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Introducing a New Incontinence Management System for Nursing Home Residents

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INTRODUCTION

Fifty percent or more of nursing home (NH) residents are incontinent.¹ Most incontinent residents have some combination of cognitive and physical impairments that limit their ability to toilet and/or change their wet garments, relying on assistance from nursing staff (primarily certified nurse assistants, CNAs) for this care.² NH staff report that urinary incontinence care is difficult and time-consuming.³ Practice guidelines specify that a resident's soiled garments should be changed and skin cleansed in a timely fashion.^{4,5,6,7,8} However, little data exists describing the amount of time required to implement incontinence management activities, and there is even less data about how better skin cleansing might improve outcomes.

Prior NH research has demonstrated that perineal skin disorders correlate with frequency of incontinence.⁹ In addition, skin exposure to urine due to infrequent adult brief changes can produce a significant increase in skin wetness, with increased rubbing and abrasion predisposing the skin to breakdown.¹⁰ Urinary and fecal incontinence also predispose the perineal area to skin irritation and impairs the healing process of pressure ulcers.^{2,11} Perineal dermatitis is caused by irritation from ammonia produced in urine and acidic urine or residual antiseptics, or harsh soaps and detergents.¹² Infrequent adult brief changes and/or adult brief changes without adequate cleansing of urine from skin folds and in the perineal area is believed to increase the vulnerability of skin damage due to urine exposure.¹³ Fecal incontinence may present even more risk to skin integrity.¹⁴ A number of studies have compared incontinence care and skin cleansing using soap and water to other skin cleansers. Prior research suggests that skin cleansers provide an alternative means to promote skin hygiene, potentially avoiding some of the adverse effects of soap, due to their chemical composition and more advantageous effects on skin pH with wipes, which may effect the protective skin barrier.¹⁵ In addition, Jeter and Lutz recommend that future research in frail, incontinent, older people take into

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account both the frequency and manner of skin cleansing, products used, and risks and benefits of absorbent products and devices.¹⁶

A recent study among 32 incontinent NH residents evaluated two incontinence skin care protocols, and concluded that use of soap, water, and a moisturizer may be less effective and more time-consuming than use of a no-rinse cleanser and a durable barrier product.¹⁷ A recent review of the literature on the inter-relationship between skin vulnerability, urinary incontinence and effectiveness of related nursing interventions revealed limited research in this area, despite the significant amount of time nurses spend washing patients.⁵ Most NH studies, including those cited above, consist of small samples of only 10 – 25 participants. In addition, further research is necessary to determine whether findings are consistent and can be generalized across populations, settings and variations in treatment.¹⁸

Urinary and fecal incontinence in older people is considered a major health and economic problem in NH, hospital, and home settings. Of the 1.5 million residents in the 18,000 NHs in the United States, over half have some degree of incontinence.^{2,19,20} In hospitals, the statistics are similarly astounding, with a reported 8%–20% of adult patients being affected by incontinence. One study suggested that urinary incontinence affects at least 10 million Americans.²¹ Fecal incontinence is estimated to affect between 17 and 66 percent of hospitalized older people.¹² According to the Health Care Financing Review data from 1999, \$80 billion is spent annually for NH care, approximately 60% of which is publicly funded.²² Incontinence care is a significant contributor to the costs of this care.

Although many studies on incontinence care have shown that disposable wipes are effective in terms of skin cleansing, these items are generally absent from most nursing home incontinence care routines. The purpose of the One Step Incontinence System (OSIS) is to allow for an effective cleansing routine by unifying necessary supplies in one convenient product (see Figures 1 and 2). With this in mind, the specific aims of the current study were to:

1. Describe current incontinence care practices of CNAs in NHs, including location and thoroughness of care, and amount and type of materials used.
2. Compare incontinence care practices at baseline (under usual care conditions) with a control condition with a box of wipes at the bedside (BW) and an intervention condition utilizing OSIS.
3. Assess CNAs' opinions and perceptions of OSIS and BW, and their preferred incontinence care materials.

