Costs of Bed Baths: A Scoping Review

Pia L. Veje
Jette Primdahl
Ming Chen
Christian S. Jensen
Jan Sørensen

Evaluative research into bed baths often includes cost analysis, but these analyses frequently lack transparency and well-structured comprehensive cost models. This scoping review found significant variation in costing methodology and estimates of bed bath costs.

Nursing staff often provide bed baths for bedridden patients (Groven et al., 2017). The cost of a single bed bath is low as the cost only includes staff time and a few consumables. Such costs could be perceived as unimportant to the overall cost of hospital care.

However, in a hospital or a medical department, the time nursing staff spend on bed baths over a year may be considerable. With increasing pressure on nursing staff's time, hospital management should focus on ways to increase staff efficiency through application of new technological solutions.

The traditional method for bed baths is use of soap and water (SAW), but disposable wet wipes (DWW) have been introduced as an alternative (Groven et al., 2017). Implementation of changes in bed bath practice from using SAW to DWW should be based on documented advantages and disadvantages.

Previous studies have shown that patient preferences for bed bath practice might differ between individuals and situations, and there is currently no conclusive evidence to support that patients generally prefer either of the two methods, as long as they can be washed when needed (Veje et al., 2019a).

In a hospital setting, the hygiene impact of bed baths is important. Bed baths may reduce the risk of hospital-acquired infections and related complications, which may require additional treatment and delayed discharge. Studies comparing the two washing methods have not found differences in the efficiency to reduce the presence of microorganisms on patients (Larson et al., 2004; Matsumoto et al., 2019; Veje et al., 2019b).

With no clear patient preference and no apparent difference in effects of the two washing methods, the relevant factors in determining guideline recommendations may relate to ease of provision, use of nursing time, and use of consumables and the aggregated costs.

Analysis of resource use and costs can be designed and conducted in different ways and depends on the intended application of the results (Welton et al., 2018). In many studies that have considered the cost of bed baths, assessments often lack details and transparency regarding which and how costs have been analyzed (Büyükyilmaz & Şendir, 2017; Larson et al., 2004; Shoonhoven et al., 2015).

This review of the literature contributes to clarifying the costs of nursing time and consumables. The objective was to conduct a scoping review of published scientific articles that have analyzed the resource use and costs of providing bed baths. The review focuses on the methodological conduct of such

studies to identify good practice when analyzing the resource use and cost of bed baths.

Methods

This scoping review was conducted and reported per the PRISMA-ScR guidelines (Preferred Reporting Items for Systematic reviews and Meta-Analysis for Scoping Reviews) (Tricco et al., 2018).

A scoping review includes five stages: identifying the research questions, identifying relevant studies, selecting relevant studies (without quality assessment), charting data from the studies, and collating, summarizing, and reporting the results (Levac et al., 2010).

There is a range of methods for costing nursing services (Dowless, 2007). For a well-defined procedure such as bed bath, an appropriate method for analysis is referred to as *activity-based costing* in the health management literature and *micro-costing* in the health economics literature (Welton et al., 2018). This method obtains measures of actual use of resources (e.g., staff time and consumables) and values of these in monetary terms. Another technique is the time-based activity driven costing, which only requires two parameters: the capacity cost rate and the staff time needed to perform the activities (Keel et al., 2017).

Before embarking on a cost assessment, it is essential to define the scope for the analysis. Who will use the cost estimates and for what purpose? If the cost estimates are to be used in a cost-effectiveness analysis, only incremental costs may be necessary (the cost difference between the experimental and comparison procedure). However, if the intended use is in a budget impact analysis, then the full cost will be relevant. Also, for budgeting and consideration of efficiency improvement, it may be pertinent to include all costs related to hospital budgets.

Typically, bed bath costing is relevant to hospital and departmental nursing management to inform decisions about standard procedures for bed baths. In this case, the perspective of the cost analysis can be restricted to hospital resources (disregarding resource use elsewhere) over a relevant period (e.g., one budget year).

Identifying the Research Questions

Cost analysis involves three phases: identification of relevant resource items, measuring the use of these resource items in the care process, and assigning a value to each resource item (Beecham, 2000). Relevant resource items for bed baths include nursing staff, consumables, and equipment. The focus of this review is on how this identification, measurement, and valuation processes have been conducted in the literature.

