THE NURSING DIAGNOSIS ‘IMPAIRED WALKING’ IN ELDERLY: SYSTEMATIC LITERATURE REVIEW

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ABSTRACT: Walk is an activity that requires different skills and can be highly complex particularly for the elderly. The aim was to identify the defined characteristics and related factors of the nursing diagnosis impaired walking in elderly. A Systematic literature review, based on a search done between January and March 2014, in the electronic platforms EBSCO Host®, SCOPUS and ISI, and using the search strategy walk* OR gait AND Nurs*. A sample of 36 studies was obtained. A total of 17 defined characteristics and 34 related factors were identified. Among all, nine defined characteristics and 20 related factors are not listed in the diagnosis of NANDA International. This research identified new defined characteristics and related factors not listed in NANDA International. This study is a contribution to the development of the taxonomy of NANDA International, which should represent nursing knowledge, and this highlights some implications for clinical practice, education and further research.


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INTRODUCTION

People are bipedal beings, who use walking to travel from one place to another and thus ensure their independence. Walking is a highly complex and challenging activity that is controlled by superior brain structures. Changes in walking may occur in humans throughout their life cycle and when unexpected, can put you in vulnerable circumstances. The vulnerability is accentuated even further when referring to the elderly. The sooner the elderly regain the ability to walk, the faster they become independent in other activities of life.

The World Health Organization defines elderly according to the socioeconomic status of their country. Thus, every person aged over 60 in developing countries are considered elderly and in developed countries this age is increased to 65 years of age.

Rehabilitation nurses have an approach which is focused on the development of patient skills that are needed to return in order to perform this complex task. Planning should be negotiated with the patient, which desirably should be shared with their family or community. With the largest number of elderly in the population, observations were made including an increase in the incidence of chronic-degenerative diseases, which are often accompanied by sequelae, limiting the functional performance and generate dependence. The continuing inability to walk can lead to social isolation and the need for a family caregiver. Through analysis of the literature, an idea emerges that the existence of compromised walking in the elderly is highly relevant.

Due to the importance of walking as a human response and due to the possibility of nursing evaluation and interventions, impaired walking as a nursing diagnosis was proposed by Brenda Emick-Herring to the North American Nursing Diagnosis Association. It was published in 1998 when taxonomy I was in use, and organized according to the Gordon functional health patterns, listed in pattern 6 (Movement). In 2006, taxonomy II was revised and organized in 13 domains, and the diagnosis was coded as 00088, and listed in the domain 4 (Activity/Rest) and class 2 (Activity/Exercise). A proposal for taxonomy III was recently disclosed, whose suggestion for this diagnosis is to integrate the domain 4 (Functional) and class 2 (physical ability).

Impaired walking is defined by NANDA International (NANDA-I) as ‘Limitation of independent movement within the environment on foot’. The defined characteristics (signs/symptoms observed and reported, which the nurse receives after the data collection, in the most varied sources) are: “impaired ability to climb stairs, impaired ability to overcome curbs, impaired capacity to descend an inclined plane, impaired ability to climb slopes, impaired ability to walk on uneven surfaces, and impaired ability to walk the distance required. Related factors (etiology and causes) are: changes in cognitive function, change in mood, decreased resistance, environmental barriers (e.g.: stairs, slopes, uneven surfaces, unsafe obstacles, distances, lack of devices or individual assistance, restrictions), fear of falling, impaired balance, impaired vision, insufficient knowledge of mobility strategies, insufficient muscle strength, impaired musculoskeletal system, compromised neuromuscular system, obesity, pain and decreased physical condition.”

Also, in the International Classification for Nursing Practice (ICNP®) it is possible to identify the definition for the diagnosis ‘impaired walking’ (10001046): ability to walk. There are two areas of focus described in this classification: one walking (10020886), defined as, “to mobilize: body movement from one place to another by moving the legs step by step, ability to sustain body weight and walk with effective ambulation, with speed ranging from slow to moderate or fast. Walking up and down stairs and ramps”; the other focus is ‘walking with walking aid’ (10020903), defined as walking, “body movement from one place to another by moving the legs step by step; ability to sustain body weight and walk with an effective march, using one or more walking with a support such as corrective shoes, artificial limb, cane, brace, crutches or walker, with speeds ranging from slow to moderate and fast; up and down stairs and ramps”.

