

The aging process in prison: pathologies and health conditions in old inmates. An epidemiological research in Italy

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Abstract

Background & Aims. Elderly may suffer from different pathologies during their detention in jail because of their age. Conditions in jails were tough and adapting to that life could be problematic for the elder population. This article aimed to analyse the pathologies and health conditions in a sample of elder inmates from Italy.

Methods. The sample was composed by 94 elderly inmates. The research is multicentric. We selected jails from the cities of Bari, Taranto, Foggia, Lecce, Brescia, Bergamo, Cremona and Mantua. The study was conducted by interviewing the prisoners over 60 years of age, in the period between September and December 2017.

Results. 64% of the sample was in a "Not Optimal" health status. Most of pathologies were Cardiac pathologies (23.4%), Diabetes (12.8 %) and Surgery (9.6%). Statistically significant differences were found for heart disease ($p=0.02$) and Neoplasia ($p=0.025$) in the prison of Bari compared to all the other prisons. Statistically significant differences were found for Hypertension in Foggia and Taranto prisons compared to all the other ($p=0.023$). Furthermore, 18.1% of inmates ended up having an addiction.

Conclusions. Our analysis showed that in our sample physical problems were more frequent than psychological one. In fact, in spite of in the literature there was a high prevalence of mental health problems among elderly inmates, we did not find this result. However, stress conditions may increase the risk of pathologies: for example, being in jail and adapt to new hard environment may increase the risk of getting sick. Heart disease pathologies and diabetes were very common in our sample as confirmed by the literature. *Clin Ter* 2020; 171 (4):e340-345. doi: 10.7417/CT.2020.2237

Key words: elderly, prisons, health, disease, pathologies

Introduction

The increase of life-expectancy and the improvement of population general conditions led to a significant change in the demographic structure of the global society. At the beginning of the 20th century the world population over 65 was less than 1%, while in 2050 it will be about 20%¹. Eurostat data (2017) confirmed this trend on ageing stating that, in 2017, 19% of the whole European population was 65 years or over. Italy was the country with the oldest population (22.3%) and the lowest birth rate in Europe². The ageing process caused several physical, psychological and in particular cognitive changes.

Regarding cerebral alterations, changes in the prefrontal cortex, which is the neural substratum of executive functions, led to neuropsychological decline. Modifications in this brain area caused working memory, attentive processes, planning skills and cognitive flexibility deteriorations. A second class of transformations concerned the alteration of the cerebral networks of the medial temporal lobe (including the hippocampus) which is responsible for the deficit of declarative memory, often precursor of Alzheimer's disease³. When these cognitive changes caused a Mild Cognitive Impairment of the most important memory functions, they can be identified as precursors of Alzheimer's disease or Dementia⁴.

Dementia was one of the most common diseases in old age. The prevalence in adults over 60 years ranged from 5 to 7% in the world population, a percentage that grew exponentially with the aging process at least until the age of 95⁵. The prevalence rates showed that 50% of women over 90 suffer from dementia, compared to 25% of men⁶. In 2005, 24 million cases of dementia were diagnosed, a number that is expected to double every 20 years, reaching 81 million in 2040⁷.

Psychiatric disorders were closely related to neurodegenerative diseases. Some authors^{8,9} argued that the prevalence of psychiatric diseases tended to decrease with the aging process. Siracusano (2014), however, suggested that these epidemiological studies may underestimate the real prevalence of mental illness in old people. In fact, according to

the author, mental disorders' diagnostic criteria had been standardized in a sample of adults; so, they may be inadequate to diagnose elderly psychiatric symptoms¹. Considering major depression, the prevalence varied between 1% and 4% over the general elderly population, but it can reach up to 10-15% if hospital settings were considered, while minor depression ranging from 4 to 13% in the elderly general population and 17-35% in hospital settings⁸. Anxiety disorders, on the other hand, seemed to be more common in the general elderly population, with a prevalence of 2-10% and 5% in care setting¹⁰.