Identifying Relevant Studies

A literature search was conducted to identify relevant, published, scientific papers that report on empirical analyses of the resource use and costs of bed baths. The PCC (Participants, Concepts, and Context) framework was used to specify the search strategy (Peters et al., 2015).

The definition of bed baths was the washing of the whole body or parts of the body of bedridden patients who were too frail and immobile to shower. Bed baths could be provided by nursing staff in hospitals, nursing homes, or in patients' homes.

The search strategy was performed in three steps. First, an initial scoping search was conducted to identify relevant keywords and search terms. All search terms were checked with truncations and whether they were defined in the databases. The applied search terms are presented in Table 1. This was followed by a systematic database search for published peer-reviewed studies and a search for grey (not peer-reviewed) literature. A search of search terms and a free texts search in title and abstract were performed.

The literature search was conducted in PubMed, CINAHL, Scopus, Embase, and the Cochrane library databases. A search for grey literature (dissertations, theses, ongoing trials, and other online scientific documents) was performed using the web search engine Google Scholar. In addition, a manual search was performed based on reference lists and bibliographies of relevant articles and reviews. Language was restricted to English. Databases were searched from their inception date until the end of March 2019.

Study Selection

One reviewer (PLV) conducted the searches supported by experienced research librarians. The identified references were transferred to the reference software, Endnote, and duplicate references were excluded. Based on inspections of the titles and abstracts, studies were categorized as *potentially relevant* or *irrelevant* by PLV (Bramer & Bain, 2017). References deemed potentially

Table 1.
Search Terms

1.	bath* OR hygiene* OR clean* OR wash OR washes OR washing OR genitalia OR meatal OR meatus OR penile OR intimate OR perineal OR urethral OR perineum
2.	wipe* OR basin* OR bowl* OR towel* OR washcloth* OR soap* OR water OR rinse-free OR disposable OR prepackage* OR basinless
3.	costs* OR economic OR timesaving OR time and motion OR time saving
4.	patient* OR aged OR elderly OR homecare OR Hospitalized OR bedbound OR bedridden OR inpatient OR admitted OR client

*Denotes truncation

appropriate were obtained as full text. A few full-text references could not be retrieved. The final selection of studies was based on scrutiny by two researchers (PLV and JS) of the full-text papers with the specified relevance criteria as recommended by guidelines for scoping reviews (Levac et al., 2010).

Charting the Data

To categorize the studies, a standardized charting form was developed and revised during the research (Levac et al., 2010). The selected papers were described in terms of author, year, country, bed bath methods, setting and sample, study design, study period, unit of analysis, measure methods, and reported time. Concerning the cost analysis, the included resource items were categorized. Also, the mean costs were reported as they appeared in the papers and were converted to 2018 U.S. dollars using the mid-year currency rate for the reported year and relevant price indices to account for inflation and price changes.

Results

Figure 1 shows the result from the screening process leading to the final nine included studies in Figure 1. The nine included studies are summarized in Tables 2 and 3.

