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Article Review

Instruments for assessing adverse events associated with the use of geriatric diapers

Instrumentos de avaliação dos eventos adversos associados ao uso de fraldas geriátricas

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Objective: to analyze instruments for the evaluation of adverse events associated with the use of geriatric diapers. **Methods:** integrative review of the literature, in the LILACS, MEDLINE, CINAHL and EMBASE databases, with publications in Portuguese, English and Spanish. In the analysis of the data, categorization occurred by the identification of adverse events and screening instruments. **Results:** of the 19 publications, we identified as adverse events and respective instruments: motor deficit/Barthel index; Incontinence/*Kings's Health Questionnaire* and International Consultation on Incontinence Questionnaire-Short Form; skin moisture/Transepidermal Water Loss; quality of life/Hospital Anxiety and Depression Scale; incontinence-associated dermatitis/Nix Perineal Rating Scale. **Conclusion:** instruments were analyzed that evaluated the adverse events associated with the use of diapers that may be potentially used in nursing practice.
Descriptors: Diapers, Adult; Incontinence Pads; Nursing Assessment; Nursing Care.

Objetivo: analisar instrumentos de avaliação dos eventos adversos associados ao uso de fraldas geriátricas. **Métodos:** revisão integrativa da literatura, nas bases de dados LILACS, MEDLINE, CINAHL e EMBASE, com publicações em português, inglês e espanhol. Na análise dos dados, a categorização ocorreu pela identificação dos eventos adversos e instrumentos de rastreio. **Resultados:** das 19 publicações, identificaram-se como eventos adversos e respectivos instrumentos: déficit motor/índice de Barthel; *incontinência/Kings's Health Questionnaire e International Consultation on Incontinence Questionnaire-Short Form*; umidade da pele/*Transepidermal Water Loss*; qualidade de vida/*Hospital Anxiety and Depression Scale*; dermatite associada à incontinência/Escala de Avaliação Perineal de Nix. **Conclusão:** foram analisados instrumentos que avaliaram os eventos adversos associados ao uso de fraldas que podem ser potencialmente utilizados na prática de enfermagem.
Descritores: Fraldas para Adultos; Tampões Absorventes para a Incontinência Urinária; Avaliação em Enfermagem; Cuidados de Enfermagem.

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Introduction

The use of geriatric diapers can be observed in different care settings in nursing. They are absorbent, hygiene products with the function of retaining urine and feces, used by those who have the control of the elimination of physiological needs impaired[1]. However, this practice requires caution, since it presents specific indications, whose use without predefined criteria can cause adverse events to the elderly.

Adverse events can be defined as undesirable but predictable incidents that occur during the provision of health care that result in harm to the client. They may cause impairment of body structure or function and/or some harmful effect, such as illness, injury, disability, or death, and may be of a physical, social and/or psychological nature[2].

When considering care with geriatric diapers as an intervention in the control of urinary problems, the literature suggests as main adverse events: incontinence-associated dermatitis, worsening incontinence (which becomes a cyclical problem), and quality of life[3].

Incontinence-associated dermatitis is the clinical manifestation of moisture-related skin lesions, common in patients with fecal and/or urinary incontinence. It is an inflammation of the skin in the perineal region, perigenital, perianal and adjacent, coming from contact with urine or feces. Corresponds to lesions characterized by rashes, erosion of the epidermis and macerated appearance[4-5]. Generally, the cutaneous fragility of the aging process, associated to the number of changes greater than every three hours or to the absence of the use of barrier products, such as zinc oxide, exposes the risk[1].

Incontinence has effects on the social and mental well-being of the elderly and can significantly affect the quality of life. A study indicates that among the patients with urinary incontinence, 81.0% reported feelings such as frustration, shame, worry, loss of self-confidence, anxiety and sadness. The decrease in the urinary receptors stimulus occurs due to the restriction of mobility caused by the use of diapers; since the longer the elderly use diapers, the less he walks through the hospital unit, which compromises musculoskeletal vitality[5].

In addition, the frequency of urinary tract infection rises with age in both sexes. In elderly women, in addition to menopause, anatomical and functional changes in the bladder, related or not to multiple births, contribute to this increase, potentiated by the use of diapers[2].