About 50% of the elderly aged over 65 and almost 25% of subjects over 85 years old drank alcohol. 1-3% of elderly subjects were afflicted by Alcohol-use-disorders (AUDs). In addition, AUDs represented a cause of physical and psychiatric morbidity and social distress. Concerning hospitalized elderly people, up to 30% of older patients of general medicine and up to 50% of those hospitalized in psychiatric divisions presented AUDs.

The prevalence of psychotic disorders was the one with the largest gap in the elderly population: it was 4-6% over the general population and reached up to 60% in nursing homes. Moreover, in nursing homes psychotic symptoms were more associated with cognitive functions impairment. However, the most common psychotic disorders were those associated with dementia and central nervous system disorders that were frequently floating with continuous remissions and exacerbations¹.

A typical pathology for elderly was diabetes. Recent data from the US Centres for Disease Control and Prevention (2014) showed that 11.2 million people over 65 (25.9%) were diagnosed with diabetes¹¹. Croxson and colleagues (1991), however, argued that the prevalence of this disease was underestimated since these studies only consider the cases of diagnosed diabetes¹².

Hypertension was also one of the most common disease in subjects older than 55 years. The literature reported a higher prevalence of Hypertension in women rather than in man¹³. These gender differences are probably due to the rapid hormones decreased during menopause that led to an upsurge in blood pressure¹⁴.

Aging in prison was a peculiar and difficult experience since elderly people brought with them complex and special needs. Due to their physical vulnerability even mental health can be exposed to multiple risks: in fact, experiencing detention can lead to develop psychiatric disorders or to exacerbate pre-existing psychiatric conditions¹⁵. In one of the first works on the elderly in prison, Fazel and colleagues (2001) discovered that 29.6% of the sample (203 men) had a diagnosis of depressive disorder, followed by personality disorder and substance abuse or dependence¹⁶. According to several authors the most common psychiatric disorders in prison comprehended mood, anxiety, psychotic, substance use, personality disorders and schizophrenia^{17,18}.

Moreover, a comorbidity between mental health issues and substance abuse was often observed in elderly prisoners¹⁹. While the most used substance in prison was alcohol, there was a minority of elderly inmates that used illegal drugs, alcohol and pharmaceuticals together¹⁸.

Elderly detainees often represent a major challenge for health professionals in detention since they have problems

of alcoholism, drug abuse, sedentary lifestyle more easily than other prisoners. All these elements predispose them to serious health problems during detention^{20,21,22}.

Materials and methods

Our sample consisted of 94 subjects, 88 of which were male and 6 females; the average age of the sample was 65.6 (DS=3.9 years; range= 60.0-76.0). The nationality was known, with 90 Italians and 4 foreigners. The empirical research was multi-centric because it involved eight penitentiary institutes from Bari, Taranto, Foggia, Lecce, Brescia, Bergamo, Cremona and Mantova. The study was conducted by interviewing 94 prisoners over 60 years of age, in the period between September and December 2017. For each inmate, personal data and identification of any pathological addictions and pathologies were reported using a standardised format. Statistical analyses were performed using the Statistical Package for Social Science (SPSS) version 22 software. A p value of .05 was considered statistically significant. We used an ANOVA to analyse the differences between all the prisons for the age and the health condition of elder detainees.

Results

The ANOVA test showed a statistically significant difference about the age of inmates among all the prisons ($p=0.008$). The Post hoc test showed a statistically significant difference between Bari and Cremona, Bari and Taranto.

As shown in Figure 1, 36.2% of inmates had an "Optimal" health condition ($N=34$) while 63.8% ($N=60$) of inmates had a "Not Optimal" health condition" because of a prior or actual pathology. 28% of our sample was affected by a "Single Pathology" while 29% was affected by "Multiple Pathologies". We did not have health status information for 7% of inmates.

Pathologies detected for inmates reported a non-optimal health condition were represented in Table 1.

Considering the χ^2 in the total population we found statistically significant differences in the following pathologies: heart disease for the city of Bari ($p=0.02$); Hypertension for the cities of Foggia and Taranto ($p=0.023$); Neoplasia for the city of Bari ($p=0.025$).

