

Historical micronutrient psychiatry: descriptive analysis of patients with pellagra admitted to the “San Lazzaro” asylum in Reggio Emilia (Italy) in the decade 1901-1910

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Abstract. This study aims at describing the socio-demographic and clinical characteristics of the patients affected by pellagra and admitted to the “San Lazzaro” psychiatric asylum (Reggio Emilia, Italy) from 1901 to 1910 besides exploring possible gender differences for the collected information. Data were collected from the admission register and clinical records of those patients who were admitted to the San Lazzaro Psychiatric Hospital receiving a diagnosis of pellagra at their first admission. The pellagrous patient population was characterised by a higher rate of hospitalisation for women (64.3%) and the number of hospitalised patients suffering from pellagra gradually decreased from 1901 (78; 8.3%) to 1910 (8; 0.7%). The most common profession for men admitted with pellagra was farmer/agricultural labourer, while most of the women were housewives. A characteristic shared by both the male and female population of inpatients was very high rate of illiteracy: only one patient was recorded as being able to read and write. The generic diagnosis of “mental illness from pellagra” was predominant (70%), while “dementia from pellagra” accounts for 17.85% of the admission diagnoses: no statistically significant differences between men and women were found in the frequency of diagnosis. Half of the patients, both men and women, died while being inpatients. This study confirms previous findings about the case mix of pellagra patients admitted to psychiatric hospital at the beginning of the last century in northern Italy and highlights the significance of the relationship of psychiatry with other medical disciplines and the sociocultural milieu.

Keywords: Pellagra; Asylum; Twentieth century; History of psychiatry.

Introduction

Pellagra is a multisystemic disease caused by severe deficiency of niacin, also known as vitamin B3 or PP (from pellagra-preventing factor). Its most common aetiology is inadequate dietary intake, especially in diets based almost exclusively on cereals with poor niacin and tryptophan (a precursor of niacin)

content, such as maize or millet. Chronic and severe niacin deficiency disrupts various fundamental metabolic pathways involved in protein synthesis, energy production and DNA repair. Initial and most evident manifestations of pellagra are cutaneous, in the form of sunburn-like erythematous lesions most evident in sun-exposed areas, developing in hyperpigmented, scaling and hyperkeratotic areas. Therefore, it is named

as “pellagra” (from “pelle”=skin and “agra”=rough). Symptoms are initially nonspecific with weakness, loss of appetite and nausea evolving into severe diarrhoea and gastrointestinal bleeding. The course is typically accompanied by emotional, psychiatric and neurological changes. Psychiatric symptoms include lethargy, irritability, and apathy. In more advanced stages, the symptoms include hallucinations and delusions with persecutory ideation often accompanied by cognitive dysfunction. Cognitive deficits may be present as dementia, but are usually associated to confusion as in typical delirium. If left untreated, death ensues within a few months in severe cases. The fundamental role that niacin and tryptophan play in the synthesis of serotonin and in the kynurenine pathway is perceived to be the main cause of the neuropsychiatric manifestations (1).

The initial medical descriptions of pellagra date back to the mid of the eighteenth century in Spain and Italy due to the diffusion among poor peasants of diets based almost exclusively on maize, imported from America and grown more and more intensively in southern Mediterranean Countries. The Italian Francesco Frapolli is credited with one of the first published descriptions of the illness in 1771 (“Animadversiones in morbum vulgo pelagram”) (2). Mariani-Costantini & Mariani-Costantini (3), Ginnaio (4), Gentilcore (5) and Gentilcore & Priani (6) have scholarly outlined the epidemiological and social history of the diffusion of pellagra in Northern Italy (especially in farm labourers of the fertile padan lowlands regions of Lombardy, Veneto and Emilia, the so called “pellagra triangle”) and documented the medical and public health debate on the etiopathogenesis of the disease caused by the recognition of its association with poor socioeconomic conditions and exclusively maize based diets.

Dr. Joseph Goldberger of the U.S. Public Health Service is credited for having proved the case for dietary deficiency during 1914–1915 (7). However, in 1937, the discovery that the deficiency of niacin causes pellagra (8) put a definitive end to the many speculations which had developed to explain the illness diffusion. In fact, two major theories had emerged. The association with an exclusive cornmeal diet by poor farm labourers had been recognised early by various scientists, consequently leading to a “deficiency” hypothesis.

