

Pain: The Neglect Issue in Old People's Life

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Abstract

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BACKGROUND: As the elderly population increases dramatically, the chronic age-related disease should be noted. In the elderly, chronic pain is a common health problem.

METHODS: This search was performed in 3 databases (PubMed, Google Scholar, Embase). We have reviewed articles related to pain management in the elderly.

RESULT: The prevalence of pain in people aged above 60 is twice that in younger people. Pain is estimated to be 45-85 per cent in the elderly. Pain is not a part of the ageing process, but many older people can experience it. Perception of pain can be affected by environmental, emotional, cultural and cognitive factors. Pain in the elderly often remains untreated and misdiagnosed.

CONCLUSION: Pain management in elderly needs different approach because of unreported pain in this population, and usually they have multiple problems and comorbidities that complicate evaluation and treatment.

Introduction

In 2012, an estimated 8 per cent of the world's populations were aged 65 or older, with the expectation to nearly double (about 16 per cent) in 2050 (Figure 1). Considering the rapid increase in the number and percentage of older people, especially in less developed countries, it is imperative to adapt quickly to this new reality. The importance of chronic diseases such as chronic obstructive pulmonary disease, cardiovascular disorders, Alzheimer disease, ALS, diabetes mellitus, osteoarthritis and cancer should be considered with this epidemiologic transition [1].

Pain is the most common reason people visit doctors and can result in disability and suffering [2]. It is reported that more than one hundred million Americans are affected by pain annually, and they spend about 600 billion dollars for pain relief which is more than payment for diabetes, cancer and heart diseases [3] [4].

In the elderly, chronic pain is a common health problem (Table 1) [5]. The prevalence of pain in people aged above 60 is twice that in younger people [6]. Uncontrolled pain in the elderly has a great financial burden on health system [7]. According to some studies, nearly 20% of the elderly have received many forms of analgesic during the past 6 months because of chronic pain [8] [9] [10]. It should be

considered that 75% of patients with pain do not receive pain control and 45 to 80% of others receive inadequate pain control [10].

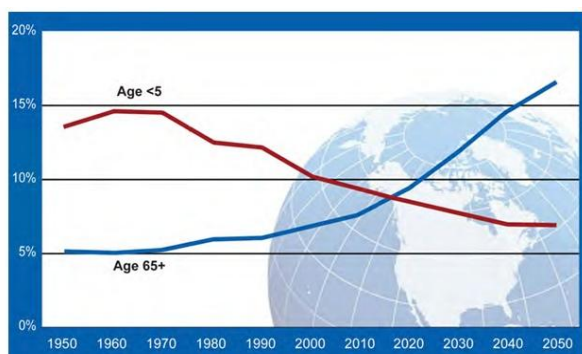


Figure 1: Young children and older people as a percentage of the global population: 1950-2050

In adults, there is female predominance in pain complaints, the severity of pain and longer duration of pain. However, the reason is not clear. It could be due to different biological mechanisms or the effect of psychological and social factors [11] [12]. Prevalence of pain is increased from childhood to adulthood. Therefore pain is most common in the elderly [13] [14]. It is estimated to be 45-85 per cent in the elderly [15] [16].

Table 1: Pain syndromes associated with ageing

Cancer pain
Osteoarthritis
Angina
Rheumatic disease(such as Rheumatic fever)
Postherpetic Neuralgia/trigeminal Neuralgia
Visceral pain(Irritable bowel syndrome, Peptic ulcer, gastritis, dyspepsia)
Alcohol Abuse
Malnutrition
Pain associated with atherosclerosis and diabetic neuropathy
Temporal arthritis
Discopathy
A headache

Pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described regarding such damage” [8]. Pain is classified in different ways, but chronological classification is used more commonly.

Acute pain is associated with an injury or illness. The location and cause of this type of pain can be identified easily, and it usually has a predictable course with the expectation to diminish as the injury heals. It lasts less than 3 months without long-term effects on the patient’s quality of life. The key roles of this pain are warning and protecting against tissue injuries [16]. Pain due to surgery and trauma are examples of acute pain.