METHODS

After one week of baseline assessment in two NHs, this controlled trial randomly assigned one unit in each participating NH to one week of either the intervention (OSIS) or control (BW) condition. The BW condition was used to determine whether simply increasing accessibility of wipes at the bedside would result in equivalent frequency of skin cleansing as the possibly more expensive manufacturing solution of a physically integrated product, such as OSIS. The OSIS adult briefs used at each site were identical to the brand and size of adult briefs that each participating resident was already using at baseline, and the wipes used at both sites in the OSIS adult briefs and BW were identical to the wipes already used in the one NH that made wipes available to CNAs. The other NH did not use wipes at baseline. During baseline, we recorded the sizes of adult briefs that each patient was wearing, which tended to vary between day and night. Then OSIS adult briefs were assembled in large quantity for the study. While OSIS is intended to be a complete product available for purchase, as opposed to an augmentation of a pre-existing product, for the current study we manufactured the OSIS product with adult briefs

already in use at the nursing homes to remove the variable of newly introduced brands and styles of incontinence supplies.

If patients had any fecal incontinence, CNAs were instructed to cleanse the resident's skin first and then use the two wipes from the clean OSIS for final cleansing and application of a skin barrier to the perineal area. One wipe was to be used for the entire anterior area, including scrotum and penis for males. The other wipe was to be used for the posterior area, starting from outer buttocks to posterior perineum including the anal area, before fastening the clean new brief. For urinary incontinence, we hypothesize that two wipes are sufficient. During incontinence care, CNAs were to check patients' perineal area and skin folds for any dry fecal particles that may exist, even if only urinary incontinence is apparent. For fecal incontinence, as the type and quantity of cleansing materials may vary depending on the nature of those episodes, other cleansing supplies such as soap and water, cloth towels, and bath wipes were usually needed, with the wipes in OSIS to be used last to sanitize skin of urine and fecal particles and leave an emollient skin barrier from the wipes.

Sample

The two participating NHs included one Veterans Administration and one not-for-profit community facility in the Los Angeles area. Resident inclusion criteria included documented urinary and/or fecal incontinence and a willingness to wear disposable adult briefs. Exclusion criteria included current skin breakdown or pressure ulcers, post-acute skilled care unit location, and use of a private duty aide. The protocol was approved by the Institutional Review Board of the VA Greater Los Angeles Healthcare System. Written informed consent was obtained from participating residents (or their responsible party with the assent of the resident if unable to provide informed consent). Written informed consent was also obtained from CNAs on all three shifts providing care for participating residents. A total of 36 residents at both sites (two units in each NH) were identified as potentially eligible for the study. Of these residents, 24 (67%) consented to participate (6 refused and 6 were lost prior to enrollment due to hospitalization, transfer, or death). See Table 1 for participating resident characteristics.

The CNAs from all three shifts were approached for participation in the study during a short orientation done twice in each NH. We recruited CNAs who regularly provided incontinence care to our consented NH residents. A total of 72 CNAs were identified as potentially eligible for the study. Of these CNAs, 9 refused before assignment of units (to intervention or control) and 63 (88%) agreed to participate. Of these, 61 CNAs were actually observed providing incontinence care to a participating resident by research staff during the study period. There were 37 and 24 CNAs from OSIS and BW units, respectively, and no CNA withdrew from the study. At the end of the study, 58 out of 61 CNAs (95%) observed were approached for the survey; 3 were not approached at the end due to moving, having a change of assignment, or being off duty. Thirty-seven CNAs completed the follow-up survey on the units randomly assigned to OSIS (76% female, mean age 45.7 [+ 10.3] years, 11.4 [+ 9.3] years experience in paid direct caregiving, and 6.7 [+ 6.9] years experience in the current NH). Twenty-one CNAs completed the follow-up survey on the BW units (84% female, 45.9 [+ 11.0] years, 14.6 [+ 13.5] years experience in paid caregiving, 6.5 [+ 6.7] years in the NH). There were no significant associations between these CNA characteristics and group assignment (P-values. 969,.341,.952 and.471, respectively).