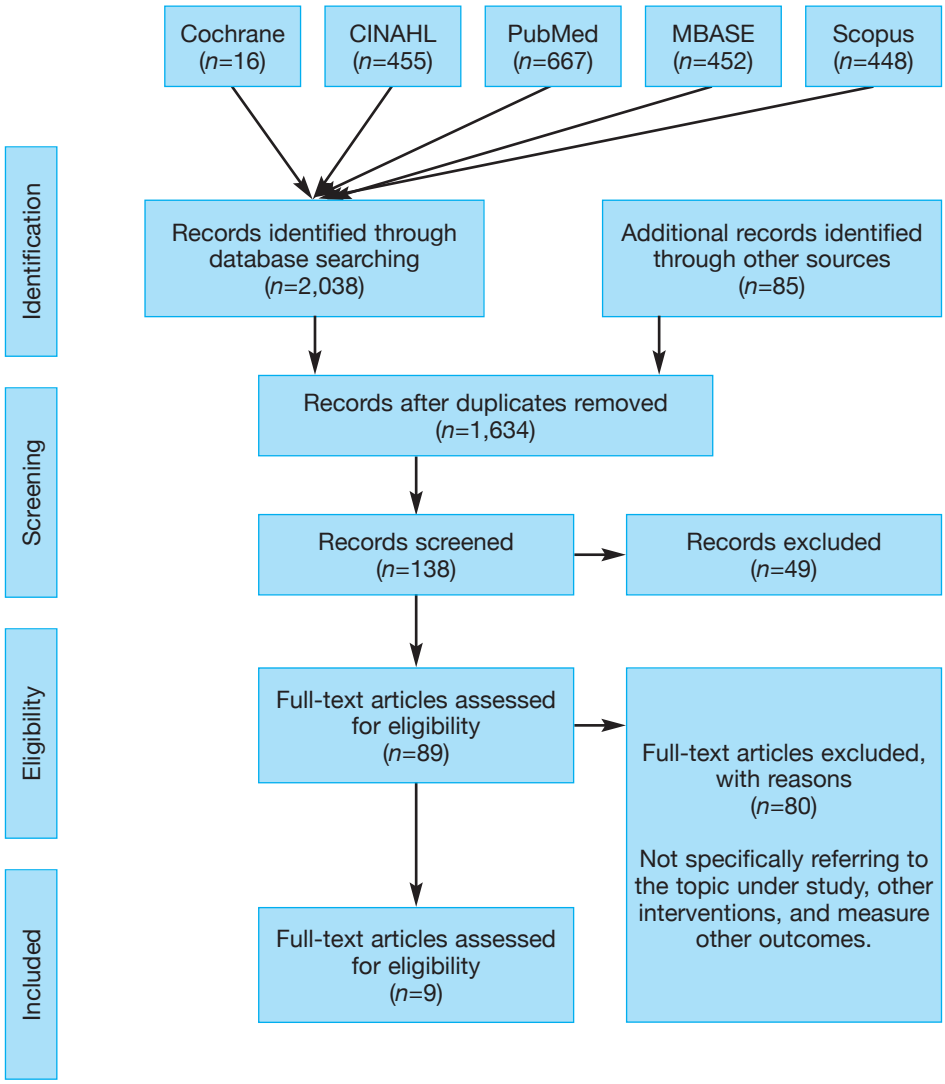
Five studies originated from the United States and one from Australia, Denmark, The Netherlands, and Turkey, respectively. The studies were conducted in different settings: six studies were conducted at a hospital (Büyükyilmaz & Şendir, 2017; Carruth et al., 1995; Hancock et al., 2000; Larson et al., 2004; Nøddeskou et al., 2015; Wright, 1996) and three in other settings (Kron-Chalupa et al., 2006; McGuckin et al., 2008; Shoonhoven et al., 2015). Two studies used towel interventions and one used disposable washing gloves while the six remaining studies used some type of disposable wipes (Büyükyilmaz & Şendir, 2017; Carruth et al., 1995; Kron-Chalupa et al., 2006; Larson et al., 2004; Nøddeskou et al., 2015; Wright, 1996). The studies employed a range of study designs, including one randomized cluster trial (Shoonhoven et al., 2015) and two with a crossover design (Larson et al., 2004; Nøddeskou et al., 2015) (see Table 2).

The duration of the studies varied from 3 days to 18 months and were conducted between 1995 and 2017. Unit of analysis was typically per patient or bath, and the time horizon ranged from weeks to years. Nearly all the studies employed time and motion data, but only three studies described the used data collection methods (Larson et al., 2004; Nøddeskou et al., 2015; Shoonhoven et al., 2015) while one study relied on self-reported data (Buyukyilmaz & Şendir, 2017). The different resource variables included in the nine studies are shown in Table 3.

Running costs (e.g., staff time and consumables) were identified in all studies, while five studies also included capital costs. Nearly all studies included and measured staff time, but there were methodological differences in the costing of staff time. All studies included costs of direct staff time use without any uplifting to include the cost of the direct time (i.e., a load factor), ratio of maximum work time per staff (e.g., 1,924 hours per year), and mean time spent (observed) with patient care (e.g., 1,400 hours per year) (Beecham, 2000).