The NANDA-I is a classification of nursing diagnoses which is subjected to the greater amount of research studies. It is characterized by objectivity and compared to ICNP®, which is a classification of terms, and is considered more suitable for the clinical reasoning of nurses and to define diagnosis.

The fact that a diagnosis is included in a classification does not mean it cannot be subjected to research. The development of science and patients’ reponses to health/disease transitions are dynamic and differ culturally. Therefore, research on the concepts of diagnoses and clinical validation is desirable to sustain the evidence-based practice concerning the clinical practice of nurses to what, in fact, are the results of scientific research.

The aim of this study is to identify the defined characteristics and related factors of the nursing diagnosis impaired walking in the elderly. It is intended to verify the existence of other defined char-
characteristics and related factors beyond those which are described in NANDA-I and thus contribute to updating the taxonomy.

METHOD

The authors conducted a systematic literature review (SLR) which is based on scientific rigor through specific strategies that limit the biases selection of items, critically evaluating the articles and summarize the results of relevant studies in a given area, by predetermined criteria and a specific research question. The SLR is methodical, explicit and liable to be reproduced.12-14

The research question was: what are the defined characteristics and related factors of impaired walking in the elderly? The question was defined by PEO, considering Cochrane guidelines (Population=elderly, Exposure=impaired walking, Outcome=defined characteristics and related factors). The survey was independently conducted by two reviewers on the electronic platforms EBSCO Host®, SCOPUS and ISI. The inclusion criteria were as following: date of publication (January 2006 to December 2013); Language Portuguese, English or Spanish; full text availability (for EBSCO Host®, including CINAHL Complete, MEDLINE Complete, Nursing & Allied Health Collection, Database of Abstracts of Reviews of Effects, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Cochrane Methodology Register, Library, Information Science & Technology Abstracts, MedicLatina, Health Technology Assessments and NHS Economic Evaluation Database); origin (national and international studies).

Exclusion criteria were defined as: opinion articles related to Population= children, obstetrics and adult, Exposure=robotics and Outcome=gait resulting from amputation of at least one of the lower limbs. The search strategy resulted walk* OR gait AND Nurs*.

Data collection took place from January to March 2014. The selection of studies was conducted step by step by two reviewers and, in case of disagreement between reviewers the decision was for the study to proceed to the next step of analysis. The PRISMA protocol was used for the process of identification, selection, eligibility and inclusion of studies (Figure 1).

![Figure 1 - Mapping of selection of items to include in the review. Lisbon, Portugal, 2014](Image)

The next phase was the full text reading of the selected studies and, simultaneously, filling in a summary table for each article in order to systematize the relevant information.

The attribution of the level of evidence (LE) of the studies was based on the classification of the Joanna Briggs Institute.15 All studies were accepted without making the quality appraisal, in view of
the goal of revision.

The process of translation, linguistic and cultural adaptation of the original ‘impaired walking diagnosis’ (00088), from the original version (American English) to European Portuguese was performed, as it differs from the Portuguese of Brazil, which is one of the official translations of NANDA-I, in particular its statement, definition, defined characteristics and related factors.

RESULTS

A total of 36 papers was obtained. In relation to the year of publication, one was from 2006, three from 2008, four from 2009, two from 2010, seven from 2011, ten from 2012, nine from 2013, one in 2014, three in 2015, two from 2016, two from 2017, three from 2018, four from 2019, seven from 2020, ten from 2021, and nine from 2022. With regard to the language, 34 were published in English, one in Portuguese, and one in Spanish, as for the country of origin we highlighted 14 in the United States of America, three in Italy, with two Holland, Canada, Switzerland, Australia, Japan, Sweden, Alemanha, and with one the Republic of China, Spain, Brazil, Argentina and Finland.