Procedure

Descriptive data were collected on all participating residents from their medical records and the most recently completed Minimum Data Set (MDS). Incontinence care provided to each participating resident was observed under usual care conditions for five days and under trial

conditions (OSIS or BW) for five days, Monday through Friday, in the early morning (4:00 am to 7:00 am), after breakfast (8:00 am to 11:00 am), and in the evening (4 pm – 10:30 pm).

Trained research staff followed and observed as the CNAs provided incontinence care to participating residents, standing close enough to observe the care process, but not to participate in or get in the way of the care. Two observation start times were recorded, first (T1) when CNAs put their gloves on and second (T2) when patients were uncovered to perform incontinence care. The end time of observation was recorded as the time a clean adult brief was completely fastened. Research staff also recorded the manner and amount of all supplies and other items used in the incontinence care episode. Inter-rater reliability was tested for all key observed variables. Research staff made no efforts to encourage CNAs at any time during observations (baseline or follow-up) or to interfere in their care in any way throughout the observation.

Follow-up observations of the same variables assessed in the baseline condition began immediately, continuing for 5 days. On the nursing units assigned to OSIS, research staff placed OSIS adult briefs alongside other incontinence care supplies and did not remove the regular adult brief; thus CNAs had the choice to use regular adult briefs or to use OSIS. On the nursing units assigned to BW, research staff placed a box of wipes in each consented resident's room on the bedside table. On these units, the CNAs continued to use regular adult briefs and were informed that a box of wipes was available for use for only that resident. On the last day of follow-up (OSIS and BW or on a following day if the CNA was not working that day), each participating CNA was asked to complete a simple survey and to express their opinions concerning supplies that they like to have handy, satisfaction, and practicality of either the OSIS or BW, along with their recommendations for improvement.

Data Analysis

Descriptive statistics were used to summarize resident and CNA characteristics. Key variables were compared between baseline, OSIS, and BW conditions using contingency table analysis and Chi-Square (χ^2) for categorical variables, and t-tests or one-way analysis of variance (ANOVA) with Scheffe post hoc range tests to compare continuous variables. To control for the nesting of residents within CNAs, differences in time taken for adult brief changing between conditions was also analyzed using a hierarchical one-way ANOVA (Type I sums of squares). Comparison of CNA survey responses was conducted using contingency table analyses with the Chi-square statistic (for categorical variables) and independent t-tests for continuous variables. All analyses were performed using SPSS v 12.0 (SPSS Inc., Chicago, IL).

RESULTS

All 24 participating residents (54% male, 46% female) remained in the NH for the entire study duration, except one resident who was transferred to another NH during the second week. As seen in Table 1, there were no significant differences in the demographic or MDS variables illustrated between the 15 residents on the units assigned to OSIS compared to those 9 on units assigned to BW. There were 53% and 33% female participants in the OSIS and BW groups, respectively.

Results of the baseline description of incontinence care practices are shown in Table 2, which lists the results of behavioral observations of incontinence care episodes at baseline and at follow-up under the OSIS or BW condition. Inter-rater reliability was very good for these variables, and ranged from $\kappa=.788 - 1.00$ for material supplied, $\kappa=.847 - 1.00$ for material used, and $\kappa=.577 - 1.00$ for other items observed (except redness at resident's perineal area and amount of cleansing, which had a reliability of only $\kappa=.274$ and $\kappa=.069$, respectively).

In 23% of the observations, CNAs were interrupted after putting on gloves by the patient, other patients, and needed to leave the room to get more supplies, or to talk to other staff. The exact time of these interruptions was recorded and subtracted from total time of actual incontinence care. In cases of interruptions when CNAs left the room, the CNA would put on a new pair of disposable gloves when they returned, and the time of incontinence care was reset to the time of the new set of gloves.