Subjects were asked about their addictions. 81.8% had not an addiction while 18.1% had one. The typologies of addictions were explained in Figure 2.

Discussion

Although in literature it was assumed that the population of older prisoners suffered from psychiatric and physical problems more than younger prisoners²⁰, in our sample we found a fair prevalence of physical but not psychiatric disorders. Our research showed that heart disease was the most common health problem in our sample of elderly penitentiary

INMATE HEALTH CONDITIONS

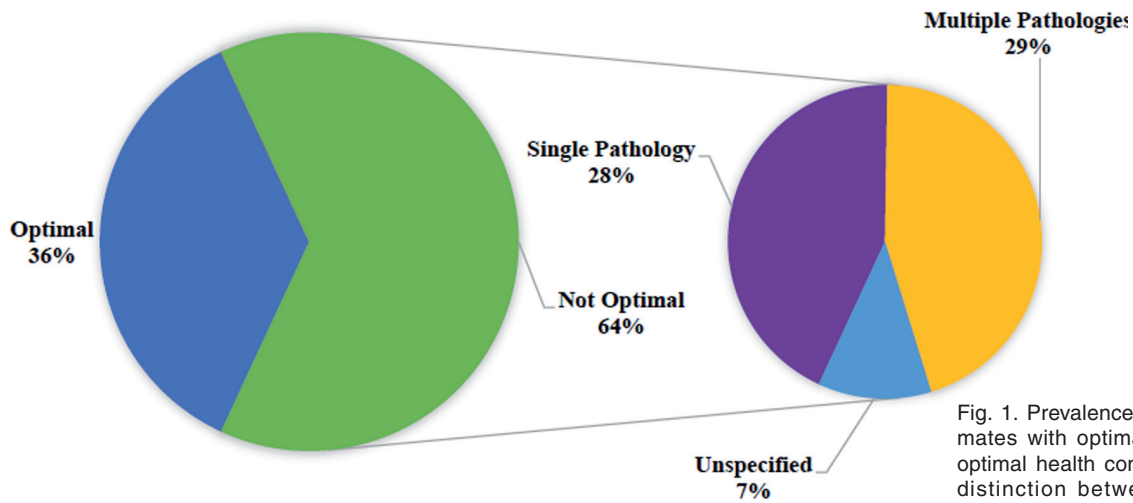


Fig. 1. Prevalence (%) of inmates with optimal and not optimal health condition and distinction between those with single and multiple pathologies

inmates. As amply confirmed by an analysis conducted by the Italian Health Ministry (2014), cardiovascular diseases had long been the first cause of death in Italy and in the World, both due to the population's aging process and to the constant increase in associated risk factors linked in particular to the lifestyle. These included cigarette smoking, an

unbalanced diet, sedentary lifestyle, overweight and obesity. There was a major presence of these risk factors in penitentiary populations, also linked to unfavourable environmental conditions and to the state of material and psychological deprivation that the inmates frequently suffer²¹.

Arterial hypertension was one of the factors responsible for the development of heart disease²². In our study several elderly inmates suffered from arterial hypertension. This finding was confirmed by other studies conducted among prisoners over 50 that showed high rates of hypertension (about twice the percentage recorded in young prison

Table 1. Prevalence (%) and number (N) of detected pathologies

Types of pathologies	Prevalence of pathologies %	Number of pathologies (N)
Cardiac pathologies	23.4%	22
Diabetes	12.8%	12
Surgery	9.6%	9
Hypertension	8.5%	8
Lunge pathologies	7.4%	7
Psychopathologies	7.4%	7
Neoplasia	6.6%	6
Physical disabilities	5.3%	5
Joint problems	4.3%	4
Prostate problems	4.3%	4
Hernia	3.2%	3
Cholesterol problems	3.2%	3
Liver disease	3.2%	3
Sight problems	2.1%	2
Hepatitis C	2.1%	2
Stroke	2.1%	2
Ischemia	2.1%	2
Burns	1.1%	1
Intestinal Problems	1.1%	1
Dental Problems	1.1%	1
Acufen	1.1%	1
Allergies	1.1%	1
Kidney Problems	1.1%	1
Thyroid Problems	1.1%	1
Parkinson's	1.1%	1
Dyslipidaemia	1.1%	1