Inadequately treated acute pain can cause tachycardia, tachypnea, widening of pulse pressure and increased sympathetic nervous system activity [8] [16]. Also, untreated pain can lead to gait impairment, which may cause injuries from falls and accidents [17].

Persistent pain that lasts more than 3 months is called chronic pain. There are different risk factors for developing chronic pain, including female sex, increasing age, environmental factors, previous pain experience and physiological factors like anxiety or depression [8].

Another important cause of chronic pain is cancer. Pain in cancer patients can be caused by the disease itself, treatment, or autoimmune antibodies associated with the malignancy [18] [19]. Anatomically, chronic pain can be classified into receptive (nociceptive) and non-receptive (neuropathic) subgroups. The first one results from stimulation of somatic or visceral pain receptors. Pains resulting from a bone fracture, muscle spasm or joint disease are examples of somatic pain. Damage to an organ, system or tissue-like pleura or peritoneum can cause visceral pain (Figure 2).

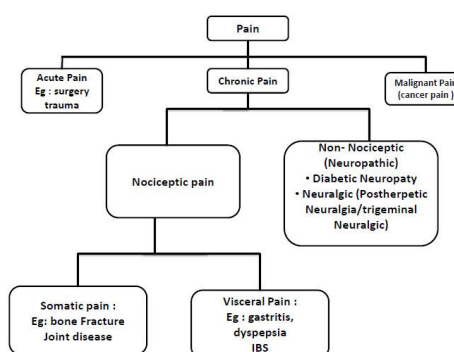


Figure 2: Classification of the pain

Nerve damage during surgery, radiotherapy, medicine or advanced diseases may result in neuropathic pain. It can be described as burning, tingling or pins and needles [8].

There are four basic stages during nociception: transduction, transmission, modulation and perception. In the elderly, there are some differences that are mentioned briefly in the article.

When nociceptors (free nerve endings, located in different tissues) are exposed to a sufficient quantity of stimuli, transduction begins. A variety of chemical agents like histamine, serotonin, bradykinin and prostaglandin and neuropeptides including neurokinin A, substance P and calcitonin gene-related peptide (CGRP) are released which sensitise nociceptors. Following this step, the permeability of neuronal cells increases and depolarisation occurs [20] [21]. Thermal and mechanical pain threshold is higher in elderly than younger people [22] [23], but pain tolerance decreases with ageing [22] [23] [24]. Pain threshold is not different in demented patients. Nevertheless, the tolerance threshold is higher in non-demented ones [25] [26].

Moreover, it has been shown that somatosensory threshold for non-noxious stimuli

increases with age, whereas pressure pain threshold decreases and heat pain threshold can have no changes [27]. It is hypothesized that sensory-discriminative aspect of pain can be intact in dementia, while the effective emotional part of pain process would be compromised. This finding is supported by the fact that some brain regions such as the lateral thalamus and sensory cortex are relatively preserved during pathologic processes resulting in dementia.

On the other hand, the limbic system and prefrontal cortex functions are usually impaired during degenerative changes in Alzheimer disease [25] [26]. After stimulation of nociceptors, the message is transmitted to the spinal cord by type A or type C fibres. Contrary to C fibres, type A fibres are myelinated and have rapid conduction velocity. The smaller C fibres transmit thermal and chemical stimuli more slowly [22] [23].

Descending inhibitory signals from the thalamus, brainstem and interneurons play a modulatory role in dorsal horn which activates inhibitory neurons by releasing neurotransmitters [28]. These neurotransmitters including norepinephrine, serotonin, GABA, glycine, endorphin and enkephalin can block substance P and other excitatory neurotransmitter activity. Perception of pain is the result of this complex process. The nociceptive process, in addition to physiological and emotional responses, contributes to the sensation of pain that is experienced by the person [29].