Three-fourths of the observations were for urinary incontinence, while another 25% of observations were for urinary and fecal incontinence. CNAs always checked for signs of fecal incontinence during incontinence care. In addition, there were no significant differences in the mean time for incontinence care (T1 or T2) between care for episodes with urinary incontinence only compared to episodes of urinary and fecal incontinence occurring together.

In the large majority of observations (76%) cleansing was partial, covering the front and back of the perineal area; 3% of observations were dry changes and residents were not cleansed completely (if at all), and 21% of the observations had ideal cleansing with 360 degrees around the perineal area, although the inter-rater reliability in regards to amount of cleansing was poor (as described above). Materials used included disposable gloves, towels, and lotions, which were utilized 100%, 67%, and 17% of the time, respectively. During baseline condition, wipes were available in one NH at all times in packages of three or eight wipes each. CNAs usually loaded the carts with adult briefs and other incontinence care supplies prior to incontinence care.

As indicated in Table 2, during usual care at baseline, the average duration of time from putting on clean gloves until fastening the adult brief completely (total time for incontinence care episode) was 519.3 (± 319.6) seconds. Of this time, the average duration of time from uncovering the resident to final fastening of the adult brief was 328.6 (± 176.7) seconds. There were no significant differences in these time intervals at baseline between the units later assigned to the OSIS or BW conditions.

Results of the comparison between baseline and the OSIS and BW conditions at follow-up are also shown in Table 2. At baseline, there were no significant differences between the OSIS and BW groups in the average time per incontinence care episodes, and in all other variables except for the percent of incontinence care observations in bed (83 % for OSIS versus 95% for BW, $p=.045$). There were no differences in the frequency of some form of cleansing during incontinence care between baseline, OSIS, and BW trial conditions, and residents with wet adult briefs were virtually always cleansed during baseline, OSIS, and BW conditions (97%, 98% and 100% of observations respectively). Overall, in 88% of the observations residents were in bed during incontinence care, while the remaining 12% were out of bed in other areas, such as in their personal bathroom. During OSIS and BW conditions, three-fourths of the observations were for urinary incontinence, while another 25% of observations were for urinary and fecal incontinence.

Using the baseline data from the one NH that used wipes at baseline, there was a significant increase in the frequency of cleansing with wipes for incontinence care during the OSIS condition compared to baseline or the BW condition (97%, 77%, and 71 % of episodes, respectively, $p<.001$). The frequency of CNAs interrupted during incontinence care was significantly decreased with OSIS, with interruptions occurring during 23%, 13% and 36% of incontinence care episodes at baseline, OSIS, and BW, respectively ($p=.005$). In addition, CNAs were significantly less likely to use cloth towels for additional cleansing in the OSIS condition compared to baseline or the BW condition (53%, 67%, and 82 % of episodes, respectively, $p=.002$).

There was a significant decrease in time spent on incontinence care between baseline and the OSIS or BW conditions. The total average time (T1) for each incontinence care episode, adjusted for CNA, decreased from 512.2 seconds at baseline to 413.1 seconds with the OSIS condition in place, and to 389.5 seconds with the BW condition in place ($p=.037$). The average observed time for incontinence care from uncovering resident to fastening a clean adult brief (T2) also decreased significantly during OSIS and BW, aside from frequent replacement of the BW before gloves were worn by CNAs, compared to usual care ($P= <0.001$). There were no significant differences in the average observed T1 and T2 between groups during baseline ($P= 0.956$, and 0.993) and follow-up (OSIS or BW) conditions ($P= 0.646$ and 0.066 , respectively).