With regard to the LE, the analyzed studies are: Three experimental studies (LE 1) a quasi-experimental studies (LE 2), 17 observational studies: analytical (NE 3), 16-17,27,29,31,33-35,39,41,43-47 13 observational studies: descriptive (LE 4) 16-20,22,25-26,30,36-38,42,50-51 and two systematic review of expert opinion (LE 5) 28,49

Specifically, the selected studies are three randomized clinical studies, one prospective quasi-experimental controlled study, 12 cohort studies with control group, three case-control studies, two observational studies with no control group, ten longitudinal studies, one study of series of cases and two systematic expert opinion reviews.

The sample of the study population ranges from nine and 2.26919 participants.

The translation process of ‘impaired walking’ (00088) was agreed, with the exception of the binomial statement that had several suggestions, such as impaired gait, difficulty walking, changes in walking and inability to walk. A meeting with three experts resulted in a consensus for impaired gait, also corresponding to the English version of ICNP®.

A total of 17 defined characteristics of the diagnosis were identified and comprises the results (Table 1). All defined characteristics listed in NANDA-I have been identified in the results of the SLR, with the exception of ‘impaired ability to climb slope’. A total of 11 other defined characteristics emerged in this study that are not listed in the classification, including: ‘impaired gait speed’ (n=22), ‘impaired ability to walk certain distances in given time’ (n=20), ‘posture change’ (n=9), ‘engaged walking in rough terrain (evaluation abroad on asphalted and paved floor)’ (n=6), ‘impaired ability to change the speed of gait’ (n=5), ‘impaired capacity descending stairs’ (n=4), ‘impaired walking with other challenges (verbal response to auditory and visual stimuli)’ (n=4), ‘impaired walking while changing posture (turn your head, lean)’ (n=4), ‘impaired ability to walk for the required time’ (n=3), ‘impaired ability to walk forward on flat surface’ (n=3) and ‘intermittent claudication’ (n=2).

Table 1 - Distribution of the defined characteristics of the sample. Lisbon, Portugal, 2014

<table>
<thead>
<tr>
<th>Defined characteristics listed in NANDA-I (2015-2017)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impaired ability to climb stairs18,26,30,37,40,47,50</td>
<td>7</td>
</tr>
<tr>
<td>Impaired ability to bypass curbs (around obstacles)17,18,26,32,45-46</td>
<td>6</td>
</tr>
<tr>
<td>Impaired ability to descend an inclined terrain15</td>
<td>1</td>
</tr>
<tr>
<td>Impaired ability to climb slopes</td>
<td>0</td>
</tr>
<tr>
<td>Impaired ability to walk on irregular surfaces18,40</td>
<td>2</td>
</tr>
<tr>
<td>Impaired ability to walk for the required distance16,20,26,30,38,41,42,45,47,50,51</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Defined characteristics not listed in NANDA-I (2015-2017)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impaired ability to descend stairs26,30,37,50</td>
<td>4</td>
</tr>
<tr>
<td>Impaired ability to walk for determined distances and times (cadence, cycle time, gait cycle, support time, stride distance)16,17,20,23,25,32,34-36,40,42,43,45-50</td>
<td>20</td>
</tr>
<tr>
<td>Impaired ability to walk during the requested time27,45,48</td>
<td>3</td>
</tr>
<tr>
<td>Impaired ability in the gait speed16,17,19,20,23,26,34,36,41,43,45-51</td>
<td>22</td>
</tr>
<tr>
<td>Impaired ability to change speed of gait17,26,32,35,37</td>
<td>5</td>
</tr>
</tbody>
</table>
The nursing diagnosis ‘impaired walking’ in elderly: systematic...  