An alternative, wrong explanation which nevertheless prevailed for decades, was the so called “toxic” theory which posited that pellagra was caused by the ingestion of corn contaminated by moulds or fungus. One of the most convinced proposer and defender of the toxic hypothesis was the famous psychiatrist and anthropologist Cesare Lombroso. Various commentators have noted how this second theory may have found more favour in the ruling classes since it did not directly call for radical important social reforms addressing the exploitation of labourers condemned by miserable wages to a cheap exclusive corn diet (3,9)].

Pellagra peaked in Northern Italy in the 1870s – 1880s with a gradual decline up to the first world war. Adult farm labourers in the 25–45 age range were the most affected (4).

Given the high frequency of neuropsychiatric manifestations of the illness, patients with severe pellagra represented a significant percentage of admissions to psychiatric asylums of North Italian regions in the second half of the nineteenth and first two decades of the twentieth century. Numerous administrative statistical tables and published reports exist that describe this population of patients. In 1881, the Director of Ferrara psychiatric hospital published a report concerning 85 admissions of pellagra patients admitted in 1879 (10). Priani has recently reviewed historical records, publications and etiological theories pertaining to pellagra patients admitted in years 1840 to 1900 in Venetian psychiatric hospitals in comparison to those dealing with the general paralysis of the insane (end stage manifestation of neurosyphilis) in UK asylum. Admission rates of pellagra patients in the second half of the nineteenth century in Venice were on average around one third of the total admissions (11).

Women were more vulnerable. This is not surprising since women usually had a poorer diet than men who were the first to eat during meals before women and children. Pregnancies and lactation also cause higher dietary requirements of niacin, while female sexual hormones reduce its availability (4).

The two aims of this study are: 1) to describe the socio-demographic and clinical characteristics of patients affected by pellagra admitted to “San Lazzaro” psychiatric asylum from 1901 to 1910; 2) to test the possible presence of gender differences (male popula-

tion vs female population) for the collected socio-demographic and clinical information.

Materials and Methods

The “San Lazzaro” asylum was established in Reggio Emilia (Italy) as “Stabilimento Generale delle Case de’ Pazzi degli Stati Estensi” (General Madhouse of the Estense States) in 1821 by Duke Francesco IV d’Este who realised a real architectural and organisational revolution of the area previously used as a leper colony since the 12th century and as a refuge for people with a physical or mental disability since the 16th century (12,13).

With the Directors Carlo Livi (1873-1877) and, after his death, Augusto Tamburini (1877-1907), San Lazzaro asylum gained relevance both at national and international level. During these years, the asylum underwent substantial structural developments. Its size grew in order to host an increasing number of patients (421 in 1873, 599 in 1877, 961 in 1900, up to 2,038 in 1940). Moreover, in order to sustain such a huge number of admissions, the asylum had to become economically self-sufficient, exploiting committed patients for useful work (ergotherapy) (14). The thirty-year period of direction by Augusto Tamburini, in particular, brought to the asylum both organisational and scientific innovations. The former encompassed the so-called “scattered asylum”, turning the asylum into a kind of village, where inpatients lived as they were in a parallel society. Most importantly, for the first time, they were positioned according to the gender, social status, and illness severity. This led to the foundation of many sections, up to 11 at the beginning of 1900, citing as examples for “chronic tranquil”, “dirties semi-agitated”, “over-excited women” and “well-of patients” among the others (15). Regarding scientific developments, Augusto Tamburini and colleagues aimed to move beyond the classic alienist paradigm to make San Lazzaro asylum a clinic for mental diseases. He turned the scientific cabinet, established by the former Director Carlo Livi, into proper laboratories furnished with advanced tools and devices, where researches on bacteriology, histology, chemistry, and psychology were conducted. Moreover, Tamburini took the lead of

the journal founded by Carlo Livi in 1875 (16), “*Rivista Sperimentale di Freniatria e Medicina Legale delle Alienazioni Mentali*” (still running as “*Rivista Sperimentale di Freniatria - The Italian Journal of Mental Health*”), yielding advanced scientific reports in the fields of neuroanatomy, neurophysiology and experimental psychology (17). Many important psychiatrist and scientists published their researches in the journal “*Rivista Sperimentale di Freniatria*” (18,19) and visited the asylum (e.g. Jean-Martin Charcot in 1881, Emil Kraepelin in 1893) (17).