During the BW condition, there was a significant decrease in time spent on incontinence care when the box of wipes was actually present or after it was replaced. However, BW was not at the bedside during 33% of the observations and the box was found empty during 26% of incontinence care episodes (for 59% of the observed BW incontinence care episodes, BW was missing from the bedside, or completely absent from the patient's room and had to be replaced). Therefore, in the BW condition, wipes were only used in 41% of incontinence care episodes. The time spent searching for the box of wipes if not found by the bedside was not included since, in most cases, CNAs try to have their supplies prepared before putting on gloves. Of note, we observed CNA's using the BW condition wipes for other purposes, such as cleaning catheters and wiping the bed and tables. We also observed aides putting soiled wipes on top of the box, pulling several wipes out at one time, and using wipes to moisten their own hands. During the BW condition, wipe boxes were found at the bedsides of other residents, in the closet, and in one case, a resident tried to sell his/her box of wipes to a roommate.

Fifty-eight (95%) of the 61 CNAs who consented to participate and were observed providing incontinence care episodes, completed the CNA survey. As shown in Table 3, CNAs in both the OSIS and BW groups reported the most desired items for incontinence care were disposable gloves (92% and 95%, respectively) and disposable wipes (86% and 81% respectively). Those who used OSIS found having cleansing wipes attached to an adult brief more convenient than a bedside box of wipes, and those who used BW found it necessary to have wipes in the patient's room. Both OSIS and BW groups reported an average $3.7 (\pm 1.1)$ wipes are needed for most types of incontinence care.

DISCUSSION

This study provides evidence that the OSIS is effective for management of urinary, fecal and combined (urinary plus fecal) incontinence, and encouraged the cleansing, sanitizing, and application of an emollient to the perineal area prior to applying a clean brief. For urinary incontinence, the OSIS wipes were used alone for almost all incontinence episodes; for fecal incontinence, the OSIS wipes were used at the end of cleansing along with other supplies, depending on the nature and type of fecal incontinence. As intended, OSIS wipes were used in both urinary and fecal incontinence at the end of incontinence care episode before application of a clean brief on the patient.

We chose to include both urinary and fecal incontinence, since fecal incontinence is unpredictable and may happen with any "diapered" resident. In addition, including both types of incontinence more accurately reflects the 'real world' aspects of providing care for residents with incontinence. In addition, including urinary incontinence episodes alone would have limited our sample size. As we hoped, CNAs logically opened the pouch and removed and used the wipes from OSIS to sanitize the perineal area. Based on the CNA survey, the preferred number of wipes to include in the OSIS is three to four. Our observations also demonstrated the shortages and difficulties involved with keeping a box of wipes by the bedside at all times

or in any consistent place in the NH, as well as the misuse of wipes for activities that are not related to skin cleansing, such as wiping tables, mattresses, hands and catheters.

The use of OSIS decreased the amount of time needed for CNAs to complete incontinence care in 97% of the observed episodes. For BW the time savings occurred in only 41% of the observed episodes, depending on whether the box was present at the bedside because of additional time required to locate the box of wipes, in addition to dealing with other interruptions. In other words, the time savings with use of BW was offset by the time spent finding the box of wipes and replacing it by the bedside. The time of incontinence care was reduced in both follow-up (OSIS and BW) conditions without evidence of jeopardizing the quality of the incontinence care process.

These findings suggest that, under the best conditions, when CNAs know they are being observed, they can give the same quality of incontinence care and cleansing in significantly less time using either the OSIS or BW systems. The survey results also demonstrated that CNAs preferred handy disposable wipes during incontinence care second only to disposable gloves. When CNAs were asked if their use of OSIS or BW facilitated cleansing, 97% and 88% responded “yes,” respectively.

There are limitations inherent in a small study of this size and in the quasi-experimental assignment of units to conditions. First, there are limitations of power considerations, the small sample size, and to the relatively short periods of testing. In addition, the presence of observers may influence the performance of CNAs to clean sufficiently and encourage the use of incontinence care products. Future studies may need to more thoroughly mask study purpose to avoid this limitation. However, a strength of this study was the inclusion of observations of incontinence care on all three nursing shifts.