Costs related to laundry service were measured in most of the studies, but only one included costs of water consumption. Very few of the studies included electricity or sewage-related costs. Capital costs, such as the use of basins, were reported in most of the studies and were included in the cost calculation in some. Three studies reported the cost of a microwave oven. None of these studies included service cost or equivalent annual costs (Drummond et al., 2015) of capitals such as buildings, basins, or microwave. No studies considered the cost of extra building space related to storage of wash-

Figure 1.
Flowchart of the Screening Process



ing equipment. Furthermore, none of the studies considered environmental impact.

Discussion

A cost analysis should be transparent, reproducible, and reflect current clinical practice to be relevant for decision-making. From these literature reviews, it appears there are many challenges in estimating and reporting the costs of the different bed bath methods.

It is notable that many of the cost analyses have used assumptions of resources used and unit costs and included only selected cost items. This implies the cost studies may not adhere to the gold standards for cost analysis, where inclusion of all relevant costs is required (Dakin & Wordsworth, 2013; Drummond et al., 2015). Further, some of the included studies were not explicit about the analytical units (patient, bath, unit, ward, hospital) and time period, which is important for the cost assessments. Pollution and life-cycle assessments were not considered in any of the studies. Measures of resource use were obtained

Table 2.
Included studies and characteristics (listed by first author)

Authors, Year, Country	Objective	Bed Bath Methods	Setting and Sample	Study Design	Study Period	Unit of Analysis	Measure Methods Time/ Resources	Time in Minutes	Cost Result	Adjusted 2018 US $ values
Carruth et al., 1995, USA [45]	To compare the cost of SAW to DWW	Traditional bed bath and bag bath	North Oaks Medical Center. Medicine, surgery, telemetry, intensive care unit	Survey	2 weeks	One bath	NA/NA	SAW: 30 DWW: 15	SAW: 6.22 $ DWW: 2.24 $	10.54 4.06
Wright, 1996, USA [44]	To assess patient and staff opinions about DWW and costs	Standard bed bath and bag bath	Fairfax Hospital. 32-bed, medical and surgical unit, 65 patients, 32 staff	Survey, questionnaire	30 days	One bath RN/NA	OBS/NA	SAW: 21 DWW: 7	SAW: 7.05 $ DWW: 4.68 $	11.61 7.70
Hancock et al., 2000, Australia [15]	To compare the impression of patient and staff relations to two bed-bathing methods and obtain data regarding cost	Traditional bathing and soft towel bed bath	Royal North Shore Hospital, Northern Sydney Area Health Service. Surgical and medical wards. 200 patients, 200 nursing staff	Questionnaire	6 months	One bath	SELF/ EXPERTS	SAW: 16 Other: 10	SAW: 3.79 AU $ Other: 2.84 AU $	4.28 2.04
Larson et al., 2004, USA [17]	To compare SAW with DWW in terms of time, quality, microbial counts, nurse and patient satisfaction and costs	Traditional bath and disposable bath	New York Presbyterian Hospital Columbia. Three intensive care units, medical and surgical. 47 patients, 40 nurses	Crossover	12 weeks	One bath	OBS/OBS	SAW: 14 DWW:13	SAW: 19.87 $ DWW: 18.15 $	27.18 24.84
Kron-Chalupa et al., 2006, USA [48]	To compare DWW to SAW for effectiveness of improving dry skin, patient and nurse satisfaction, and cost effectiveness	Traditional basin bath and basinless bath	Iowa City Veterans Affairs Medical Center. Progressive care unit, surgical unit. 60 patients	Quasi-experimental	3 days	One bath	NA/NA	SAW: 21 DWW: 10	SAW: 7.01 $ DWW: 4.90 $	8.98 6.28

continued on next page

from a variety of sources, including expert estimates or registration as part of controlled clinical trials. The accuracy and validity of these measures may be different and thus influence the cost assessment and comparability between studies.

Running Cost

The procedures for calculating and analyzing running cost of different interventions are not simple. Different items may be relevant for costing of a bed bath and the choice may be context related. Assuming a fixed resource use may not be appropriate if patients require a varying number of wipes related to their body size, sweat production, and whether all the wipes from one package can be used for only a single bath or patient. Also, it is unclear how the selected cost items (appropriate equipment for bed baths) were validated (e.g., by different clinical expert opinions) (Beecham, 2000).

