RISK FACTORS FOR LOSS OF SKIN INTEGRITY: ASPECTS OF INGUINAL MICROBIOTA IN ELDERLY WOMEN USING DIAPERS

FATORES DE RISCO PARA A PERDA DA INTEGRIDADE DA PELE: ASPECTOS DA MICROBIOTA INGUINAL EM IDOSAS EM USO DE FRALDAS

FACTORES DE RIESGO PARA LA PÉRDIDA DE LA INTEGRIDAD CUTÁNEA: ASPECTOS DE LA MICROBIOTA INGUINAL EN ANCIANAS QUE UTILIZAN PAÑALES

Thaynara Ferreira Lopes*, Sarah Lidia Fonteles Lucena*, Odêzio Damasceno Brito*, Maria Célia de Freitas*

ABSTRACT

Objective: to identify the risk factors for loss of skin integrity associated with changes in the microbiota of the inguinal region in elderly women using diapers. Method: this is a cross-sectional study conducted from November to December 2018. It is informed that the sample consisted of 16 elderly women, aged between 69 and 93 years, in continuous use of diapers. The data was collected by means of a form. A Digital Skin Analyser device was used to assess skin conditions. The data were organized using the software Statistical Package for the Social Sciences, version 20.0. The study was approved with Opinion number 1.600.818 and CAAE 54617616.6.0000.5534. Results: the results related to the mobility of the elderly women and the female population were found to be wheelchair users (50%), bedridden (37.5%) and walking with assistance (12.5%). Regarding the aspect of the skin in the diaper area, hyperemic skin (81.25%), with hyperpigmentation (12.5%) and loss of epidermis (6.25%) were observed. It was noticed that "oily skin" (43.75%) presented bad elasticity, followed by "dry skin" (12.5%), "mixed skin" (18.75%) and "adequate skin" (25%). Conclusion: the observation of the practice of care related to the use of diapers and the identification of risk factors involving the loss of skin integrity associated with changes in the microbiota of elderly women became possible.

Descriptors: Elderly; Skin; Microbiota; Long-Term Care Institutions for the Elderly; Risk factors; Health of the elderly.

RESUMO

Objetivo: identificar os fatores de risco para a perda da integridade da pele associada a alterações da microbiota da região inguinal em idosas em uso de fraldas. Método: trata-se de um estudo transversal realizado de novembro a dezembro de 2018. Informa-se que a amostra foi de 16 idosas, com idades entre 69 e 93 anos, em uso contínuo de fraldas. Coletaram-se os dados por meio de um
formulário. Utilizou-se o aparelho Skin Analyser Digital para a avaliação das condições da pele. Organizaram-se os dados pelo software Statistical Package for the Social Sciences, versão 20.0. Aprovou-se o estudo com o número de Parecer 1.600.818 e CAAE 54617616.6.0000.5534. **Resultados:** apuraram-se os resultados relacionados à mobilidade das idosas e à população feminina cadeirante (50%), acamada (37,5%) e deambulando com auxílio (12,5%). Observaram-se, quanto ao aspecto da pele na região da fralda, a pele hiperemiada (81,25%), com hiperpigmentação (12,5%) e a perda de epiderme (6,25%). Percebeu-se que a “pele oleosa” (43,75%) apresentou elasticidade ruim, seguida pela “pele seca” (12,5%), “pele mista” (18,75%) e “pele adequada” (25%). **Conclusão:** tornaram-se possíveis a observação da prática de cuidados relacionados ao uso de fraldas e a identificação de fatores de risco que envolvem a perda da integridade de pele associada a alterações da microbiota de idosas. **Descritores:** Idoso; Pele; Microbiota; Instituição de longa permanência para idosos; Fatores de risco; Saúde do idoso.

**RESUMEN**

**Objetivo:** identificar factores de riesgo para la pérdida de integridad cutánea asociados a cambios de la microbiota de la región inguinal en ancianas que usan pañales. **Método:** se trata de un estudio transversal realizado de noviembre a diciembre de 2018. Se informa que la muestra fue de 16 ancianas, con edades entre 69 y 93 años, en uso continuo de pañales. Los datos fueron recolectados a través de un formulario. El dispositivo Skin Analyzer Digital se utilizó para evaluar las condiciones de la piel. Los datos se organizaron mediante el software Statistical Package for the Social Sciences, versión 20.0. El estudio fue aprobado a través del número 1.600.818 y CAAE 54617616.6.0000.5534. **Resultados:** los resultados se encontraron relacionados con la movilidad de las ancianas y la población femenina en silla de ruedas (50%), encamadas (37,5%) y caminar con asistencia (12,5%). En cuanto al aspecto de la piel en la región del pañal, se observó piel hiperémica (81,25%), con hiperpigmentación (12,5%) y pérdida de epidermis (6,25%). Se notó que la “piel grasosa” (43,75%) tenía poca elasticidad, seguida de “piel seca” (12,5%), “piel mixta” (18,75%) y “piel adecuada” (25%). **Conclusión:** se pudo observar la práctica de cuidados relacionados con el uso de pañales e identificar factores de riesgo que involucran la pérdida de la integridad de la piel asociada a cambios en la microbiota de las mujeres mayores. **Descritores:** Anciano; Piel; Microbiota; Institución de larga estancia para ancianos; Factores de riesgo; Salud del anciano.
INTRODUCTION