A prior controlled study examining the association between various skin cleansing regimens for incontinence care and skin health revealed that a no-rinse cleanser (as used in disposable wipes) was better than soap and water in regards to skin health and cost-effectiveness.^{17 23} The authors of that study also reported that a no-rinse cleanser, when used with a moisture barrier, is more skin-protective and cost-effective for incontinence care cleansing than soap and water. OSIS improves upon this regimen by increasing the ease, efficiency, and consistency with which these products are used.

The incidence and prevalence of skin disorders in the NH have been previously described.⁹ The economic cost of urinary incontinence to NHs has been estimated at almost \$5 billion annually when the costs of supplies, laundry and staff time are included, and as a health problem, urinary incontinence costs close to \$2 billion annually.²⁴ Thus, urinary incontinence confers terrific human, health, and economic costs to individuals, NHs, and society.²⁵ Protocols or products that can be efficiently implemented within the resource limitations of the NH and reduce the high prevalence of adverse skin conditions are needed and could significantly reduce the high cost of incontinence-related skin disorders.

According to the 1997 US Census Bureau and the Centers for Medicare and Medicaid Services (CMS; formerly known as the Healthcare Financing Administration) medical statistics, of the 1,813,665 million nursing home beds in the US, 83% were occupied and 55% of patients were incontinent, giving an estimated 827,938 incontinent NH residents.²⁶ By conservative estimates, each resident is changed 4 times a day. The 100 second savings per incontinence care episode with OSIS could translate to almost a hundred thousand hours saved each year. This caregiver time could be allocated to other important activities (such as other resident personal care needs, social interaction, and feeding), especially when the time saving is accompanied by adequate incontinence care and cleansing. We have also highlighted outcomes of OSIS besides those related to caregiver time, such as ease of use, practicality, less

wastefulness in regards to use of materials and effectiveness to facilitate incontinence care. The above was not the same with BW condition as described earlier. CNAs were much more likely to need to perform activities such as finding, filling and replacing BW before it could be used and there were hygienic concerns during the use of BW.

Our findings regarding efficiency and length of time of incontinence care associated with the use of OSIS was consistent with other research studies. In a retrospective study, Clever et al suggested that protecting patients' skin against the effects of urine and/or feces with a disposable skin cleansing/protectant wipe may help prevent pressure ulcers. The authors concluded that time constraints and other real or perceived considerations may, unfortunately, result in less-than-optimal incontinence care procedures in everyday practice."²⁷ In addition, a prospective study on the cost of urinary incontinence in two skilled nursing facilities indicated that an important element of the costs of incontinence is the time spent by staff in caring for these residents. That study reported that the average time for each incontinence care episode was 3 minutes and 33 seconds.²⁸

The findings from the current study also answer some questions as to why disposable wipes in packages (separate from the diaper) and bedside placement of these boxes of wipes, while effective, are not used widely in nursing homes. Good disposable wipes with a balanced pH level and skin barrier cream are not articles that an institution would want wasted. In our study, wipes were not used at all or were consistently misused, and therefore wasted, when available in large quantities like the BW, and also when they were available in smaller quantities in separate packages. The two wipes that were incorporated with OSIS were used for perineal skin cleansing immediately, as intended, and appeared to improve the ease of providing incontinence care.

CONCLUSION

CNAs used the OSIS incontinence care product appropriately, and as intended. They consistently used OSIS wipes to sanitize the perineal area. In all of our observations, aides opened the pouch and used the enclosed wipes for cleansing the perineal area before applying the new adult brief. CNAs reported that the most desired items for incontinence care were disposable gloves and disposable wipes. Under baseline conditions, wipes were not used for cleansing during incontinence care in 23% of episodes even when it the wipes were available in small packages of 3 and 8 wipes each, and during the BW condition, the box of wipes needed to be replaced in 59% of episodes and was neglected in 29% of observed episodes of care even after it had been replaced at the bedside. In addition, our observations during the BW condition suggest that even if the box of wipes is available, the wipes would not only be used wastefully at times, but may also encourage some unhygienic practices. We found that when available, the OSIS diapers were selected in almost all incontinence care episodes (97%). CNAs reported that they liked to have disposable wipes handy when changing, and the average number of wipes they felt was needed for skin cleansing during incontinence care is between 3–4 wipes. Further study is planned to compare the effect of OSIS and usual care on perineal dermatitis, and to further examine patterns of incontinence care using OSIS as compared to usual incontinence care practices.