Greater involvement of structures from medical pain system (e.g. anterior cingulate cortex, medial thalamus and anterior insula) can result in more pain complaints in vascular dementia compared to Alzheimer disease [30]. It has been shown in a study that there is a correlation between vascular lesion extent in the subcortical white matter, especially dorsolateral prefrontal cortex, and intensity of the effective component of pain [30]. Different factors like hereditary and genetics, concomitant disease, level of intellectual complicity or ability, and stress from daily activities or trauma can have a role in age-induced changes in the central nervous system [31]. Moreover, it has been shown that age-related decrease in neuroendocrine functions can lead to different types of neurological disorders such as Alzheimer and Parkinson diseases [32].

Being old, exposes patients to several conditions such as cerebrovascular disorders, cancers and falls, increasing the risk of chronic pain in this population [33]. Pain is not a part of the ageing process, but many older people can experience it. Many elderlies believe that pain is a normal event in ageing. Therefore they don't report it. The same happens in cancerous patients and pain is not reported because of fear of disease progression. Some older people want to show they are compliant and they don't report pain, especially in nursing

homes [34] [35]. Perception of pain can be affected by environmental, emotional, cultural and cognitive factors. Because of health system managers' assumption, pain in the elderly often remains untreated and misdiagnosed [34].

Dementia is a condition characterised by progressive deterioration of cognition [36]. Alzheimer disease is the most common type of dementia that affects 5 per cent of individuals aged over 65 and one-third of those over 85 [15]. Some significant barriers to pain assessment are seen in dementia due to memory loss, personality changes and loss of other functions such as judgement, abstract thinking and language skills [37]. Moreover, some aggressive or withdrawal behaviours in these patients are related to pain, but these behaviours could be mistaken for a dementia symptom. As a result, evaluation and assessment of pain in dementia may be difficult [37] [38].

A higher prevalence of pain in adults with dementia is reported in numerous studies. In comparison to younger individuals, it has been shown that the presence of pain is twice as common in people over 60 years. In a study, about 66 % of elderly nursing home residents experienced chronic pain, but only 34% of them were detected [39].

Undetected and untreated pain in demented patients, can cause cognitive (decreased attention and concentration) and behavioural (aggression and depression) problems which cause an increase in care demand, caregiver dependency and the need for health system [37].

Somatic pain is a common complaint among depressed patients [40]. Depression has seen in 5 to 85% of patients with chronic pain syndromes, and 65% of depressed people have at least one pain complaint [41].

Depression is often under-recognised and thus undertreated in patients with pain syndrome. 75% of patients with depression present with physical complaints like pain, but depression as a cause is not diagnosed [42] [43]. Moreover, evaluation for depression should be considered in case of unexplained pain or unexplained exacerbation of stable chronic pain. On the other hand, depression complicates management of pain syndromes, decrease response to treatment and induces poor prognosis [41].

Because of the subjective nature of pain, it is difficult to measure it quantitatively. On the other hand, a thorough assessment is essential for selecting suitable treatment modalities. According to patient's ability to communicate, pain intensity is measured by using appropriate pain scale. To achieve this goal, having a complete history and examination considering both physical and psychological aspects is necessary [44].

Pain assessment is usually inadequate in the elderly patients with dementia; therefore treatment is

not enough in many cases. In this population, pain assessment could be done by considering three main issues including self-report (as gold standard), behavioural or physiological measures. Many different types of self-reporting scales are available to be used among older adults with dementia [20] [45] [46].

Pain intensity is one of the important components of pain management which can be assessed by using different tools including Visual Analog Scale (VAS), Verbal Rating Scale (VRS), Numerical Rating Scale (NRS) and Facial Pain Scale (FPS). Increasing age can lead to difficulty thinking and impaired communicating skills in older adults which can result in difficulty using these tools in geriatrics [46]. It seems that other tools considering behavioural with combination physical aspects are more useful in elderly. Observation of changes in behaviour and function, involving sleep, appetite, physical activity, motility, facial and body language alongside physiological indicators (e.g. heart rate and blood pressure) can provide valuable information, especially in demented patients [37].

There are some examples of behavioural pain scales which are mentioned below:

This tool was established by worry et al. in 1992. Ten items like sleep, verbal reaction and problems of behaviour in 3 dimensions are assessed. Based on pain intensity, each of 10 items can be described in a rating from zero to three. Scores ≥ 5 out of 30 confirm pain existence. This scale can reflect the progression of pain but does not represent pain at the specific moment. On the other hand, the value of this test is limited because the nurses completing this scale should know the patient [47] [48] [49].