During the direction of Augusto Tamburini, the clinical records of admitted patients became more complex and complete, with one section including anamnestic information and another registering the physical and psychological examination of the patient (20). Yet, it took many years from the introduction to obtain an accurate and homogeneous compilation. In addition, it is believed that only by the beginning of 1900, the information gathered in the clinical records became reliable and conventional, though still rudimentary (21). For these reasons, data used in this study were collected from the register and clinical records of patients admitted to the San Lazzaro Psychiatric Hospital in the decade 1901-1910 (period of maximum realisation of Tamburini’s “scattered asylum” project and better compilation of the clinical records). This study entails every patient first admitted and not re-hospitalisations. All patients who had received a diagnosis of pellagra at or during their first admission were identified and for each of them the following variables were collected: age, gender, year of admission to the psychiatric hospital, diagnosis at admission, province of birth, province of residence, work status, ability to read and write, institution that ordered hospitalisation, relapse after discharge and death during hospitalisation. Scalar variables were described by the mean and the standard deviation, while categorical and ordinal variables were described by the absolute and percentage value. The Anova test was used to check for differences statistically, over the years, for the age and the number of patients hospitalised with the diagnosis of pellagra. The t test and the chi square test were used to check for statistically significant differences between the male and female population for scalar and categorical variables, respectively.

Results

Table 1 describes the number and proportion of all admissions of patients hospitalised with diagnosis of pellagra at the Psychiatric Hospital “San Lazzaro” in years 1901-1910. The year with the highest proportion of pellagra admission was 1901 (N=78, 8.3% of 935), while the year with the most hospitalised patients was 1910 (with pellagra N=8, 0.7% of 1202).

Figure 1 describes the percentages relating to the gender ratio of the admitted population with pellagra. The male population varies between 22.2% in 1907 and 75% in 1910 and there is no statistically significant difference between the two subpopulations taking into consideration the entire decade: $\chi^2=9.64$; $df=9$; $p=0.38$.

The mean age of the entire population of patients suffering from pellagra was 55.2 (SD=±12.2): the minimum average age was recorded in 1906 (53.5; SD=±12.5), while the highest age was recorded in 1908 (60.1; SD=±12.1). The largest variation range was identified in 1901: the youngest patient was 20 years old, while the oldest patient was 79 years old.

The mean age of male population for the entire period is 59.83 (SD=±11.04), while the mean age of the female population is 52.59 (SD=±12.01). As described in figure 3, the mean age of male population ranges from 51 (1909; SD=±10.44) to 70.25 (1907; SD=±4.57), while female population ranges from 49.65

(1906; SD=±10.30) to 71 (1910; SD=±15.56). There is no statistically significant difference in the average age between the male and female population between the various years under study (F=0,04; $df=1$; $p=0.86$).

The most common recorded diagnosis was “mental illness from pellagra” (N=238) which affected 86.4% of female population and 68.9% of male population. The second most common diagnosis was “severe senile dementia from pellagra” which was almost equal for male and female population (Male: 17.9%; Female: 17.8%). No statistically significant differences were

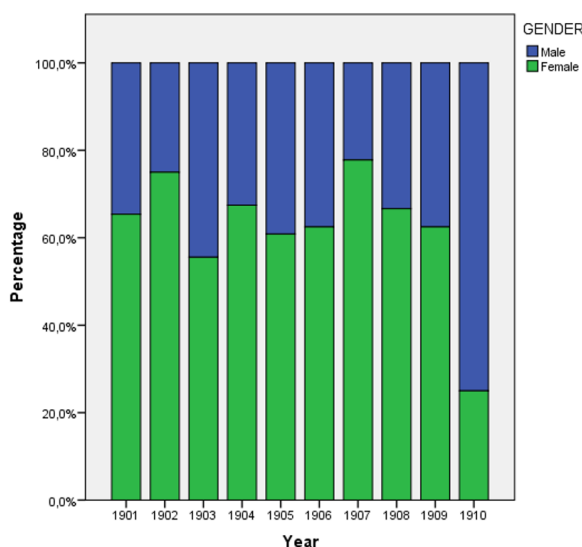


Figure 1. Percentage of male/female population, per year, of patients admitted to San Lazzaro psychiatric hospital suffering from pellagra.