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© One Step Incontinence System (OSIS)

Figure 1.
One Step Incontinence System (OSIS) used in the study

Peel here

Use This Wipe before Putting on This Diaper
Pouch and Wipes should be removed before use
© One Step Incontinence System (OSIS)

Figure 2.
OSIS pouch

Table 1

Baseline resident characteristics

	Total sample % subjects or Mean ($\pm$ SD) (N = 24)	OSIS % subjects or Mean ($\pm$ SD) (N = 15)	BW % subjects or Mean ($\pm$ SD) (N = 9)	OSIS vs. BW P-value
Age, in years	80 (11.22)	78.5 (13.21)	82.1 (6.86)	0.462
Gender: Female	46	53	33	0.341
Male	54	47	67	
Ethnicity,				
White	58	60	56	.831
African American	42	40	44	
Hispanic	0	0	0	
Other	0	0	0	
Length of stay in nursing home, in months	47 (39)	39.9 (30)	56.2 (49)	0.357
Number of medications	9.5 (4.21)	9.9 (2.97)	8.8 (5.8)	0.535
Body mass index	26.14 (4.74)	27.1 (5.25)	24.6(3.45)	0.219
Most recent MDS indicators				
Short-term memory OK seems to recall after 5 minutes.	33	27	44	0.412
Long-term memory OK seems to recall long past.	33	33	33	1.00
Physical Functioning-Bed Mobility needs at least limited assistance	75	80	67	0.657
TRANSFER: Moves to/from bed chair. needs at least limited assistance	96	100	89	.525
DRESSING: put on, fasten, and takes off all items. needs at least limited assistance	96	100	89	.524
TOILET: uses the toilet room, bedpan, urinal, cleanses, change adult brief needs at least limited assistance	96	93	89	.267
HYGIENE: needs at least limited assistance	93	93	89	.452
BATHING: Total dependence % residents	100	100	100	1.0
ACCIDENT: - Fell in past 180 days.	12	13	11	.873
PAIN: Shows evidence of pain.	25	33	11	.399

OSIS = One Step Incontinence System

BW= Bedside Wipes only

Body mass index = [weight (lbs)/height (in²)] $\times$ 704

Table 2
Observed Characteristics of Incontinence Care Episodes at Baseline and with the OSIS or BW Condition in place