With differences in procedures, it is relevant to measure the exact time used to conduct a bed bath if realistic comparison should be made of the nursing staff time needed to wash patients according to guidelines. However, guidelines are generally designed with the ideal situation in mind and, in study design, patients may not have similar needs.

The ideal setup for a costing exercise would be to compare time used for identical mock-up situations. However, this could be difficult to generalize to larger populations and for different patient groups, and it might be difficult to compare cost methods between settings, hospitals, and countries.

Notably, it seems to take

Table 2. (continued)
Included studies and characteristics (listed by first author)

Authors, Year, Country	Objective	Bed Bath Methods	Setting and Sample	Study Design	Study Period	Unit of Analysis	Measure Methods Time/ Resources	Time in Minutes	Cost Result	Adjusted 2018 US $ values
McGuckin et al., 2008, USA [47]	NA	Basin, water, paper towels, and pre-packaged bath towel	An institution	Case study	18 months	Bath per 9 months	NA/NA	NA	SAW: 224,916 $ Other: 117,175 $	268.96 140.07
Nøddeskou et al., 2015, Denmark [6]	To compare SAW to DWW in factors of duration, quality, cost, nurse and patient satisfaction	Traditional basin bed bath and disposable bed bath	One hospital, medical ward, 65 patients, 6 nurses	Crossover RCT	8 weeks	One bath	OBS/OBS	SAW: 36 DWW: 29	SAW: 115.09 Dkr DWW: 94.41 Dkr	18.33 15.07
Shoonhoven et al., 2015, The Netherlands [3]	To compare bed bath for effects on skin integrity and resistance against bathing and cost	Traditional bed bath and prepackaged disposable wash gloves	Institutional long-term care. 56 wards in 22 nursing home wards, 500 residents, 275 nurses	Cluster randomized trial	6 weeks	Bath per 6 weeks	OBS/OBS	SAW: 9 Other: 8	SAW: 5.79 € Other: 5.24 €	7.12 6.08
Büyükyilmaz & Şender, 2017, Turkey [22]	To compare SAW with the DWW in terms of two outcomes: nurse satisfaction, and preference and cost analysis	Traditional basin and disposable wipes	University hospital, intensive care, general surgical, orthopedic, neurosurgery, 41 nurses. Self-reported time data	Quasi-qualitative and descriptive	3 months	One bath	SELF/ EXPERTS	SAW: 30 DWW: 20	SAW: 4.48 $ DWW: 2.46 $	4.35 2.38

SAW = soap and water
DWW = disposable wet wipes
NA = not applicable
OBS = observations
SELF = self-reported
RCT = randomized control trial

less time for the staff to use DWW than SAW in the majority of the studies. Thus, it is relevant to discuss how the time and motion studies were conducted, and if they were done appropriately. The process of giving a bed bath could be broken down in distinct phases (e.g., preparation for the bed bath, actual bed bath, and tidy-up period after the bed bath) (Nøddeskou et al., 2015). Only some of the studies recorded the time devoted to each task (time and motion study) and provided clearly defined start and endpoints. One study did not include the time needed for preparation and clean up (Larson et al., 2004). Also, not all studies discussed how other activities, such as interruptions during time taking and putting on and removing gloves, were handled.

Recording of time and motion was performed by external observers in some studies (Frick, 2009; Lopetegui et al., 2014). Such studies require a one-to-one observer ratio and are resource intensive. Further, the Hawthorne effect could improve staff performance and increase their feeling of disturbance (Lopetegui et al., 2014). Two studies gathered data directly from the staff being studied (self-reported survey), which is considered least reliable (Lopetegui et al., 2014). No studies used time-action analysis of video records asynchronously. Among gold standards for workflow observations, video records are preferable because they are more thorough and comprehensive (Lopetegui et al., 2014).