TYPOLOGIES OF ADDICTIONS

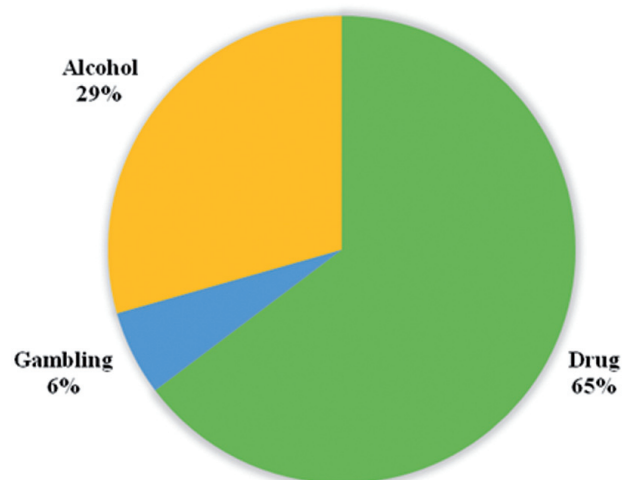


Fig. 2. Prevalence (%) in the sample of addictions typologies

inmates)²³ and also a higher risk of myocardial infarction, with higher rates of heart attack and stroke among prisoners over 60 than in subjects aged between 50 and 59 years²⁴. Moreover, due to the need to readapt imposed on inmates by the penitentiary environment, the elderly in particular can experience a state of stress that affected their psycho-physical wellbeing, fostering the onset of various diseases. Some inmates reported that they had a stroke, cancer, a metabolic disease or sight problems while they were in prison. This finding was confirmed in the literature where, paradoxically, many diseases such as infections, metabolic function alterations, stroke and cancer may be triggered by the physiological mechanisms underlying stress²⁵. The accentuated level of stress experienced by the elderly inmates was also correlated with the fact that they were frequently victims of violence by the remaining penitentiary population, as well as the inadequacy of the prison environment (stairs, corridors, etc). These elements can affect the development or deterioration not only of physical but also mental diseases²⁶. The stress state can also generate an acceleration of the aging process, to such an extent that some 50-year-olds showed the psycho-physical conditions more typical of subjects over the age of 65²⁷. The so-called “*prison syndrome*” included a series of psychic and psychosomatic disorders; it was more frequent and severe in those with a high level of education, sensitivity and culture, and when the gap between the lifestyle in freedom and in prison was particularly marked²⁸. As regards the overall penitentiary population, various studies revealed a high number of mental disorders²⁹. In decreasing order, these include: substance abuse disorders, affective disorders or those linked to anxiety, and psychotic spectrum disorders³⁰. After the age of 50 a decrease had been shown in pathologies related to drug addiction and alcoholism and an increase in depressive and anxiety symptoms³¹. While dementia³², antisocial personality disorders³³, psychotic disorders and schizophrenia³⁴ were considered risk factors for committing a crime³⁵, depressive disorders and anxiety characterized the life of elderly prison inmates³⁶. In spite of this, in our sample only a small percentage of prisoners reported a clinical-psychiatric pathology. The lack of mental illness, however, could be due to the fact that psychiatric conditions are underdiagnosed and undertreated in the incarcerated population²⁷. This datum was not confirmed by other literature studies. Specifically, several studies showed not only that psychiatric disorders represented a significant proportion of elderly inmates’ pathologies^{36;37}, but also that elderly inmates suffered in particular from affective disorders¹⁷. Indeed, the stressful environmental conditions together with a low level of personal autonomy, isolation and loss of hope for the future were sufficient factors to explain the high levels of anxiety suffered by elderly prison inmates³⁸. Moreover, the relative social isolation which characterized the correctional setting, may lead the older inmates to develop feeling of loneliness. In fact, compared to incarcerated younger adults, older inmates generally had fewer visits as well as fewer relationships with the social networks and self-help groups³⁹.