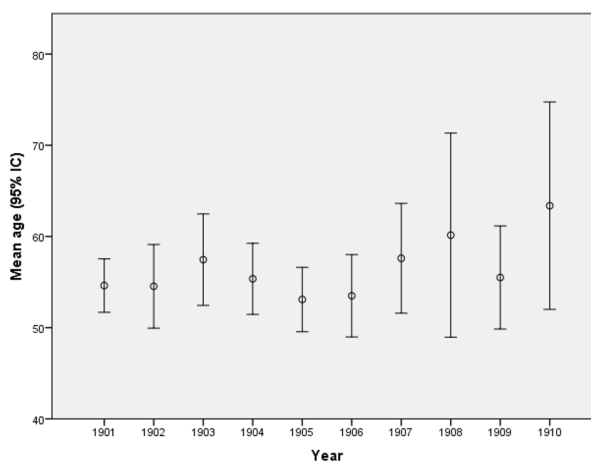


Figure 2. Mean age, per year, of patients admitted to San Lazzaro psychiatric hospital suffering from pellagra.

Table 1. Number of patients admitted to San Lazzaro psychiatric hospital per year and number (percentage) of those suffering from pellagra.

Year	Patients present in the “San Lazzaro” asylum at 00.00 am on 1 January of each year	Patients with a diagnosis of pellagra per year (percentage over total number of admissions)
1901	935	78 (8.3%)
1902	997	28 (2.8%)
1903	1036	27 (2.6%)
1904	1049	43 (4.1%)
1905	1116	46 (4.1%)
1906	1187	32 (2.7%)
1907	1159	18 (1.6%)
1908	1133	9 (0.8%)
1909	1163	8 (0.7%)
1910	1202	8 (0.7%)

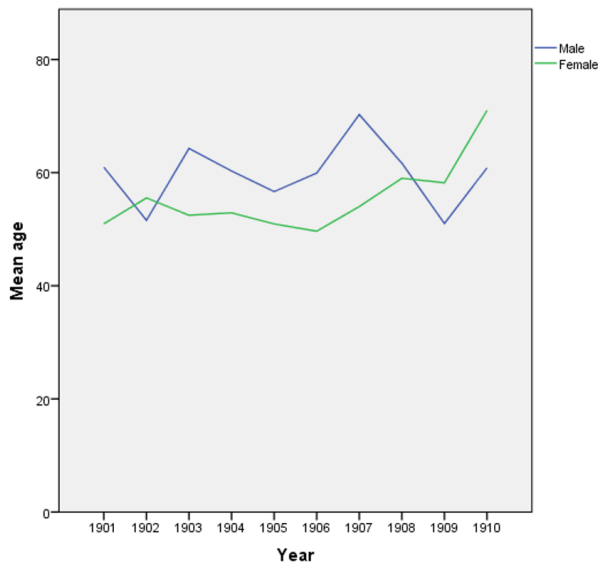


Figure 3. Mean age, per year and gender, of patients admitted to San Lazzaro psychiatric hospital suffering from pellagra.

found regarding the distribution of diagnoses in the two different subpopulations ($\chi^2=7.55$; $df=6$; $p=0.27$).

Half of the patients were born in the province of Reggio Emilia where they also resided (Table 3 and 4). There was no statistically significant difference be-

tween the male and female population with respect to the province of birth ($\chi^2=2.44$; $df=2$; $p=0.30$) and the place of residence ($\chi^2=3.32$; $df=2$; $p=0.19$).

Farmer and farm labourer were two main occupations (Table 5) adopted before admission: (57.9% of the entire population; 80.19% of the male population and 45.6% of the female population). A high percentage of women (39.3%) were housewives.

The educational level of patients hospitalised for pellagra did not show significant differences between the male and female population ($\chi^2=0.54$; $df=1$; $p=0.65$): about 2 out of 3 people were positively recorded as illiterate and only one woman, in the whole population, was able to read and write (Table 6).

Most of the hospitalisations were ordered by the mayor of the country of residence ($N=186$; 62.6%) or by the magistrate ($N=70$; 23.6%) (Table 7). In the two subpopulations (male and female), there are no statistically significant differences ($\chi^2=1.41$; $df=2$; $p=0.50$): the greatest number of hospitalisation requests were made by the mayor (male: 61.32%; female: 63.35%).

16.16% of first admitted patients ($N=48$) suffering from pellagra had at least one relapse with readmission once discharged from the psychiatric hospital.