The unit's cost of nursing staff time could be derived from information about the actual staff grade, gross salaries, and

Table 3.
Resource Variables of Bed Bath Methods

Studies (Listed by first author) Structure (X/O)[1]	Carruth et al., 1995	Wright, 1996	Hancock et al., 2000	Larson et al., 2004	Kron-Chalupa et al., 2006	McGuckin et al., 2008	Nøddeskou et al., 2015	Shoonhoven et al., 2015	Büyükyilmaz & Şendir, 2017
Running Cost	X	X	X	X	X	X	X	X	X
Staff time	X	X	X	X	X		X	X	X
Load factor[9]									
Consumables[2]	X	X	X	X	X	X	X	X	X
Waste			0						0
Laundry service	X	X	X	X	X			X	
Electricity[3]			0	0			0		0
Water			X	0		0		0	0
Sewage				0					
Capital Cost	X	X		X	X	X	0	0	
Microwave/Decontaminator	0	0					0		
EAC[8]									
Basin	X	X		X	X	X	0	0	
EAC[8]									
Buildings[10]									
EAC[8]									
Consequences	X	X	X	X	X	X	X	X	X
Infection/HAI[4]/UTI[5]/LOS[6]						X			
Basins harboring MOs[7]	0	0		0		0			
Skin impact	0	X	X		X			X	X
Patient	X	X	X		X		X	X	X
Staff	0	X	X	X	X		X	X	X

[1] X = present and measured, O=present and not measured
[2] Consumables included supplies and equipment
[3] Electricity included heating
[4] Hospital-acquired infection (HAI)
[5] Urinary tract infection (UTI)
[6] Length of stay (LOS)
[7] Microorganisms (MOs)
[8] Equivalent annual cost (EAC) including investment, lifetime, service, and activity
[9] Load factor or overload calculated as ratio work hours
[10] Buildings included facilities, rooms, installation, and storage

direct and indirect working time. Uplifting the observed direct working time with a load factor is a simple way to account for work time indirectly related to patient care (Beecham, 2000). None of the included studies applied a load factor for salary, which in general would result in an underestimation of the real costs (see Table 3).

The unit cost for consumables could be based on the hospital purchase price (excluding value-added taxes). Consumables and staff time were often calculated as an average of the local or national level of costs, which may be inaccurate and change over time.

Capital Cost

Many studies have considered the application of a microwave oven to warm the wipes. However, the cost of a decontaminator, microwave, and basin may depend on how they are used at different units. To establish unit cost, it is necessary to consider the purchase

price, expected lifetime, and anticipated use during the lifetime. In addition, possible maintenance costs and time for cleaning should be considered. None of the studies included costs of capital goods or their service cost. The cost analysis may, therefore, underestimate the actual cost (Frick, 2009).

Both methods require the same space (the patient in the bed) for the bath, but there could be some increase in storage space (more single-use equipment), waste, and waste collection. Buildings and costs regarding water, electricity, and acquisitions were often determined as zero costs in the included studies (Büyükyilmaz & Şendir, 2017).

Consequences

Few of the nine studies included the costs of possible implications of using SAW and DWW, such as infections. SAW and DWW were assumed to be comparable for patients' physiological and health outcomes (Groven et al., 2017). There may be hygiene benefits in terms of less transportation of contaminated basins, less odor, and less mess with basins in the cleaning rooms.

Cost minimization analysis (CMA) (Dakin & Wordsworth, 2013) was used as a framework in most of the included studies because it measures and compares only costs of the intervention and comparator studied. However, the cost of bed baths should incorporate possible resource consequences related to changes in risk of infections and shorter length of stay based on an assessment of the difference in risk of infection and additional costs of treating the infection. CMA may introduce bias into uncertainty estimates and is only recommended if the difference in additional cost is not significant (Dakin & Wordsworth, 2013).

Study Limitations

The internal validity of this review was ensured by the application of a systematic methodology and by the involvement and aid from experienced research librarians regarding keyword and database identification.

All bed bath interventions were included, regardless of bathing methods or brands of consumables used. This was chosen due to the small number of studies and because researchers were only looking for variables for cost assessment. Notably, no studies of disposable molded cardboard basins were found, despite being available in some Danish wards.

Also, many of the studies were small scale and there was a great variety in their design, interventions, settings, countries, outcome, and how participants and data were included (e.g., age, diagnosis). In addition, the literature is primarily descriptive with little data on statistical variations, which makes it difficult to interpret with confidence and to conduct a meta-analysis (Groven et al., 2017). However, the high heterogeneity in reported outcomes may contribute to the development of a more comprehensive, comparable, and generic cost model.