This scale was designed by Baculon et al. for detecting changes in behaviour in the elderly with or without communicating impairment. It consists of 10 items such as sleep, verbal reactions and interaction with the environment that are assessed during and aftercare. The reliability and validity of this tool are not tested. This scale is modified from the University of Alabama Birmingham Pain Behavior Scale that was designed for assessing chronic pain. It consists of 6 items scored during movement and rest. Restlessness, rubbing and vocal complaints are 3 of the items. Each present item scores 1, and if not observed, the score is 0. Scores 1-2 show mild, 3-4 moderate and 5-6 refer to severe pain. However, more modification of the scale and psychometric testing is needed.

It is established by Fuchs et al. to assess chronic pain in the elderly patients with dementia. This tool has a long list consisting of 60 items in four subclasses including facial experience, activity/body movement, social/personal mood & physiological/eating/sleeping and vocal features.

This scale is designed by Warden et al. for pain assessment in advanced dementia. It consists of

10 items. As an example, facial experience can be scored as following: Smiling = 0, sad = 1, frightened = 3. A greater score indicates more pain. This tool needs more testing.

This scale is developed by Villanueva et al. for pain assessment in advanced dementia. It has 24 items covering facial experience, the activity of daily living and caregiver's judgment of pain. Because of the different scoring of methods, it could be problematic to calculate cutoff scores.

It is consisting of 18 items covering behavioural, emotional, autonomic and postural dimensions developed by Sign and Orrell for pain rating in dementia. Each items can have scores from 0 (absent) to 3 (severe).

This tool consists of 6 items (like physiological and physical changes) rating from 0-3 for pain assessment in end-stage dementia. The classification of pain intensity is as follow> 3: mild pain, 8-13 moderate and > 14: severe pain. It needs more investigation for reliability and validity.

According to a systematic review, SOLO PLUS 2 and PACSLAC are the most appropriate scales which are currently available [37].

Because of the subjective nature, it is difficult to measure pain quantitatively. On the other hand, a thorough assessment is essential for selecting suitable treatment modalities. To achieve this goal, having a complete history and examination considering both physical and psychological aspects is necessary [44]. Pain intensity determination is an important component of pain management which can be assessed using different tools including Visual Analog Scale (VAS), Verbal Rating Scale (VRS), Numerical Rating Scale (NRS) and Facial Pain Scale (FPS). Increasing age can lead to difficulty in thinking and impaired communicating skills in older adults which can make use of these tools in geriatrics difficult [46].

Pharmacodynamics and pharmacokinetic changes in the elderly should be considered in selecting treatments. Efficacy, safety and cost of pharmacological modalities should be considered for appropriate choice of the treatment regimen. Comorbid disease and polypharmacy are important as well [50]. When treating pain, a careful review of all patients' medication is essential to eliminate any unnecessary drugs. It can help to prevent probable drug interactions [50] [51] [52].

In conclusion, pain management in elderly needs different approach because of unreported pain in this population, and usually they have multiple problems and comorbidities that complicate evaluation and treatment. On the other hand, they have a higher incidence of medication side effects and potential for adverse effect and complication secondary to treatment.

Authors' Contributions

All authors reviewed the manuscript, and they read and approved the final manuscript.

