < .05$
Marital/civil status (ref: Married)	Burge et al (2011)[19,a]	Single: Regression coefficient = −1.35, $P < .001$

(*continues*)

TABLE 2.
Significant Factors Associated With Toileting or Overall ADL Independence[a] (*Continued*)

Risk Factors Associated With Toileting (or ADL Dependence, Inclusive of Toileting)[a]	Reference	Findings
Exercise/sports activity (ref: No)	Burge et al (2011)[19,a]	Yes: Regression coefficient = −1.28, $P < .001$
Self-report: Poor/fair health (ref: Excellent)	Talley et al (2014)[16]	Fair: OR = 4.61 (95% CI, 1.20-17.68), $P < .03$ Poor: OR = 4.38 (95% CI, 1.05-18.31), $P < .04$
Self-report: Been upset lately (ref: Yes)	Mattos et al (2014)[20,a]	No: OR = 0.21 (95% CI, 0.06-0.70), $P < .05$
MDS Depression Scale	Burge et al (2011)[19,a]	Regression coefficient = 0.24, $P < .001$
Self-report: Stroke (ref: No)	Mattos et al (2014)[20,a]	Yes: OR = 4.39 (95% CI, 1.25-15.40), $P < .05$
MMSE score (temporal orientation), (refs: 4 and 5)	Mattos et al (2014)[20,a]	2 and 3: OR = 1.21 (95% CI, 0.38-3.82), $P < .05$ 0 and 1: OR = 4.41 (95% CI, 1.46-13.38), $P < .05$
Environmental factors		
For-profit facility	Talley et al (2014)[16]	OR = 1.82 (95% CI, 1.16-2.84), $P = .009$
Small facility size (ref: Extra-large >100 beds)	Talley et al (2014)[16]	Small 4-10 beds: OR = 2.59 (95% CI, 1.25-5.38), $P = .01$

Abbreviations: ADL, activities of daily living; BMI, body mass index; CI, confidence interval; OR, odds ratio; regression coefficient, based on multiple linear regressions.
[a]ADL dependence.

Impaired balance, regardless of cognition, was significantly associated with greater dependence in toileting ($P = .01$).[17] In this study, authors used 2 MDS balance items, standing and sitting balance, to develop an overall balance scale with a score that ranged from 0 (good standing balance) to 5 (poor standing and sitting balance). People requiring assistance with dressing were 7 times more likely to have toileting disability, those requiring assistance with transfers were 9 times more likely to have toileting disability, and those requiring assistance with bathing were twice as likely to have toileting disability.[16] We identified 1 self-reported factor (indicating fair or poor health status) that was associated with toileting disability ($P < .05$).[16] In contrast, we found 2 extra-individual factors (living in a facility with 4-10 residents and living in a for-profit facility) that were associated with toileting disability ($P < .05$).[16]

DISCUSSION

We completed a scoping review and summarized the current literature on toileting disability. In an extensive search of 9 electronic databases, only 1 study was found that reported the prevalence of and factors associated with toileting disability in older adults living in long-term care facilities.[16] Other articles we identified recognized toileting disability as a significant problem but did not report it as a single entity; instead, toileting disability was included with other activities in order to generate an overall ADL rating score.

The ability to successfully toilet requires competence in physical, functional, and cognitive domains, along with the need for a familiar environment to toilet. Morris and colleagues[22] postulated that the paucity of research focusing on a single ADL item such as toileting may be attributable to bias in research funding, which often encourages the need to go beyond a resident's status in a single ADL area. Clinical and programmatic initiatives almost always focus on a broader conceptualization of the self-performance status of the resident, enabling brevity in research dissemination and education.[22] Thus, researchers tend to examine ADL cumulatively rather than focusing on a single activity such as toileting in order to achieve funding.

Another explanation for the trend toward studying a cumulative ADL summary score is the drive to document overall progress toward a physiological or functional goal when measuring the efficacy of an intervention. Nevertheless, we assert that exclusive reliance on a cumulative ADL score results in a loss of information specific to each ADL item. Previous research indicates that a hierarchical profile of ADL loss exists and loss of individual activities exerts variable effects on overall ADL.[22] Skills specific for independent toileting (recognizing the need to toilet, getting to the toilet, undressing, cleaning oneself, and getting back up independently) are unique and we recommend against combining these assessments with all the other ADL abilities. More specifically, dressing and personal hygiene can be classified as "early loss ADL" on the hierarchy scale; toileting use, transfer, and locomotion are considered "middle loss ADL"; and bed mobility and eating are deemed "late loss ADL." Thus, we assert that combining ADL to generate a single score may mask any effects of the postulated hierarchy.

We acknowledge that there are several ways to calculate summary ADL scores. However, the studies retrieved in this scoping review calculated the sum of the MDS ADL long form and MDS ADL short forms. Neither instrument accounts for the differences in ADL hierarchy, and both assume that each ADL item contributes equally to the overall function Therefore, relying on a summary ADL score does not yield specific information on a resident's toileting ability and it is unclear whether 2 residents with the same ADL score face the same difficulties with toileting unless individual ADL items are evaluated.