From this, it is incumbent on nurses to indicate the care with geriatric diapers, considering, in addition to the adverse events, the cost analysis and other possible pertinent treatments, based on the benefit to the patient. The choice was made according to the dependence and availability of toilets, as well as the volume of urinary and fecal loss, cognitive deficits and severe physical impairment[1].

Thus, since geriatric diaper care can lead to adverse events, instruments are needed to assist in the early identification and evaluation of the risks associated with their use. From this, this study aimed to analyze instruments for the evaluation of adverse events associated with the use of geriatric diapers.

Methods

This is an integrative review of the literature, which synthesizes the available studies on a given topic and leads to practice, based on scientific knowledge. It aims to generate knowledge about a problem and determine if the application is feasible in practice[6]. In order to do so, we used the checklist Preferred Reporting Items for Systematic Reviews and Meta-Analyzes (PRISMA) to guide the organization of information[7].

As a starting point, the question was elaborated: which instruments help in the nursing evaluation of adverse events in diapers using the elderly? For this, the strategy was used: P - define the population, context and/or situation-problem (elderly people who use diapers); V- defines the variables (assessment instruments of care with geriatric diapers); O - defines

desired or undesirable outcomes (adverse events associated with geriatric diaper care)[8].

As a search strategy for the studies, the following databases were consulted: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), Latin American Literature in Health Sciences (LILACS) and Embase Database (Embase), first with the descriptors "*dermatite associada à incontinência*"/"incontinence dermatitis associated"; "*incontinência*"/"incontinence" and "*qualidade de vida*"/"quality of life", separately and in combination with the Boolean operators AND and OR. However, no studies with assessment instruments with these descriptors alone or added to the descriptor "adult diapers" were found. Subsequently, the descriptors "*fraldas para adultos*"/"adult diapers" and "*idoso*"/"aged"; "*avaliação em infermagem*"/"nursing assessment" were used in isolation and combined with the Boolean operators AND and OR; finding the instruments described in this study.

For the MEDLINE database, an investigation was made using the descriptors of the *Medical Subject Headings* (MeSH) terminology, isolated and combined by the Boolean operators AND and OR: "adult diapers", "aged" and "nursing assessment".

We included articles focusing on nursing monitoring elderly using diapers, which described the geriatric diapers inserted in the nursing practices and techniques; published in the Portuguese, English and Spanish languages until July 2018. To this end, instruments to assist in the evaluation of adverse events in the elderly using diapers were considered: scales, questionnaires, protocols, standard operating procedures and tests. Articles describing nursing interventions related to the use of diapers in children were excluded.

The search strategy of the studies in the databases is described in Figure 1.