	Baseline			Follow-up		
	OSIS % of episode Or Mean (SD) N=95	BW % of episodes Or Mean (SD) N=60	OSIS vs. BW (P-value)	Total (BW + OSIS) % of episodes Or Mean (SD) N=155	OSIS % Episode Or Mean (SD) N=103	BW % Episode Or Mean (SD) N=49
Supplies available during incontinence observations: % of observations or mean (±)						
Disposable gloves, %	100	100	1.0	100	100	100
Disposable adult brief, %	95	93	.733	94	90	90
Supplies used during incontinence observations: % of observations or mean (±)						
Disposable gloves, %	100	100	1.0	100	100	100
Disposable adult brief	97	94	.528	96	93	96
Cloth towel used to cleanse resident, %	67	67	.964	67	53	82
Lotion used, %	19	13	.347	17	10	12
No. of towels used to cleanse resident	1.1(±.910)	1.2(±1.245)	.648	1.1(± 1.040)	.77(±.882)	1.2(± .868)
No. of wipes used (Note: at Usual care only 1 NH used wipes) (adj x = controlling for CNA)	2.9(±2.93) N=54	2.5(±2.66) N=33	.513	2.8 (± 2.83) adj x = 2.4	2.3 (± 1.34) adj x = 2.9	2.2 (± 2.01) adj x = 2.6
Disposable wipes used, % [†]	75 N=54	78 N=33	.758	77 N=87	97	71
No. of gloves used (adj x = controlling for CNA)	2.4 (± 0.98)	2.6 (± 1.49)	.391	2.5 (± 1.21) adj x = 2.6	2.4 (± 1.07) adj x = 2.4	2.7 (± 1.14) adj x = 2.5
Time variables, location of incontinence observations and Other observations : % of observations or mean (±)						
Total time between wearing gloves and fastening clean adult brief (adj x = controlling for CNA), in seconds	469.2 (± 248.13) adj x = 502.03	588.9 (± 392.06) adj x = 521.03	.112 0.956	519.3 (± 319.58) adj x = 512.2	399.9 (± 236.99) adj x = 413.1	464.1 (± 235.27) adj x = 389.5
Time between uncovering resident and fastening clean adult brief (adj x = controlling for CNA), in seconds	310.1 (± 148.73) adj x = 334.0	356.2 (± 210.23) adj x = 333.3	.135 .993	328.6 (± 176.74) adj x = 330.3	282.9 (± 142.83) adj x = 256.1	264.0 (± 106.13) adj x = 213.0
Was CNA interrupted during changing interval?	24	22	.847	23	13	36
% of observations in bed	83	95	.024 [*]	88	82	92
Did CNA leave the adult brief area open to air before fastening the clean adult brief?	39	43	.659	41	38	42

OSIS = one- step incontinence system; BW = bedside box of wipes only; adj X = controlling for CNA.

Baseline= OSIS versus BW at usual care condition only (second – fourth columns); Follow up= Total usual care versus OSIS versus BW (fifth –eighth columns).

[†] At usual care only 1 NH used disposable wipes.

^{*} indicates significant ($P < .05$)

^{**} indicates significant ($P < .01$)

Table 3
Results of (CNA) survey, with OSIS) or BW Conditions in Place

Survey questions	OSIS % of CNAs or Mean (±SD)	BW % of CNAs or Mean (±SD)	t-test or χ^2 P values
1. What supplies do you like to have handy when changing a patient's disposable adult brief or pad? (Please select as many as you feel necessary)			
☐ Disposable gloves	92	95	.629
☐ Towels	70	67	.776
☐ Ointment	62	67	.732
☐ Disposable wipes	86	81	.576
☐ Moisturizing lotion	49	43	.671
☐ Water	67	57	.427
☐ Soap or cleansing agent	76	62	.268
2. When do you think it is necessary to cleanse the adult brief area? (Check all that apply)			
☐ If the area looks like it needs cleaning	38	24	.274
☐ Every time the adult brief is changed	97	91	.260
☐ If there is feces	39	57	.155
☐ If the area is red	27	47	.113
3. When changing a adult brief, how often do you cleanse the adult brief area?			
☐ Always	97	95	.680
☐ Sometimes	3	5	
☐ Rarely	Unchecked	Unchecked	
4. When changing a adult brief, would you like to have disposable wipes available? ☐ Yes	95	100	.586
6. If you used the study adult briefs/ or study box of wipes provided in this project do you think that they facilitated cleansing? ☐ Yes	97	88	.186
8. Do you think it is more convenient to have cleansing wipes attached to the adult brief than it would be to have wipes in a box at the bedside? ☐ Yes	79	53	.049*
10. How many cleansing wipes (on average) do you think are necessary for each cleansing episode?	3.6(±1.2)	3.8(±1.1)	.728

CNA= certified nursing assistant; OSIS = One Step Incontinence System; BW =Bedside Box of Wipes only. OSIS: n=37CNAs; BW: n=21 CNAs.

* indicates significant ($P < .05$).