References

1. Organization WH. Global health and aging. Acedido março. 2011; 5:2015.
2. Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *The Lancet*. 2013; 380(9859):2163-96. [https://doi.org/10.1016/S0140-6736\(12\)61729-2](https://doi.org/10.1016/S0140-6736(12)61729-2)
3. Simon LS. Relieving pain in America: A blueprint for transforming prevention, care, education, and research. *Journal of pain & palliative care pharmacotherapy*. 2012; 26(2):197-8. <https://doi.org/10.3109/15360288.2012.678473>
4. Gaskin DJ, Richard P. The economic costs of pain in the United States. *The Journal of Pain*. 2012; 13(8):715-24. <https://doi.org/10.1016/j.jpain.2012.03.009> PMID:22607834
5. Kaye AD, Baluch AR, Kaye RJ, Niaz RS, Kaye AJ, Liu H, et al. Geriatric pain management, pharmacological and nonpharmacological considerations. *Psychology & Neuroscience*. 2014; 7(1):15. <https://doi.org/10.3922/j.psns.2014.1.04>
6. Middaugh SJ, Pawlick K. Biofeedback and behavioral treatment of persistent pain in the older adult: A review and a study. *Applied psychophysiology and biofeedback*. 2002; 27(3):185-202. <https://doi.org/10.1023/A:1016208128254>
7. Karttunen NM, Turunen J, Ahonen R, Hartikainen S. More attention to pain management in community-dwelling older persons with chronic musculoskeletal pain. *Age and ageing*. 2014; 43(6):845-50. <https://doi.org/10.1093/ageing/afu052> PMID:24814961
8. Apkarian AV, Hashmi JA, Baliki MN. Pain and the brain: specificity and plasticity of the brain in clinical chronic pain. *Pain*. 2011; 152(3 Suppl):S49. <https://doi.org/10.1016/j.pain.2010.11.010> PMID:21146929 PMCID:PMC3045648
9. Won AB, Lapane KL, Vallow S, Schein J, Morris JN, Lipsitz LA. Persistent nonmalignant pain and analgesic prescribing patterns in elderly nursing home residents. *Journal of the American Geriatrics Society*. 2004; 52(6):867-74. <https://doi.org/10.1111/j.1532-5415.2004.52251.x> PMID:15161448
10. Arneric SP, Laird JM, Chappell AS, Kennedy JD. Tailoring chronic pain treatments for the elderly: are we prepared for the challenge? *Drug discovery today*. 2014; 19(1):8-17. <https://doi.org/10.1016/j.drudis.2013.08.017> PMID:24001595
11. Unruh AM. Gender variations in clinical pain experience. *Pain*. 1996; 65(2):123-67. [https://doi.org/10.1016/0304-3959\(95\)00214-6](https://doi.org/10.1016/0304-3959(95)00214-6)
12. Thomas MJ, Roddy E, Zhang W, Menz HB, Hannan MT, Peat GM. The population prevalence of foot and ankle pain in middle and old age: a systematic review. *Pain*. 2011; 152(12):2870-80. <https://doi.org/10.1016/j.pain.2011.09.019> PMID:22019150
13. King S, Chambers CT, Huguet A, MacNevin RC, McGrath PJ, Parker L, et al. The epidemiology of chronic pain in children and adolescents revisited: a systematic review. *Pain*. 2011; 152(12):2729-38. <https://doi.org/10.1016/j.pain.2011.07.016> PMID:22078064
14. Swain MS, Henschke N, Kamper SJ, Gobina I, Ottová-Jordan V, Maher CG. An international survey of pain in adolescents. *BMC public health*. 2014; 14(1):1. <https://doi.org/10.1186/1471-2458-14-447> PMID:24885027 PMCID:PMC4046513
15. Andrade D, Faria J, Caramelli P, Alvarenga L, Galhardoni R, Siqueira SR, et al. The assessment and management of pain in the demented and non-demented elderly patient. *Arquivos de neuro-psiquiatria*. 2011; 69(2B):387-94. <https://doi.org/10.1590/S0004-282X2011000300023> PMID:21625771