Two studies employed a crossover design (Larson et al., 2004; Nøddeskou et al., 2015). Crossover design contributes to balanced assessments of the two bed bath methods because they were conducted in the same setting and with the same patient.

Identified cost variables were included, but there may be other relevant variables that were not found through the search, because of language limitations or the search terms used.

The classification of the studies for the cost analysis was based on the researchers' judgment, but there may be other ways of grouping them.

Cost analyses can be used in decision-making at the hospital where they were conducted because the bed bath methods were measured in the same context (unit/ward/guidelines/equipment). A possible next step for measuring time use could be workflow observations using video records (Drummond et al., 2015; Lopetegui et al., 2014).

Conclusion

There are many challenges in estimating costs of the different bed bath methods, and this scoping review identified great variation in costing methodologies and estimates of bed bath costs. Future development of generic cost models may provide theoretical support and a firmer foundation to the decision-making process to assess which bed bath methods are the most cost effective. The model should, at a minimum, include running costs and capital costs. $

Pia L. Veje, MSc, RN
PhD Student
Department of Regional Health Research
University of Southern Denmark
Odense, Denmark
University College South Denmark, UCSYD
Aabenraa, Denmark

Jette Primdahl, PhD, MNH, RN
Professor
Department of Regional Health Research
University of Southern Denmark
Odense, Denmark
Danish Hospital for Rheumatic Diseases
Sønderborg, Denmark
University Hospital of Southern Denmark
Aabenraa, Denmark

Ming Chen, PhD, MSc
Senior Consultant Microbiologist
Associate Professor
Department of Regional Health Research
University of Southern Denmark
Clinical Associate Professor
Odense, Denmark
Department of Clinical Microbiology
University Hospital of Southern Denmark
Sønderborg, Denmark

Christian S. Jensen, PhD, MSc
Academic Employee
National Center for Infection Control
Statens Serum Institut
Copenhagen, Denmark

Jan Sørensen, PhD, MSc
Professor and Director
Healthcare Outcomes Research Centre
Royal College of Surgeons in Ireland
Dublin, Ireland

Acknowledgment: Thanks to Lorna Campbell for language editing.

Funding Support: Unrestricted funding was provided by The University of Southern Denmark, Region of Southern Denmark, University College South Denmark and Hospital of Southern Jutland.

References

Beecham, J. (2000). *Unit costs: Not exactly child's play. A guide to estimating unit costs for children's social care.* University of Kent: Joint publication from the Department of Health, Dartington Social Research Unit, and the Personal Social Services Research Unit.

Bramer, W., & Bain, P. (2017). Updating search strategies for systematic reviews using EndNote. *Journal of the Medical Library Association, 105*(3), 285-289. https://doi.org/10.5195/jmla.2017.183

Büyükyilmaz, F., & Şendir, M. (2017). Opinions of intensive care nurses: Traditional or disposable wipes bed bath? A quasi-qualitative and cost analysis study. *International Journal of Nursing & Clinical Practices, 1*(4). https://doi.org/10.15344/2394-4978/2017/269

Carruth, A.K., Ricks, D., & Pullen, P. (1995). Bag baths: An alternative to the bed bath. *Nursing Management, 26*(9), 75-76, 78.

Dakin, H., & Wordsworth, S. (2013). Cost-minimisation analysis versus cost-effectiveness analysis, revisited. *Health Economics, 22*(1), 22-34. https://doi.org/10.1002/hec.1812

Dowless, R.M. (2007). Procedure costing flexibility. *Healthcare Financial Management, 61*(6), 103-104.

Drummond, M.F., Sculpher, M.J., Claxton, K., Stoddart, G.L., & Torrance, G.W. (2015). *Methods for the economic evaluation of health care programmes*. Oxford University Press.

Frick, K.D. (2009). Microcosting quantity data collection methods. *Medical Care, 47*(7, Suppl. 1), S76-S81. https://doi.org/10.1097/MLR.0b013e31819bc064

Groven, F.M., Zwakhalen, S.M., Odekerken-Schröder, G., Joosten, E.J., & Hamers, J.P. (2017). How does washing without water perform compared to the traditional bed bath: A systematic review. *BMC Geriatrics, 17*(1), 31. https://doi.org/10.1186/s12877-017-0425-4

Hancock, I., Bowman, A., & Prater, D. (2000). The day of the soft towel? Comparison of the current bed-bathing method with the soft towel bed-bathing method. *International Journal of Nursing Practice, 6*(4), 207-213.