We found ambiguity in the definition of toileting disability. Talley and colleagues[16] mentioned that the limitation in their study was the use of the question, "Does the resident currently receive any assistance using the bathroom?" to measure toileting disability. In British English, the term "bathroom" would refer to a room for bathing, not toileting. The word "toilet" would have provided a clearer response as toileting needs of patients are met differently, depending on their underlying condition. That is, a patient may need assistance to walk to a toilet, transfer to a bedside commode or onto a bedpan,

to use a urinal, or to remove or replace clothes. We believe that use of a standardized instrument with clear definitions is a better choice. In countries such as the United States and Canada, long-term care regulations mandate the measurement of ADL (including toileting ability) via the standardized RAI-MDS 2.0 assessment instrument.[22] In the RAI-MDS, "toilet use" is clearly defined as how the resident uses the toilet room, commode, bedpan, or urinal, transfers on/off toilet, cleanses, changes pad, manages ostomy or catheter, and adjusts clothing. The RAI-MDS, therefore, is potentially of greater use in this area because it does not limit the assessment of elimination to only one setting.

The study on toileting disability conducted by Talley and colleagues[16] used a cross-sectional design that does not allow for temporal influences. Specifically, they were unable to follow residents over time to measure change in status and it was unknown what developed first, the associated factors or the toileting disability. The use of different study designs such as a cohort study and/or the use of longitudinal data will remedy these limitations.

Although our scoping review identified multiple factors associated with toileting, several had ambiguous interpretations that require clarification with additional research. For example, despite visual impairment being cited as a significant factor in toileting disability/independence in 4 studies,[14,16,19,20] its measurement varied significantly across studies. Talley and colleagues[16] defined visual impairment dichotomously as having difficulty seeing (regardless of the presence of glasses), whereas Burge and colleagues[19] defined visual impairment based on the presence of glasses/contact lenses. In addition, one study reported that musculoskeletal diseases were significantly associated with ADL independence while another found no association.[18,19] The ambiguity of evidence concerning toileting disability in older adults makes it difficult for policy makers to decide what, if any, interventions might be introduced to reduce toileting disability in this frail population.

Despite these limitations, the results of our study can be used to guide a framework for the activity of toileting. Identifying factors affecting toileting disability in older adults can also inform practice changes and research insight to the extent of this disability in residents in long-term or assisted care facilities. Reducing their risk for toileting disability benefits not only the caregiver and the health care system but also nearly one-third of long-term care facility residents.[16] Given the multiple factors leading to toileting disability, a multicomponent and multidisciplinary approach is needed to prevent or manage this condition. To expand research in toileting disability, we suggest (1) conducting studies that use longitudinal data to establish temporal inferences; (2) adopting use of standardized instruments, such as the RAI-MDS 2.0, to mitigate ambiguity in research findings and make results comparable across studies; and (3) investigate factors not previously studied and/or study-specific relationships between associated factors and toileting disability.

LIMITATIONS

Scoping reviews are particularly useful for topics such as toileting disability that have not been reviewed in the literature. Although a comprehensive search was implemented, some relevant studies may have been missed for several reasons. First, given the large number of articles available on incontinence compared to the number relating to toileting disability, it was difficult for our screening criteria to capture studies that may contain partial information on toileting disability but are primarily focused on incontinence. To mitigate this, we consulted a librarian scientist and clinical expert to optimize the search strategy. Limiting our areas of interest to older people residing in institutional care settings may too have limited our findings, but we may have expected those with toileting disability to have been concentrated in these settings.

Second, searching other databases may have identified additional relevant studies. To avoid this, all primary databases recommended by the librarian scientist were included. Third, our review was limited to studies published in the English language. Studies in languages other than English may have different requirements for toileting independence that may influence how toileting disability is defined, identified, prevented, and managed.

Finally, not addressing quality appraisal is a primary limitation of scoping reviews.[23-25] The emphasis of a scoping study is on comprehensive coverage, rather than on a particular standard of evidence, and our review purposely included a broader range of study designs and methods that would not have been possible in a systematic review.[24,25] We therefore assert that a scoping review is particularly beneficial for a topic as understudied as toileting disability.

CONCLUSIONS

We completed a scoping review of toileting disability in older persons residing in long-term care or assisted living facilities and found that a dearth of evidence relevant to toileting disability exists. Gaps in the evidence include lack of a standardized definition or validated instruments for toileting disability and limited evidence available on its epidemiology and contributing factors. Studies that found factors associated with toileting disability were unable to establish temporal inferences. Future research should use multicomponent and multidisciplinary approaches to increase the breadth and depth of available evidence on the prevention and management of toileting disability.

KEY POINTS

- We completed a sopping review and found a dearth of research regarding toileting disability among long-term care and assisted living residents.
- The majority of studies focused their interest on overall ADL performance, rather than examining the specific deficits of ADL such as toileting.
- Toileting independence was measured using a cross-sectional technique in all studies either by reviewing nursing staff medical charts by case definition or by using standardized instruments such as the RAI-MDS.

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