16. Maxwell CJ, Dalby DM, Slater M, Patten SB, Hogan DB, Eliasziw M, et al. The prevalence and management of current daily pain among older home care clients. *Pain*. 2008; 138(1):208-16. <https://doi.org/10.1016/j.pain.2008.04.007> PMID:18513871
17. Yates P, Dewar A, Edwards H, Fentiman B, Najman J, Nash R, et al. The prevalence and perception of pain amongst hospital in-patients. *Journal of clinical nursing*. 1998; 7(6):521-30. <https://doi.org/10.1046/j.1365-2702.1998.00192.x> PMID:10222947
18. Shah R, Gulati A. Patients with Advanced Cancer: Update on Pain Management| Page 3.
19. Organization WH. Cancer pain relief: with a guide to opioid availability: World Health Organization, 1996.
20. Heller P, Green P, Tanner K, Miao F, Levine J. Peripheral neural contributions to inflammation. *Progress in Pain Management*. Seattle: IASP Press; 1994: 31-42. PMID:8170628
21. AH D. The role of transmitters and their receptors in system related to pain and analgesia. *IASP Preess*, 1999: 381.
22. Chakour M, Gibson S, Bradbeer M, Helme R. The effect of age on Aδ-and C-fibre thermal pain perception. *Pain*. 1996; 64(1):143-52. [https://doi.org/10.1016/0304-3959\(95\)00102-6](https://doi.org/10.1016/0304-3959(95)00102-6)
23. Lautenbacher S, Strian F. Similarities in age differences in heat pain perception and thermal sensitivity. *Functional neurology*. 1990; 6(2):129-35.
24. Lasch H, Castell D, Castell J. Evidence for diminished visceral pain with aging: studies using graded intraesophageal balloon distension. *American Journal of Physiology-Gastrointestinal and Liver Physiology*. 1997; 272(1):G1-G3. <https://doi.org/10.1152/ajpgi.1997.272.1.G1> PMID:9038868
25. Ciampi de Andrade D MX, Bouhassira D. Current therapy in pain. *New York: Saunders*. 2009; 1:45-50.
26. Farrell MJ, Katz B, Helme RD. The impact of dementia on the pain experience. *Pain*. 1996; 67(1):7-15. [https://doi.org/10.1016/0304-3959\(96\)03041-2](https://doi.org/10.1016/0304-3959(96)03041-2)
27. Lautenbacher S, Kunz M, Strate P, Nielsen J, Arendt-Nielsen L. Age effects on pain thresholds, temporal summation and spatial summation of heat and pressure pain. *Pain*. 2005; 115(3):410-8. <https://doi.org/10.1016/j.pain.2005.03.025> PMID:15876494
28. Golianu B, Krane EJ, Galloway KS, Yaster M. Pediatric acute pain management. *Pediatric Clinics of North America*. 2000; 47(3):559-87. [https://doi.org/10.1016/S0031-3955\(05\)70226-1](https://doi.org/10.1016/S0031-3955(05)70226-1)
29. Pain: clinical manual. St Louis: Mosby, 1999; 15.
30. Oosterman JM, van Harten B, Weinstein HC, Scheltens P, Scherder EJ. Pain intensity and pain affect in relation to white matter changes. *Pain*. 2006; 125(1):74-81. <https://doi.org/10.1016/j.pain.2006.04.030> PMID:16750299
31. Samorajski T. How the human brain responds to aging. *Journal of the American Geriatrics Society*. 1976; 24(1):4-11. <https://doi.org/10.1111/j.1532-5415.1976.tb03246.x> PMID:172540
32. Rehman HU, Masson EA. Neuroendocrinology of ageing. *Age and ageing*. 2001; 30(4):279-87. <https://doi.org/10.1093/ageing/30.4.279>
33. Soldato M, Liperoti R, Landi F, Finne-Soveri H, Carpenter I, Fialova D, et al. Non malignant daily pain and risk of disability among older adults in home care in Europe. *Pain*. 2007; 129(3):304-10. <https://doi.org/10.1016/j.pain.2006.10.016> PMID:17156918
34. Brown ST, Kirkpatrick MK, Swanson MS, McKenzie IL. Pain experience of the elderly. *Pain Management Nursing*. 2011; 12(4):190-6. <https://doi.org/10.1016/j.pmn.2010.05.004> PMID:22117750
35. Kaye AD, Baluch A, Scott JT. Pain management in the elderly