Keel, G., Savage, C., Rafiq, M., & Mazzocato, P. (2017). Time-driven activity-based costing in health care: A systematic review of the literature. *Health Policy, 121*(7), 755-763. https://doi.org/10.1016/j.healthpol.2017.04.013

Kron-Chalupa, J., Benda, T., & Williams, B. (2006). *The basinless bath: A study on skin dryness and patient satisfaction*. https://sageproducts.com/wp-content/uploads/20060b_The_basinless_bath_A_study_on_skin_dryness_and_patient_satisfaction.pdf

Larson, E.L., Ciliberti, T., Chantler, C., Abraham, J., Lazaro, E.M., Venturanza, M., & Pancholi, P. (2004). Comparison of traditional and disposable bed baths in critically ill patients. *American Journal of Critical Care, 13*(3), 235-241.

Levac, D., Colquhoun, H., & O'Brien, K.K. (2010). Scoping studies: Advancing the methodology. *Implementation Science, 5*, 69. https://doi.org/10.1186/1748-5908-5-69

Lopetegui, M., Yen, P.Y., Lai, A., Jeffries, J., Embi, P., & Payne, P. (2014). Time motion studies in healthcare: What are we talking about? *Journal of Biomedical Informatics, 49*, 292-299. https://doi.org/10.1016/j.jbi.2014.02.017

Matsumoto, C., Nanke, K., Furumura, S., Arimatsu, M., Fukuyama, M., & Maeda, H. (2019). Effects of disposable bath and towel bath on the transition of resident skin bacteria, water content of the stratum corneum, and relaxation. *American Journal of Infection control, 47*(7), 811-815. https://doi.org/10.1016/j.ajic.2018.12.008

McGuckin, M., Shubin, A., & Hujcs, M. (2008). Interventional patient hygiene model: Infection control and nursing share responsibility for patient safety. *American Journal of Infection Control, 36*(1), 59-62. https://doi.org/10.1016/j.ajic.2007.01.010

Nøddeskou, L.H., Hemmingsen, L.E., & Hørdam, B. (2015). Elderly patients' and nurses' assesment of traditional bed bath compared to prepacked single units – randomised controlled trial. *Scandinavian Journal of Caring Sciences, 29*(2), 347-352. https://doi.org/10.1111/scs.12170

Peters, M.D., Godfrey, C.M., Khalil, H., McInerney, P., Parker, D., & Soares, C.B. (2015). Guidance for conducting systematic scoping reviews. *International Journal of Evidence-Based Healthcare, 13*(3), 141-144.

Schoonhoven, L., Van Gaal, B.G., Teerenstra, S., Adang, E., Van Der Vleuten, C., & Van Achterberg, T. (2015). Cost-consequence analysis of "washing without water" for nursing home residents: A cluster randomized trial. *International Journal of Nursing Studies, 52*(1), 112-120. https://doi.org/10.1016/j.ijnurstu.2014.08.001

Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., … Straus, S.E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine, 169*(7), 467-473. https://doi.org/10.7326/M18-0850

Veje, P.L., Chen, M., Jensen, C.S., Sørensen, J., & Primdahl, J. (2019a). Bed bath with soap and water or disposable wet wipes: Patients' experiences and preferences. *Journal of Clinical Nursing, 28*(11-12), 2235-2244. https://doi.org/10.1111/jocn.14825

Veje, P.L., Chen, M., Jensen, C.S., Sørensen, J., & Primdahl, J. (2019b). Effectiveness of two bed bath methods in removing microorganisms from hospitalized patients: A prospective randomized crossover study. *American Journal of Infection Control*. https://doi.org/10.1016/j.ajic.2019.10.011

Welton, J.M., Jenkins, P., & Perraillon, M.C. (2018). A micro-costing or 'bottom-up' approach to measuring nursing costs using data from electronic health records. *Nursing Economic$, 36*(1), 46-48, 51.

Wright, K.L. (1996). Considering a new product? Put it to a test. *RN, 59*(12).