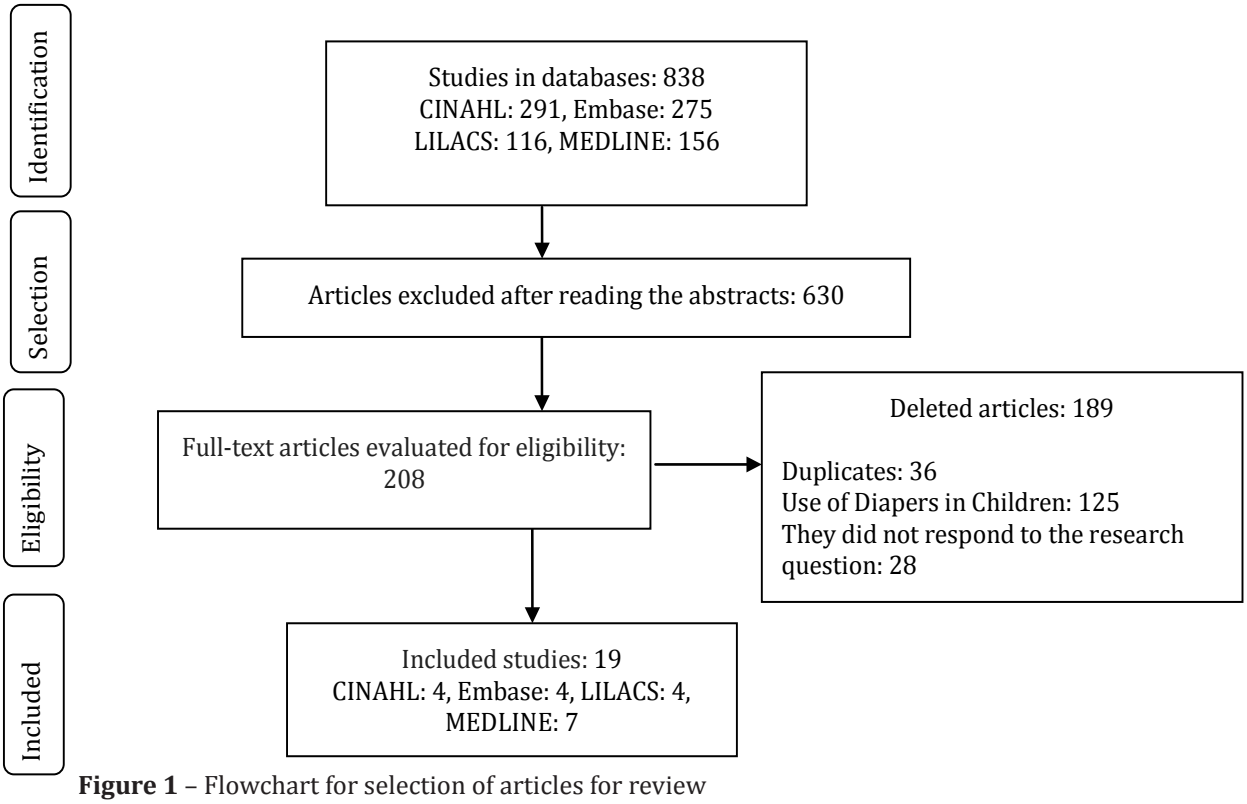

Figure 1 – Flowchart for selection of articles for review

To classify the level of evidence, the following classification was chosen: level 1 - evidence from a systematic review or meta-analysis of relevant randomized controlled clinical trials or from clinical guidelines based on systematic reviews of randomized controlled trials; level 2 - evidence obtained from at least one well-delineated randomized controlled trial; level 3 - evidence obtained from well-delineated clinical trials without randomization; level 4 - evidence from well-delineated cohort and case-control studies; level 5 - evidence originating from a systematic review of descriptive and qualitative studies; level 6 - evidence from a single descriptive or qualitative study; level 7 - evidence from the opinion of authorities and/or expert committee reports[7].

To analyze the material, it was decided to group and categorize the information according to the data of the instruments used in geriatric diaper care and respective measurement strategies.

Results

Figure 2 presents the description of the studies selected for this literature review, specifying authorship, journal, country, year of publication, level of evidence and type of study.

No.	Base	Author, journal, country/year	Level of Evidence	Kind of study
1	LILACS	Fonseca ESM et al., Rev Bras Ginecol Obstet, Brazil/2005	6	Observational study
2	LILACS	Silva L, Lopes MHBM, Rev Esc Enferm USP, Brazil/2009	6	Observational study
3	CINAHL	Omili RO et al., Age Aging, USA/2010	3	Clinical trial
4	EMBASE	Beeckman D et al., J Wound Ostomy Continence Nurs, USA/2011	2	Controlled clinical trial
5	CINAHL	Naruse T, Nagata S, Int J Urol, Japan/2011	6	Cross-sectional study
6	CINAHL	Black JM et al., J Wound Ostomy Continence Nurs, USA/2011	7	Narrative literature review
7	CINAHL	Bliss DZ et al., J Wound Ostomy Continence Nurs, USA/2011	2	Clinical trial
8	LILACS	Pereira VS, Rev Bras Ginecol Obstet, Brazil/2011	6	Observational study
9	MEDLINE	Tibaek S, Christian DC, Neurourol Urodyn, Denmark/2012	6	Observational study
10	MEDLINE	Sugama J et al., BMC Geriatr, USA/2012	2	Randomized clinical trial
11	MEDLINE	Figueiredo EM et al., Int Urogynecol J Pelvic Floor Dysfunct, Brazil/2012	6	Observational study
12	EMBASE	Rohwer K et al., J Wound Ostomy Continence Nurs, USA/2013	6	Observational study
13	MEDLINE	Taerawattananon Y et al., Int J Technol Assess Health Care, Thailand/2015	4	Quasi-experimental
14	EMBASE	Grybowska M et al., BMC Womens Health, Poland/2015	6	Cross-sectional study
15	EMBASE	Beeckmann D et al., Int Wound J, USA, 2015	6	Cross-sectional study
16	MEDLINE	Palomar FL et al., Enferm Dermatol, Spain/2016	6	Observational study
17	MEDLINE	Lai HH et al., BMC Urologic, Japan/2016	2	Controlled clinical trial
18	MEDLINE	Gray M, Age Ageing, USA/2016	1	Systematic review
19	LILACS	Bitencourt et al., Rev Bras Enferm, Brazil/2018	2	Controlled clinical trial