With regard to related factors of the nursing diagnosis, a total of 34 were identified (Table 2). The most common were ‘decreased physical condition’ (n=23), ‘impaired balance’ (n=19) and ‘fear of falling’ (n=17). All related factors described in NANDA-I emerged in this SLR. Other etiological factors have emerged in this study beyond that described in this classification, a total of 20, which are: ‘neurological impairment’ (n=13), ‘walking with aids (walker with twin wheels, cane, walker, crutches)’ (n=12), ‘aging (age ≥65 years)’ (n=12), ‘fatigue’ (n=10), ‘cardiorespiratory impairment (angina, congestive heart failure, pulmonary disease)’ (n=9) ‘medication (antidepressants, antihypertensive, antipsychotics, benzodiazepines, diuretics, sedatives, and hypnotics)’ (n=8), ‘number of activities or tasks to be performed simultaneously’ (n=6), ‘atrophy of muscle mass’ (n=4), ‘beliefs (education and religion, sedentary behavior)’ (n=3), ‘management problems of the feet and footwear (aesthetics, comfort and safety)’ (n=3), ‘mental health change’ (n=3), ‘orthostatic hypotension (postural management)’ (n=2), ‘hard of hearing’ (n=2), ‘females’ (n=2), ‘sleep problems’ (n=2), ‘institutionalization’ (n=2), ‘lack of social support (social-family devaluation)’ (n=2), ‘perception on security compromised ability to walk’ (n=1), ‘walking with assistance (third party)’ (n=1) and ‘post-surgery recovery period’ (n=1).

Table 2 - Distribution of related factors in the sample. Lisbon, Portugal, 2014

<table>
<thead>
<tr>
<th>Related Factors listed in NANDA-I (2014-2017)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alteration in cognitive function</td>
<td>14</td>
</tr>
<tr>
<td>Change in mood</td>
<td>7</td>
</tr>
<tr>
<td>Reduction in resistance</td>
<td>6</td>
</tr>
<tr>
<td>Environmental barriers (stairs, ramps, irregular surfaces, unsecured obstacles, distances, lack of support devices or care assistant, restrictions)</td>
<td>5</td>
</tr>
<tr>
<td>Fear of falling</td>
<td>17</td>
</tr>
<tr>
<td>Impaired balance</td>
<td>19</td>
</tr>
<tr>
<td>Impaired vision</td>
<td>7</td>
</tr>
<tr>
<td>Impaired knowledge about mobility strategies</td>
<td>8</td>
</tr>
<tr>
<td>Insufficient muscular strength</td>
<td>12</td>
</tr>
<tr>
<td>Impaired musculoskeletal system</td>
<td>5</td>
</tr>
<tr>
<td>Impaired neuromuscular system</td>
<td>3</td>
</tr>
<tr>
<td>Obesity</td>
<td>12</td>
</tr>
<tr>
<td>Pain</td>
<td>9</td>
</tr>
<tr>
<td>Decreased physical condition</td>
<td>23</td>
</tr>
<tr>
<td>Related factors not listed in NANDA-I (2014-2017)</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>10</td>
</tr>
<tr>
<td>Walking with a support (walker with two wheels, cane, walker with four legs)</td>
<td>12</td>
</tr>
<tr>
<td>Walking with help (from others)</td>
<td>1</td>
</tr>
<tr>
<td>Impaired neurologically</td>
<td>13</td>
</tr>
<tr>
<td>Impaired cardio respiratory system (angina, congestive heart failure, lung disease)</td>
<td>9</td>
</tr>
<tr>
<td>Orthostatic hypotension (postural management)</td>
<td>2</td>
</tr>
<tr>
<td>Sleep problems</td>
<td>2</td>
</tr>
<tr>
<td>Perception of ability to walk in impaired safety</td>
<td>1</td>
</tr>
<tr>
<td>Numerous activities or tasks to be performed simultaneously</td>
<td>6</td>
</tr>
<tr>
<td>Aging (≥65 years of age)</td>
<td>12</td>
</tr>
<tr>
<td>Beliefs (education and religion, sedentary behavior)</td>
<td>3</td>
</tr>
</tbody>
</table>
DISCUSSION

Walking can be understood as a bipedal locomotion, incorporating the reciprocating motion of lower limbs and maintaining the dynamic balance.\textsuperscript{18}