A specific investigation deserved dementia. Although dementia cases increased with age^{40;7}, especially between 65 and 90⁴¹, and the Alzheimer’s disease was the most common form of dementia in the elderly population^{42;43}, our sample of

inmates did not report cases of vascular dementia or Alzheimer. Considering that the literature reported a lack of studies assessing the incidence of Alzheimer’s problems among elderly inmates this result was not unexpected⁴⁴. However, Wilson and Barboza (2010) believed that, since the rate of dementia in the general population will double in the next two decades, there was no reason to believe that among the prison population the trend of dementia will follow a different trend, although the exact prevalence remained unknown. Moreover, the two authors suggested that the recurrence of this disease in prison is 2-3 times greater than non-prison population for the following reasons: 1) prisoners were exposed to risk factors rather than protective factors, 2) an increasing number of inmates were imprisoned in late life and for the rest of their lives, 3) the particular prison living conditions accelerated the aging process in prison⁴⁵. The lack of data in literature related to the dementia rate in prison may be due to the inability of prison workers to recognize inmates affected by mild forms of dementia. In fact, the prison system was too extensive and complex to give the right attention for diagnosing dementia⁴⁶. Moreover, many forensic psychiatrists did not use standardised procedures for the assessment of cognitive functions and this explained why mild forms of dementia often remained unidentified; especially fronto-temporal forms of dementia that were difficult to diagnose⁴⁷. The difficulty in diagnosing dementia was accentuated by the fact that those who dealt with the mental health of inmates often did not have adequate knowledge. In fact, while at the entrance of each new inmate, purely medical screenings were carried out, age-related functions (such as cognitive impairment) were not properly investigated⁴⁶. Two other factors that may delay the diagnosis of dementia were the follows: 1) prisoners often had no way of performing even the simplest daily activities (e.g. laundry and cooking) and this made it very difficult to notice cognitive impairments; 2) the lack of communication between prison staff and health care system. The result was that in most cases it was impossible to identify the necessary cures⁴⁸. Nevertheless, considering data on the rate of dementia among non-prison elderly population and the acceleration of aging process in prison, it can be estimated that about 5% of inmates aged 55 years and over suffer from it⁴⁶.

Regarding addiction, one of the main problems detected at prison entry was substance abuse⁴⁹. Specifically, in the elderly prison population there was widespread use of alcohol in the period before the imprisonment and during the period that the crime was committed⁵⁰. In our sample, substance abuse was not significant; the majority did not report problems related to alcohol, drugs or other forms of addiction. However, looking at those who reported a history of substance dependence, it seemed that drug abuse was predominant followed by alcohol abuse. Although some inmates reported problems related to substance, the results of our study did not fully overlap with other studies. In fact, the literature reported a high percentage of elderly prisoners with a personal history of substance use³⁷ and also a prevalence of alcohol use rather than drug use⁵¹. Specific risk factors in prison as well as in residential care home may lead to a variety of negative behavioral outcomes including the perpetration of sexual offending (52). In institutions, elderly people are often unrecognized victims of sexual abuse but they are also at great risk for doing abuse toward vulnerable

victims. Elderly abuse is still a hidden problem, often underestimated to be considered also in prison⁽⁵³⁻⁵⁴⁾

Among the main metabolic diseases there was diabetes, which is present in a very high percentage in our sample as compared to non-prison inmates of the same age⁵⁵. In fact, it had been demonstrated that diabetes more commonly affected socially disadvantaged groups and those with less education (including prison inmates), who showed an increased risk up to 60% of this disease as compared to subjects with a higher level of schooling⁵⁶.

Another important finding in our study was the prevalence of lung disease. Worldwide, in the course of the last decades, there was a constant increase in the incidence and prevalence of respiratory diseases, due also to the massive consumption of tobacco, that was still one of the major risk factors in penitentiaries, where smokers were 3-fold those in the general population⁵⁷. Moreover, tobacco consumption was more associated with the presence of psychiatric disease.