Figure 2 – Selected articles for integrative literature review in the MEDLINE, CINAHL, EMBASE and LILACS databases

From these studies, it was possible to group the main events associated with the use of geriatric diapers and the instruments of evaluation (Figure 3). In the studies studied, the adverse events related to geriatric diaper care identified in the studies were: motor deficit, incontinence (urinary and fecal), quality of life and incontinence-associated dermatitis.

Adverse event	Instrument (Reference)	Validated in Brazil?	No. Items	How do you rate the adverse event?
Motor deficit	Barthel index[9-10]	Yes	10	Daily living activity
	KATZ index[11]	Yes	6	Daily living activity
	Care Ensure System[10]	No	4	Daily living activity
Incontinence	Stamey incontinence score[12]	No	4	Urinary loss in 24 hours
	Kings's Health Questionnaire[13-14]	Yes	8	Impact of urinary symptoms and quality of life
	Pad tes[15-17]	Yes	1	Urinary loss in 8, 24 and 72 hours
	Incontinence Severity Index[18]	Yes	2	Urinary loss
	Fecal Incontinence Quality of Life Scale[19-20]	Yes	4	Impact of fecal loss
	EuroQol[21]	No	7	Usual activities, pain, anxiety and depression
Quality of life	Hospital Anxiety and Depression Scale[22]	No	14	Anxiety and depression
	Kings's Health Questionnaire[13-14]	Yes	8	Impact of urinary symptoms and quality of life
	International Consultation on Incontinence Questionnaire-Short Form[11,14]	Yes	5	Impact of urinary loss on quality of life
Incontinence-Linked Dermatitis	Incontinence-associated dermatitis (IAD) Skin Condition Assessment Tool[15,23]	No	3	Skin examination
	Severity Tool IAD[20,24]	No	1	Skin examination
	Incontinence Associated Dermatitis Intervention Tool[25]	No	4	Skin examination
	Iconográfica de la Dermatitis de Pañal por la Humeda[26]	No	6	Skin examination
	IAD Severity Categorisation Tool[27]	No	3	Skin examination
	Visual Erythema Scale[26]	No	1	Skin examination
	Perineal Rating Scale of Nix[24]	Yes	4	Skin examination and laboratory tests
	Incontinence associates dermatitits Intervention Tool[26]	No	2	Skin examination

Figure 3 – Tools for assessing adverse events related to geriatric diaper care

Discussion

The use of instruments can early determine the onset of a clinical condition and favor early intervention and improvement in the patient profile. For this, the professional must have the knowledge of the instruments available, in order to select the most appropriate, know the correct use of this and analyze the established scores[21]. However, most of those identified are nonspecific to the patient wearing diapers, so they were developed for other clients, but were applied in patient-oriented studies in diaper use.

In this context, some scales pointed to the use of diapers evaluate the motor deficit for the implications in the execution of daily activities of the patient, such as the Barthel index. This can identify the difficulty of urinary control due to motor deficit, although it is not specific for this purpose. To do so, it analyzes the following activities: control of the intestine, bladder, personal hygiene, transfer of hygiene, transfer of bathtub, food, clothing, transport of wheelchair to bed, walk and go up and down stairs. The total score can range from zero (dependent) to 100 (fully independent)[9-10]. For Portuguese, the use of this scale was validated in the context of outpatient care, with a reliability of 0.88[28], although not associated to the study of diaper use.

There is also the Katz Index, validated for Portuguese, also not specific for the use of diapers. Through it, the motor deficit can be evaluated by the analysis of the daily activities performed by the patient. To do so, there are two types of possible evaluations. In the first, the degree of dependence and the scores are analyzed from index D, that is, those with index D, E, F, G and 'other' show dependence on the elderly, especially, as regards going to bathroom 'and' continence '. The second one contributes with quantitative analysis of the scores in 6: Independent; 4: moderate dependence; 2 or less: Very dependent[11].