- population: a review. *The Ochsner Journal*. 2010; 10(3):179-87. PMID:21603375 PMCid:PMC3096211
36. Patterson C, Gauthier S, Bergman H, Cohen CA, Feightner J, Feldman Ha, et al. The recognition, assessment and management of dementing disorders: conclusions from the Canadian Consensus Conference on Dementia. *CMAJ: Canadian Medical Association Journal*. 1999; 160(12):S1.
37. Zwakhalen SM, Hamers JP, Abu-Saad HH, Berger MP. Pain in elderly people with severe dementia: a systematic review of behavioural pain assessment tools. *BMC geriatrics*. 2006; 6(1):1. <https://doi.org/10.1186/1471-2318-6-3> PMID:16441889 PMCid:PMC1397844
38. Feldt KS, Ryden MB, Miles S. Treatment of pain in cognitively impaired compared with cognitively intact older patients with hip-fracture. *Journal of the American Geriatrics Society*. 1998; 46(9):1079-85. <https://doi.org/10.1111/j.1532-5415.1998.tb06644.x> PMID:9736099
39. Sengstaken EA, King SA. The problems of pain and its detection among geriatric nursing home residents. *Journal of the American Geriatrics Society*. 1993; 41(5):541-4. <https://doi.org/10.1111/j.1532-5415.1993.tb01892.x>
40. Pelissolo A. [Depression and pain: prevalence and clinical implication]. *Presse medicale (Paris, France : 1983)*. 2009; 38(3):385-91. <https://doi.org/10.1016/j.lpm.2008.06.022> PMID:18977630
41. Bair MJ, Robinson RL, Katon W, Kroenke K. Depression and pain comorbidity: a literature review. *Archives of internal medicine*. 2003; 163(20):2433-45. <https://doi.org/10.1001/archinte.163.20.2433> PMID:14609780
42. Simon GE, VonKorff M, Piccinelli M, Fullerton C, Ormel J. An international study of the relation between somatic symptoms and depression. *New England Journal of Medicine*. 1999; 341(18):1329-35. <https://doi.org/10.1056/NEJM199910283411801> PMID:10536124
43. Kroenke K, Jackson JL, Chamberlin J. Depressive and anxiety disorders in patients presenting with physical complaints: clinical predictors and outcome. *The American journal of medicine*. 1997; 103(5):339-47. [https://doi.org/10.1016/S0002-9343\(97\)00241-6](https://doi.org/10.1016/S0002-9343(97)00241-6)
44. Connelly P. The management of chronic pain in older persons. *Journal of the American Geriatrics Society*. 1998; 46(5):635-51. <https://doi.org/10.1111/j.1532-5415.1998.tb01084.x>
45. Melzack R, Katz J. *The McGill Pain Questionnaire: Appraisal and current status*: Guilford Press, 2001.
46. Gagliese L, Melzack R. Chronic pain in elderly people. *Pain*. 1997; 70(1):3-14. [https://doi.org/10.1016/S0304-3959\(96\)03266-6](https://doi.org/10.1016/S0304-3959(96)03266-6)
47. Gauvain-Piquard A, Pichard-Leandri E. *La douleur chez l'enfant*: medsi-McGrawHill, 1989.
48. Michel M, Capriz F, Gentry A, Filbet M, Gauquelin F, Lefebvre-Chapiro S, et al. Doloplus 2, une échelle comportementale de la douleur validée chez la personne âgée: Etude de la fiabilité. *La Revue de gériatrie*. 2000; 25(3):155-60.
49. Serbouti S, Rat P, Passadori Y, editors. Validation of DOLOPLUS. A pain assessment tool for non-verbal or cognitively impaired elderly patients. IASP congress San Diego, 2002.
50. Nolan L, O'malley K. The need for a more rational approach to drug prescribing for elderly people in nursing homes. *Age and ageing*. 1989; 18(1):52-6. <https://doi.org/10.1093/ageing/18.1.52> PMID:2711922
51. Lazarou J, Pomeranz BH, Corey PN. Incidence of adverse drug reactions in hospitalized patients: a meta-analysis of prospective studies. *Jama*. 1998; 279(15):1200-5. <https://doi.org/10.1001/jama.279.15.1200> PMID:9555760
52. Organization WH. *Cancer pain relief and palliative care* 1990.