In conclusion, our analysis showed that in our sample physical problems were more frequent than psychological one. In fact, in spite of in the literature there was a high prevalence of mental health problems among elderly inmates, we did not find this result. However, stress conditions may increase the risk of pathologies: for example, being in jail and adapt to new hard environment may increase the risk of getting sick. Heart disease pathologies were very common among elderly as confirmed by the literature^(58,59). The percentage of subject that suffer from diabetes was consistent with the literature because it usually touched socially disadvantaged groups.

We must point out some limits of our analysis. The information on pathologies were reported by the inmates and they did not been verified through a cross-check on their medical records in the prisons or health centres. Further researches may use the sanitary information recorded in the medical database of prisons. It could be useful to enlarge the sample in order to obtain a more representative view of the problem.

References

1. Siracusano A. Manuale di Psichiatria. Roma: Il Pensiero Scientifico 2014
2. Eurostat. Struttura e invecchiamento della popolazione, 2007 [cited 23 May 2019] Available: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Population_structure_and_ageing/it#La_percentuale_di_anziani_C3.A8_in_continuo_aumento. Sito consultato in data 19/04/2019
3. Woodruff-Pak DS, Papka M. Theories of Neuropsychology and aging. In Bengtson VL, Schaie KW (Eds.) Handbook of theories of aging. NY: Springer, 1999
4. Sperling RA, Aisen PS, Beckett LA, et al. Toward defining the preclinical stages of Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. *Alzheimers Dement* 2011; 7(3):280-292
5. Prince M, Bryce R, Albanese E, et al. The global prevalence of dementia: A systematic review and metaanalysis. *Alzheimers Dement* 2013;9(1):63-75.e2
6. Centre for Disease Control and Prevention (USA). Public Health and aging: trends in aging – United State Worldwide. *JAMA* 2003;289:1371-3
7. Ferri CP, Prince M, Brayne C, et al. Global prevalence of dementia: a Delphi consensus study. *Lancet* 2005; 366(9503):2112-2117
8. Blazer DG Depression in late life: review and commentary. *J Gerontol A Biol Sci Med Sci* 2003; 58(3):249-65
9. Alonso J, Ferrer M, Romera B, et al. The European Study of the Epidemiology of Mental Disorders (ESEMEd/MHEDEA 2000) project: rationale and methods. *Int J Methods Psychiatr Res* 2002;11(2):55-67
10. Davies SJ, Jackson PR, Potokar J. Treatment of anxiety and depressive disorders in patients with cardiovascular disease. *BMJ* 2004; 328:939-943
11. US Centers for Disease Control and Prevention: National Diabetes Statistics Report, 2014. Available at: <http://www.cdc.gov/diabetes/pubs/statsreport14.htm>.
12. Croxson SCM, Burden AC, Bodington M, et al. The Prevalence of Diabetes in Elderly People. *Diabet Med* 1991; 8(1):28-31
13. Van Rossum CTM, van de Mheen H, Witteman JCM, et al. Prevalence, Treatment, and Control of Hypertension by Sociodemographic Factors Among the Dutch Elderly. *Hypertension* 2000;35(3):814-821
14. Maric-Bilkan C, Gilbert EL, Ryan MJ. Impact of ovarian function on cardiovascular health in women: focus on hypertension. *Int J Womens Health* 2014; 6:131-139
15. Di Lorito C, Völm B, Denning T. Psychiatric disorders among older prisoners: a systematic review and comparison study against older people in the community. *Aging Ment Health* 2018; 22(1):1-10
16. Fazel S, Hope T, O'Donnell I, et al. Hidden psychiatric morbidity in elderly prisoners. *Br J Psychiatry* 2001a;179:535-9
17. Davoren M, Fitzpatrick M, Caddow F, et al. Older men and older women remand prisoners: mental illness, physical illness, offending patterns and needs. *Int Psychogeriatr* 2015;27(5):747-755
18. Moschetti K, Stadelmann P, Wangmo et al. Disease profiles of detainees in the Canton of Vaud in Switzerland: gender and age differences in substance abuse, mental health and chronic health conditions. *BMC Public Health* 2015;15(1):2211-2216
19. James D, Glaze L. Mental Health Problems of Prison and Jail Inmates. *BJS Statisticians* 2006, available: <https://www.bjs.gov/content/pub/pdf/mhppji.pdf>
20. Potter E, Cashin A, Chenoweth L, et al. The healthcare of older inmates in the correctional setting. *Int J Prison Health* 2007; 3(3):204-213
21. Italian Health Ministry. Relazione sullo Stato Sanitario del Paese 2012-2013. 2014, [cited 04 May 2019] Available: <http://www.rssp.salute.gov.it>
22. Binswanger IA, Krueger PM, Steiner JF Prevalence of chronic medical conditions among jail and prison inmates in the USA. *J Epidemiol Community Health* 2009; 63(11):912-9
23. Maruschak LM Medical problems of prisoners. Bureau of Justice Statistics 2008. Available: <https://www.bjs.gov/content/pub/pdf/mpp.pdf>
24. Colsher P, Wallace R, Loeffelholz P, et al. Health status of older male prisoners: A comprehensive survey. *Am J Public Health* 1992;82(6):881-884
25. Mastronardi V, Ricci S, Adinolfi V, et al. Stress, lutto e modificazioni dei parametri immunitari. *RCVS* 2012; 6(3):212-231