Another test that may assist in the quantification of urinary incontinence is the *Pad test*, although not developed for the control of the patient in use of diapers. Also known as an absorbent test, it is a simple, non-invasive and effective method for assessing urinary loss. The application of the *Pad test* allows the classification of urinary incontinence as mild, moderate and severe according to the quantification of urine loss by weighing the absorbent after one or 24 hours of use[18-17].

Another system that evaluates the independence in the execution of activities is the Care Ensure System, not yet translated or validated into Portuguese; it evaluates the need for toilet assistance, including removal of clothing and cleaning of the skin area in contact with the diapers. The levels of necessary care punctuated in this instrument include: level 2 for moderate care; level 3, significant care; level 4, intensive care; and level 5, the maximum care[10].

Some instruments may still aid in the evaluation of urinary incontinence, such as the Stamey Incontinence Score, which considers urinary loss at zero degree (continent); grade 1 (loss of urine with sudden increase in abdominal pressure, such as coughing, sneezing, or laughter); grade 2 (leaks with lesser degree of physical stress, such as walking, erect from a sitting or sitting position in bed); and grade 3 (total incontinence, urine is lost, with no relation to physical activity or position). It is mainly used for urinary stress incontinence[12], and validation was not found in Brazil.

King's Health Questionnaire (KHQ) is another instrument composed of 21 questions, distributed in eight domains and validated in Portuguese (reliability of 0.85)[12]. This is the scale of incontinence severity and urinary symptoms. It is punctuated by domains, with no overall score, the score ranges from zero to 100. The higher the score obtained, the worse the quality of life related to that domain. In a Brazilian study, the validation showed a reliability of 0.87 in the instrument[13].

Similar to KHQ, the *International Consultation on Incontinence Questionnaire-Short Form* (ICIQ-SF), with a reliability of 0.70, is composed of four ques-

tions that assess frequency, severity and impact on quality of life. In addition, it presents a set of eight items related to the causes or situations of incontinence experienced by the patient. The scores range from zero to 10, so zero indicates nothing; 1 to 3, light; 4 to 6, moderate; 7 to 9, severe; and 10, very severe[11,14].

Another instrument that assists in the identification and evaluation of urinary incontinence, although not specifically developed for diaper use, is the Incontinence Severity Index (ISI) questionnaire. Validated for Portuguese, it is composed of two questions regarding the frequency and quantity of urinary loss, applied as an evaluation method for incontinent women. The final score, obtained by multiplying the frequency scores by the amount of urinary loss, allows urinary incontinence to be classified as mild, moderate, severe or very severe[18].

Quality of life in people with urinary and/or fecal incontinence can also be measured using the standardized EuroQol questionnaire, which has not yet been validated in Brazil. It presents the following dimensions: mobility, self-care, usual activities, pain, discomfort and anxiety and depression. Each domain contains three levels of response ("no", "some" and "serious problems") and Visual Analog Scale. The score of the EQ-5D index ranges from zero to 1, so zero indicates poorer health and 1, the better[21].

Fecal Incontinence Quality of Life Scale is another instrument validated for Portuguese (reliability of 0.754), composed of 29 questions distributed in four domains[29]. The domains or scales represent clusters of items or issues that address the same aspect regarding quality of life. The domains include lifestyle, behavior, depression and embarrassment. The score of the items in the questionnaire ranges from 1 to 4, for each domain[19-20].

There are instruments that evaluate the quality of life of caregivers of people with chronic disorders, known as Hospital Anxiety and Depression Scale. National study applied it to people with incontinence, and analyzed emotional and psychological disorders. The instrument is divided into subscales that assess anxiety and depression and presents subscale scores from zero to 21[22]. The reliability of 0.813 of the scale was analyzed in national studies[30].

Among the studies on incontinence-associated dermatitis, the results suggest that there is an association between urinary incontinence and skin damage in exposed areas, mostly from cutaneous observation. Thus, it can be inferred that patients who are incontinent have a higher risk for the appearance of these lesions[27].