It is believed that elderly care must have a comprehensive and differentiated approach, in view of the physiological changes of the senescence process and the repercussions these have on their health.

It is observed that, with ageing, the skin tissue, especially the epidermis, suffers a decrease in its thickness due to the atrophy of the keratinocytes layers and the basal layer that limits the epidermis from the dermis. In addition, there is a reduction in the number of melanocytes, which produce melanin (pigment for nails and hair) and protect the skin against ultraviolet rays (UV). The production of epithelial cells decreases, causing thinning of 20 to 30% in the thickness of the epidermis, little support tissue and reduced vascularization.1

It is alerted, moreover, that the fragility of the integumentary system, resulting from the natural aging process, constituted by the decline in the production of epithelial cells, causing the dermis to lose vigor and elasticity, by itself is already a risk factor for the development of skin lesions in the elderly.2

One can notice that the dermis suffers atrophy, with a decrease of approximately 20% of its thickness, with lower values in photoprotected regions. The decrease in the amount of fibroblasts and mast cells results in a reduction in the production of histamine and, consequently, a decrease in the inflammatory response of the skin, such as, for example, after sun exposure. The structure of the sweat glands is altered, with a reduction in the number, size, and secretion, and the skin becomes dehydrated, which loses turgor and elasticity. The combination of these factors makes the skin inelastic and more friable, leading to a greater risk for the development of dermatological lesions.1
It is noteworthy that the continuous use of diapers contributes to the involvement of the skin, especially of the perineum, anogenital, buttocks, lower abdomen and thighs, causing dermatitis, loss of tissue and lesions. Therefore, it is up to the Nursing team and caregivers to develop care and prevention actions for this grievance.3

In summary, another problem that diaper use can cause in the elderly is that the perineal environment, by undergoing these changes, can also be affected by other harmful changes, such as: acid pH of urine and feces; change of microbiota; skin dryness and the longtime of exposure of the elderly skin to the diaper.4

In view of these intrinsic and extrinsic risk factors of the aging process, it is relevant to pay attention to the prevention of these injuries, especially in the elderly who are bedridden for long periods of time.3 These injuries alter not only the quality of life of the elderly, but also generate great expense for the health system due to the difficulties of treatment.

Thus, in this scenario of fragility, Long-Term Care Institutions for the Elderly (LTCIs) constitute a peculiar field of care actions performed mainly by caregivers and with legislation competent to LTCIs, which are inserted in the context of Nursing care. It is perceived, however, that some care is not fully put into practice, contrasting with the current models of institutions proposed in other countries, which have a philosophy of providing long-term care with emphasis on promoting the quality of care and quality of life of the elderly residents.5

Therefore, it is essential that Nursing has knowledge about the skin alterations caused by aging and, thus, can attenuate and/or prevent the aggravations caused to the elderly skin by caring for the skin tissue allied to the mentioned risk factors.

**OBJECTIVE**

To identify the risk factors for loss of skin integrity associated with changes in the microbiota of the inguinal region in elderly women using diapers.

**METHOD**

This is a cross-sectional research conducted with elderly residents in a LTCI located in the city of Fortaleza-CE. The study was developed in the period from November to December 2018 with a population consisting of 72 elderly residents in the LTCI and a sample of 16 elderly women who used diapers continuously, with the age range between 69 and 93 years. The inclusion criteria adopted were the elderly residents who used diapers. We excluded the elderly who used diapers intermittently and those with lesions that could not be identified.
Data was collected through observations and evaluations of the inguinal region during bathing, observations at the time of diaper changes, and observation of medical records to complement the information.

The data was collected by filling out a form prepared for the research based on information collected from medical records and information provided by caregivers. The instrument included information on sociodemographic data, clinical conditions of the elderly, mobility conditions, evaluation of the perineal environment, humidity, oiliness, skin elasticity, hygiene and material used at each diaper change, and frequency of changes.

For the evaluation of skin moisture, oiliness and elasticity, we used the Skin Analyser Digital, a specific reader of these skin parameters, with impedance analysis technology by means of a bioelectric sensor.