26. Tarbuck A. Health of Elderly Prisoners. *Age Ageing* 2001; 30:369-370
27. Aday RH Aging prisoners: Crisis in American corrections. Westport: Praeger Publishers 2003
28. Baccaro L Carcere e salute. Padova: Sapere Edizioni 2003
29. Fazel S, Danesh J. Serious mental disorder in 23 000 prisoners: a systematic review of 62 surveys. *Lancet* 2002;359(9306):545-50
30. Blaauw E, Roesch R, Kerkhof A. Mental disorders in European prison systems. Arrangements for mentally disordered prisoners in the prison systems of 13 European countries. *Int J Law Psychiatry* 2000;23(5-6):649-63
31. Canadian Public Health Association A Health Care Needs Assessment of Federal Inmates in Canada. *Can J Public Health* 2004;95 Suppl 1:S9-63
32. Barak Y, Perry T, Elizur A. Elderly criminals: A study of the first criminal offense in old age. *Int. J. Geriatr. Psychiatry* 1995;10(6):511-516
33. Putkonen H, Weizmann-Henelius G, Repo-Tiihonen E, et al. Homicide, Psychopathy, and Aging - A Nationwide Register-based Case-comparison Study of Homicide Offenders Aged 60 Years or Older. *J Forensic Sci* 2010;55(6):1552-1556
34. Aliustaoğlu FS, Özdemir M, İnce H, et al. Criminal activities of the elderly in Turkey during the years 2000–2005. *Arch Gerontol Geriatr* 2011;53(3):e267-70
35. Nuvoli G, Rocca G, Dijk B, Ferrannini L. L'anziano autore di reato: aspetti epidemiologici e psicopatologici. *Psicogeriatra* 2018;2:69-82
36. Fazel S, Hope T, O'Donnell I, et al. Health of elderly male prisoners: worse than the general population, worse than younger prisoners. *Age Ageing* 2001b; 30(5):403-7
37. Loeb SJ, AbuDagga A (2006). Health-Related Research on Older Inmates: An Integrative Review. *Res Nurs Health* 2006;29(6):556-65
38. Gross B Elderly Offenders. Implications for Corrections Personnel. *Forensic Examiner* 2007;16(1):56-61. Available: https://sagelink.ca/sites/default/files/clinical-resources/Elderly_offenders_implications.pdf
39. Bedard R, Metzger L, Williams B Ageing prisoners: An introduction to geriatric health-care challenges in correctional facilities. *International Review of the Red Cross* 2016;98(3):917–39. Available: <https://www.icrc.org/en/international-review/article/ageing-prisoners-introduction-geriatric-health-care-challenges>
40. Jellinger KA, Attems J Prevalence of dementia disorders in the oldest-old: an autopsy study. *Acta Neuropathol* 2010;119(4):421-33
41. Corrada MM, Brookmeyer R, Paganini-Hill A, et al. Dementia Incidence Continues to Increase with Age in the Oldest Old The 90+ Study. *Ann Neurol* 2010;67(1):114-21
42. The Alzheimer's Association. 2008 Alzheimer's disease facts and figures. *Alzheimers Dement* 2008;4(2):110–133.
43. ADI World Alzheimer Report 2010. The Global Economic Impact of Dementia. 2010 [cited 15 May 2019]. Available: <https://www.alz.co.uk/research/files/WorldAlzheimerReport2010.pdf>