From this, one of the instruments that may aid in the identification of incontinence-associated dermatitis is called IAD Skin Condition Assessment Tool. It is composed of three categories (areas of rupture, redness and erosion of the skin). Areas of skin breakdown and redness of the skin are rated from zero to three, and erosion skin, from zero to four. The higher the scores, the worse the severity of the evaluation[15,23].

Severity Tool IAD, which is not yet translated into Portuguese, describes and assesses the severity of dermatitis. It presents 13 areas that can be compromised by geriatric diaper care: perianal skin; between the buttocks; lower left buttock; lower right buttock; upper left buttock; upper right buttock; genitalia (large lips / scrotum); lower abdomen; region between genitalia and thigh; inside left of thigh; outer thigh; left posterior thigh; and right posterior thigh[20,24].

Still in the evaluation of the incontinence associated dermatitis, there is the Iconográfica de la Dermatitis de Pañal por la Humedad scale, which evaluates the severity and classifies the lesions from the skin compromise. This scale, in Spanish only, classifies skin impairment in: Type 1, with liquefaction and thickening of the epidermis due to constant irritation for aggressive washing and drying of the skin in contact with the diaper; type 2, with erythema with edema that pales the skin due to inflammation and epidermal involvement of dermal capillaries, but without loss of skin continuity; type 3, in eczema desquamation, which presents the diaper area with desquamation and pruritus; type 4, with irritating erythema associated

with exudation, corresponding to irritation and wet erythema with superficial epidermis involvement; type 5, which is candidiasis, with the colonization by Candida in the epidermis and mainly affects the dermis; and type 6, ulcer, when there is tissue damage, which can reach deep planes, such as subcutaneous tissue[26].

Another similar instrument, called IAD Severity Categorization Tool, considers these variations of dermatitis in three stages: no redness and intact skin; redness, but skin intact; and redness and ruptured skin, and may present vesicles and infection[27]. However, no instruments in Portuguese were found on this instrument.

Visual Erythema Scale evaluates the intensity of erythema, but no studies have been found in Brazil about it. It uses zero score for non erythema; 1 for little erythema (almost imperceptible); 2 for moderate erythema (pink skin); 3 for severe erythema (purple or red skin); and 4 for broken skin or abrasion[26].

Some instruments associate skin assessment with intervention protocols. *Incontinence Associated Dermatitis Intervention Tool* considers both assessment measures and interventions for diaper use. It uses staging of incontinence-associated dermatitis that corresponds to: high risk (non-erythematous skin, but adjacent skin may show alterations or colored scars from previous incontinence-associated dermatitis and/or cured pressure ulcers); (skin exposed to feces and/or urine, but intact, showing diffuse red - not clearly defined - and irregular borders); moderate (bright red skin or darker skin tones; may appear white, yellow, or very dark red/purple); (red skin with areas of partial thickness skin loss and exudation or bleeding). In black skin, alterations can be identified as white skin tones and, in Caucasian individuals, as bright red or purple[20].

The priority, according to this instrument, is to treat the cause of incontinence. It covers interventions such as clearing incontinence as fast as possible applying barrier; documenting the condition of the skin at least once a day; notifying primary care provider when skin lesions occur collaborating with the care plan; considering the use of external catheter or fecal collector in evaluations; considering the short-term use of the urinary catheter only in cases of dermatitis complicated by secondary infection[27].

Nix Perineal Rating Scale assesses the risk associated with different interventions that contribute to the development of incontinence-associated dermatitis, using, as variables, type and severity of the irritant; duration of contact with the irritant; perineal skin conditions; presence of low albumin; use of antibiotics; and catheter feeding. With this analysis, the risk of incontinence-associated dermatitis is assessed in: high (6 to 8 points), moderate (5 to 3) or low (0 to 2)[24].

This study was limited to analyzing instruments that could assist nurses in the evaluation of adverse events associated with diaper use in practice, and did not aim to evaluate the reliability, sensitivity or specificity of each of the instruments.

Conclusion

Most of the instruments identified from this study were developed to other clienteles other than the elderly in diaper use. However, the literature has used them in this clientele, making possible the evaluation of the main adverse events associated with care with geriatric diapers, such as motor deficit, incontinence, quality of life and incontinence-associated dermatitis.

Collaborations

Bitencourt GR and Santana RF contributed to the conception and design, analysis, interpretation of data, article writing, critical review of intellectual content and final approval of the version to be published.

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