To organize the data obtained from the form, we used the statistical software Statistical Package for the Social Sciences (SPSS), version 20.0, which performs correlation and hypothesis tests of the content with discussion based on authors.

The research complied with the ethical precepts of Resolution 466/12 of the National Health Council, with approval from the Research Ethics Committee of the State University of Ceará, with favorable opinion number 1,600,818 and CAAE 54617616.6.0000.5534.

RESULTS

It is informed that 16 elderly women with ages between 69 and 93 years participated in the study. In this scenario, it was observed the prevalence of middle-aged women, in the range between 81 and 93 years and, with regard to the social aspect, there was a predominance of brown (62.5%) and black (25%) races.

Table 1 shows the variables related to risk factors for impaired skin integrity in elderly women who use diapers, such as "skin aspect in the region in contact with the diaper", "types of skin in the elderly" and "mobility".

<table>
<thead>
<tr>
<th>Risk to impaired skin integrity</th>
<th>Feature</th>
<th>%</th>
</tr>
</thead>
</table>

Table 1. Risk factors for loss of skin integrity in the elderly. Fortaleza (CE), 2021.
<table>
<thead>
<tr>
<th>Appearance of the skin in the region in contact with the diaper</th>
<th>Hyperemic</th>
<th>81.25</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hyperpigmentation</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Loss of epidermis</td>
<td>6.25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Types of skin in the elderly</th>
<th>Oily skin</th>
<th>43.75</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dry skin</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Mixed skin</td>
<td>18.75</td>
</tr>
<tr>
<td></td>
<td>Suitable skin</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Wheelchair user</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bedridden</td>
<td>37.5</td>
</tr>
<tr>
<td></td>
<td>Rambles with assistance</td>
<td>12.5</td>
</tr>
</tbody>
</table>

It was also investigated that the change of diapers at the LTCI, following the institution’s routine, occurred three times a day, with the material used for cleaning and intimate hygiene consisting only of water and soap provided by family members or donated to the LTCI, and that the soap used in all the elderly who use diapers is the “asceptol”.

It is detailed that other factors that contribute to the breakdown of the skin barrier are the moisture, oiliness and elasticity of the skin in contact with the diaper. It is possible, therefore, to relate the type of skin of the elderly with its elasticity.

It can be seen that, although there is a balance between the water level and the oiliness in the skin, considering it as “adequate skin”, a percentage of it was considered to have bad elasticity; moreover, the types of skin with good elasticity appeared less frequently, being “adequate skin” and “dry skin”.

**DISCUSSION**

The *stratum corneum* of white or brown skin consists of fewer layers of cells than that of black skin, thus providing a less effective barrier to external stimuli, making it consequently more vulnerable to the development of impaired skin integrity. It is important, therefore, to take care of the skin, following its specific characteristics, to prevent health problems in the elderly.

In this scenario, the functional loss, together with the morbidities of the elderly, can affect the quality of life and increase the risk of frailty in the institutionalized elderly, especially in elderly women, causing depressive symptoms.

In elderly, wheelchair-bound and bedridden women, alterations in the microbiota of the skin are related, together with impaired physical mobility, to anatomy-functional changes influenced by the decrease in estrogen levels in the body. This hormone influences the removal of bacteria by
stimulating the growth and proliferation of the vaginal mucosa, which facilitates the occurrence of infections.  

It is noteworthy that elderly wheelchair users, totally bedridden and who walk with assistance are more susceptible to alterations in the skin tissue due to prolonged tissue ischemia, usually caused by friction, shear and prolonged pressure under the bony prominences. It is also revealed that the skin of elderly people who use diapers and have difficulty moving, when exposed to a long period in the same position, suffer changes in the enzymes present in feces and urine. It can be observed, therefore, that there is a loss of hydration and the consequent formation of ulcerative processes in the tissue, which can lead to infectious processes, causing great physical, emotional and financial damage to the elderly and to the institution.  

It is observed that impaired skin integrity, evidenced by hyperemia in the area, is the most common skin alteration in elderly women who use disposable diapers. The alterations start due to a combination of factors, the most significant being prolonged contact or irritation by urine and feces, the maceration produced by humidity and local heat. Prolonged contact with urine-soaked diapers increases the skin permeability to irritants, such as the pH of the environment, thus intensifying the activity of fecal proteases and lipases, which are the major irritation agents and responsible for the changes.  

Furthermore, the hyperemia observed in the diaper area is related to the longtime of exposure of the elderly skin to the humid and acid environment, a characteristic of urine combined with the changes of the aging process, such as the decrease in physiological functions of the immune system and skin composition. Thus, hyperemia becomes a risk factor for the development of dermatitis caused by diaper use.  

It is considered necessary, in this context, that the care team, especially the nursing staff, when observing the appearance of hyperemia in the diaper area, change the decubitus, perform frequent sanitation and change the diaper every two hours and, if possible, use a cover for prevention.  