Gait gradually changes during life and, to a large extent, determines daily life activities.\textsuperscript{16} Walking at home or outside, involves additional challenges, particularly in terms of maintaining the security and independence of the elderly person.\textsuperscript{16} Other authors reinforce the idea that the elderly have the ability to adapt to expected and unexpected disturbances in gait.\textsuperscript{18} Thus, the main objective is that the elderly have the ability to walk independently, with lower possible risks.\textsuperscript{18} Independence is one of the results of gait, which can be highly impaired in some disease situations, and can be considered as a central aspect, for example, the performance of people with multiple sclerosis, which becomes a key role in their capability to perform activities of daily life.\textsuperscript{38}

Walking is essential for daily life and depends on balance, joint mobility, endurance and muscular strength.\textsuperscript{43} Going out for walks is considered the most common physical activity among older people, and is one that is practiced more regularly compared to other more vigorous activities.\textsuperscript{43} Another study confirms that walking ability is fundamental to life independence.\textsuperscript{25} The decrease in gait speed is a strong and independent predictor in regards to the need to resort to health care, admission to nursing homes and elderly mortality.\textsuperscript{25} Fatigue is often the cause of disability in the elderly gait, without it feeling that it may threaten the maintenance of other activities that are considered vital.\textsuperscript{25} These authors recommend longitudinal studies that have the prognostic value of the speed of gait, as their central theme.\textsuperscript{25} Gait velocity decreases with age and it is an important predictor of morbidity and mortality.\textsuperscript{41}

In this continuity, another study also states that gait is one of the necessary components for the elderly who have had stroke, who are residents in the community, in order for them to have an independent life, specifically in relation to the speed, balance and resistance of the gait.\textsuperscript{30} Other authors stress the idea that independent walking should represent one of the most important challenges of care, because the immobility or difficulty in walking is one of the biggest predictors of institutionalization in the elderly with dementia.\textsuperscript{29}

In the rehabilitation of an elderly person who has undergone hip replacement surgery, the baseline as regards to the previous gait before the fracture, is frequently unachievable, which can lead to permanent changes, with a consequent decline in their quality of life. One of the predictors for the elderly to walk independently once again, is the recovery that they can achieve until the time of discharge.\textsuperscript{33}

A study in elderly patients undergoing thoracic and pelvic surgery revealed that their quality of life is more determined by their functional capacity, than by the personal background they have. The best predictor of functional capacity in the postoperative period is the previous baseline.\textsuperscript{46} In another study that addresses the increase in walking, the creation of walking programs, telephone contacts, walking groups and the establishment of a pedometer referral programs, are several suggested strategies for the improvement in physical function in elderly Chinese immigrants residing in the United States of America.\textsuperscript{20} Impaired gait causes restrictions in daily life, and is a phenomenon of interest to nurses in intervention planning.\textsuperscript{34}

Among the 11 new defined characteristics (‘impaired ability to walk down stairs’, ‘impaired ability to walk certain distances at one time’, ‘impaired ability to walk for the required time’, ‘impaired capacity in gait speed’, ‘impaired capacity to change walking speed’, ‘impaired ability to walk forward on a flat surface’, ‘impaired walking on rugged terrain, altered posture’, ‘intermittent claudication’, ‘impaired walking while doing other challenges’ and ‘impaired walking while changing posture’) that have been identified in this literature,
The nursing diagnosis 'impaired walking' in elderly: systematic...

The results of this study emphasize the need to validate this new information in the clinical setting. By validating all of the defined characteristics and related factors in a sample of elderly people, which are all already listed in NANDA-I and those obtained in this study, which could verify its representation in “impaired walking”.

Therefore, contribution to the development of the NANDA-I taxonomy, for the purpose of education and for nursing practice, as this SLR contributed to the development and updating of the defined characteristics and related factors in the elderly in relation to the nursing diagnosis of impaired walking (00088).

Clinical validation studies with representative samples to confirm the sensitivity, specificity and predictive values of these new elements of diagnosis and randomized controlled trials or quasi-experimental studies to evaluate the effectiveness of certain interventions in the diagnostic indicators are recommended in future research.

The fact that the only availability of the full text is on the EBSCO Host® platform as well as the fact of all the studies being admitted without making the selection for the assessment of its quality, are considered limitations.

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The nursing diagnosis ‘impaired walking’ in elderly: systematic...


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