44. Maschi T, Kwak J, Ko E, et al. Forget Me Not: Dementia in Prison. *Gerontologist* 2012; 52(4):441-51
45. Wilson J, Barboza S. The looming challenge of dementia in prisons. *Correct Care* 2010;24(2):10–13
46. Moll A. Losing track of time: dementia and the ageing prison population: treatment challenges and examples of good practice. London: Mental Health Foundation 2013 [cited 24 April 2019] Available: <https://www.mentalhealth.org.uk/sites/default/files/losing-track-of-time-2013.pdf>
47. Yorston GA, Taylor PJ. Commentary: Older Offenders—No Place to Go?. *J Am Acad Psychiatry Law* 2006; 34(3):333-337
48. Cipriani G, Danti S, Carlesi C, et al. Old and dangerous: Prison and dementia. *JJ Forensic Leg Med* 2017; 51:40-44
49. Fazel S, Yoon IA, Hayes AJ Substance use disorders in prisoners: an updated systematic review and meta - regression analysis in recently incarcerated men and women. *Addiction* 2017; 112(10):1725-1739
50. Karberg J, James D Substance Dependence, Abuse, and Treatment of Jail Inmates, 2002. Washington, DC: U.S Department of Justice, Bureau of Justice Statistics 2005. Available: <https://www.bjs.gov/content/pub/pdf/sdatj02.pdf>
51. Lewis CF, Fields C, Rainey E. A study of geriatric forensic evaluatees: who are the violent elderly?. *J Am Acad Psychiatry Law* 2006; 34(3):324-332
52. Corbi G, Grattagliano I, Sabba C, et al. Elder abuse: perception and knowledge of the phenomenon by healthcare workers from two Italian hospitals, Internal and Emergency Medicine, 2019, Jan 29;
53. Corbi G, Grattagliano I, Catanesi, R, et al. Elderly residents at risk for being victims or offenders. *Journal American Medical Directors Association*. 2012 Sep; 13(7):657-9
54. Corbi G, Grattagliano I, Ivshina E, et al. Elderly abuse: risk factors and nursing role. *Internal and Emergency Medicine*, 2015; 10:297-303, ISSN: 1828-0447
55. Wilper AP, Woolhandler S, Wesley Boyd J, et al. The Health and Health Care of US Prisoners: Results of a Nationwide Survey. *AJPH* 2009;99(4):666–672
56. Masamitsu H, Masami O, Sanae M, et al. Metabolic improvement of male prisoners with type 2 diabetes in Fukushima Prison, Japan. *Diabetes Res Clin Pract* 2007;77(2):327-32
57. Parker DR, Fallone D, Martin RA, et al. The relation between smoking status and medical conditions among incarcerated adults. *J Addict Med* 2014;8(2):90-95
58. Campobasso CP, Bugelli V, De Micco F, et al. Sudden cardiac death in elderly: the post-mortem examination of senile myocardium and myocardial infarction. *JGG*, 65: 223-231, 2017
59. Corbi G, Romano CA, Campobasso CP, et al. A multicentre survey of the sociodemographic characteristics of Italian elderly inmates. *JGG*, in press 2020