The use of diapers by the elderly can be considered one of the factors responsible for the risk of impaired skin integrity and the exacerbation of episodes of urinary incontinence by this population. The lack of standardization in the use of this technology contributes to the appearance of skin lesions. Therefore, it is necessary to establish strategies to provide effective care, such as the cleaning routine in the region of the skin in contact with the diaper and the materials used in this process.  

It is further emphasized that diaper use intensifies skin irritation due to the increase in skin pH, which is a result of the conversion of urea to ammonia by microflora, primarily Bacillus
ammoniagenes, and a variety of fecal bacteria, producing ureases. These fecal lipases and proteases, which have a higher activity, pH > 7.0, are found to maintain the skin irritant condition, in particular if gastrointestinal transit is accelerated, e.g. in diarrhea.14

It is recommended, in addition, the use of diapers with gelling materials based on sodium polyacrylate, which keeps moisture away from the skin. Intimate hygiene should be performed at every change, however, it should not be done in an aggressive way (friction). It is recommended that it be done with coconut soap or neutral soaps and that, afterwards, barrier products (Vaseline, lanolin and zinc oxide) be used, appropriate for the protection of the perineal area, in order to reduce skin contact with urine and feces.15-16

It is noticed, however, that these actions are not always observed in clinical practice, because it is more common the use of lower cost diapers, which do not have gelling materials or the use of two units of diapers or a sheet over the diaper, to maximize the changing time and prevent the bed from getting wet, which keeps all the moisture close to the patient’s skin.

The use of a neutral soap such as “aseptol”, which has a pH equivalent to 7.8, was also identified for the hygiene of the elderly.17 The use of such product alkalizes the skin, making it more fragile and more susceptible to friction and shearing, especially in elderly people confined to wheelchairs and bedridden patients. Therefore, the use of slightly acidified soap is recommended, since it does not interfere so intensely in the skin microbiota and has less harmful potential, since it approximates the physiological pH of the elderly. It is pointed out that this care with the material and the change of diapers every three hours, or with the visible saturation of the same are equally important for the maintenance of skin integrity and the feeling of well-being of the elderly.18-19

When analyzing the parameters of humidity and oiliness to identify the type of skin of the elderly, the predominance of oily skin was observed. This finding is justified because hygiene and diaper change did not occur in the proper way, causing increased moisture in the region in contact with the diaper, which is a predisposing factor for the proliferation of microorganisms and the development of infections, dermatitis and pressure sores. It is noteworthy that excess moisture alters the pH of the elderly skin, making it basic, weakening the tissue and making it more susceptible to shearing, friction, and the development of lesions.20

It is explained that the imbalance of moisture and oil levels, coupled with the changes of the physiological aging process, in which the elderly tend to have decreased epidermal thickness, collagen and skin elasticity, characterized by wrinkled, sagging skin without elasticity, becomes a potential risk for impaired skin integrity. It should be added, moreover, that the decrease in the feeling of
thirst and the consequent decrease in water intake result in greater fragility that, combined with the incorrect use of diapers, such as poor hygiene and prolonged use of the same, is one of the factors that cause skin lesions in the elderly.21-23

Thus, it is necessary to provide comprehensive care for the elderly population, taking into account the microbiota of the skin and all the changes resulting from the senescence process, aiming to use an appropriate material, a complete hygiene to maintain the integrity of the skin of the institutionalized elderly woman using diapers.

A limitation of the study is that it took place in only one LTCI, although it has a satisfactory sample for analysis, and the observation of nursing care in another institution could cover more risk factors for the microbiota of elderly women.

CONCLUSION

The study made it possible to observe how the practice of care related to the use of diapers occurs in institutionalized bedridden and wheelchair-bound elderly women. From this, it became possible to identify risk factors that involve the loss of skin integrity associated with changes in the microbiota of elderly women who use diapers, which are: the use of inappropriate products for skin, inadequate diapers, and changes at times farther than necessary.

It is evident, by looking at the exercise performed and the better approach to care observed in the literature, how much qualification is still needed in the assistance provided to the health of the elderly.

Therefore, changes in the routine of institutions and permanent education for professionals are necessary in order to qualify them regarding the peculiarities of the elderly and, consequently, of the skin, so that they can pay attention to the strict care in the use of diapers, adopting criteria for the use of diapers on the elderly.

CONTRIBUTIONS

All authors contributed equally in the conception of the research project, data collection, analysis and discussion, as well as in the writing and critical review of the content with intellectual contribution and approval of the final version of the study.

CONFLICTS OF INTERESTS

Nothing to declare.

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Correspondence

Thaynara Ferreira Lopes
Email: thaynalaropes.13@hotmail.com

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