Table 2. Diagnoses given to patients suffering from pellagra admitted to San Lazzaro psychiatric hospital in years 1901-1910

Diagnosis	N (% of entire population suffering from pellagra)	Male	Female	Difference between male and female population
		N (% of entire male population suffering from pellagra)	N (% of entire female population suffering from pellagra)	
Mental illness from pellagra (“Frenosi pellagrosa”)	208 (70%)	73 (68.9%)	135 (86.4%)	$\chi^2=7.55$; $df=6$; $p=0.27$
Severe senile dementia from pellagra (“Demenza senile pellagrosa grave”)	53 (17.9%)	19 (17.9%)	34 (17.8%)	
Severe mental illness from pellagra (“Frenosi pellagrosa grave”)	11 (3.7%)	6 (5.7%)	5 (2.6%)	
Typhus from pellagra (“Tifo pellagroso”)	10 (3.4%)	2 (1.9%)	8 (4.2%)	
Melancholy from pellagra (“Lipemania pellagrosa”)	9 (3%)	3 (2.8%)	6 (3.1%)	
Manic state from pellagra (“Eccitamento maniacale pellagroso”)	2 (0.7%)	2 (1.9%)	0	
Mental illness in cachectic pellagra (“Frenosi pellagrosa cachettica”)	2 (0.7%)	0	2 (1.1%)	
Missing	2 (0.7%)	1 (0.9%)	1 (0.5%)	

Table 3. Province of birth of patients affected by pellagra admitted to San Lazzaro psychiatric hospital in years 2001-2010

Province	N (% of the entire population suffering from pellagra)	Male	Female	Difference between male and female population
		N (% of the entire male population suffering from pellagra)	N (% of the entire female population suffering from pellagra)	
Reggio Emilia	150 (50.5%)	52 (51%)	98 (51.9%)	$\chi^2=2.44$; $df=2$; $p=0.30$
Modena	119 (40.1%)	39 (38.2%)	80 (42.3%)	
Other province	22 (7.4%)	11 (10.8%)	11 (5.8%)	
Missing	6 (2%)	4 (3.8%)	2 (1.1%)	

Table 4. Province of residence of patients affected by pellagra admitted to San Lazzaro psychiatric hospital in years 2001-2010

Province	N (% of the entire population suffering from pellagra)	Male	Female	Difference between male and female population
		N (% of the entire male population suffering from pellagra)	N (% of the entire female population suffering from pellagra)	
Reggio Emilia	148 (49.8%)	54 (50.9%)	94 (49.2%)	$\chi^2=3.32$; $df=2$; $p=0.19$
Modena	134 (45.1%)	44 (41.5%)	90 (47.1%)	
Other province	14 (4.7%)	8 (7.6%)	6 (3.1%)	
Missing	1 (0.3%)	0	1 (0.3%)	

In particular, the percentage of men (N=25; 23.6%) who had a relapse was double than that of women ($\chi^2=6.70$; $df=1$; $p=0.01$) (Table 8).

Half of the hospitalised patients affected by pellagra (N=148; 49.8%) died during admission and the same percentage is found in both the male (N=51; 48.11%) and female population (N=97; 50.8%) (Table 9).

Discussion

The aim of the study was to describe the characteristics of patients admitted to “San Lazzaro” psychiatric asylum from 1901 to 1910 affected by pellagra besides exploring possible gender differences.

Before discussing results, some limitations of the study need to be acknowledged: 1) We applied quantitative methods to the collected data without conduct-

Table 5. Occupation before admission of patients affected by pellagra admitted to San Lazzaro psychiatric hospital in years 2001-2010

Work	N (% on entire population suffering from pellagra)	Male	Female	Difference between male and female population
		N (% on entire male population suffering from pellagra)	N (% on entire female population suffering from pellagra)	
Farm labourer	172 (57.9%)	85 (80.2%)	87 (45.6%)	$\chi^2=58.11$; $df=2$; $p<0.001$
Housewife	75 (38.1%)	0	75 (39.3%)	
Other work	19 (9.6%)	10 (9.4%)	9 (4.7%)	
Missing	31 (10.4%)	11 (10.4%)	20 (10.5%)	

Table 6. Educational level of patients affected by pellagra admitted to San Lazzaro psychiatric hospital in years 2001-2010

Educational level	N (% on entire population suffering from pellagra)	Male	Female	Difference between male and female population
		N (% on entire male population suffering from pellagra)	N (% on entire female population suffering from pellagra)	
Illiterate	197 (66.33%)	69 (65.1%)	128 (67.0%)	$\chi^2=0.54$; $df=1$; $p=0.65$
Able to read and write	1 (0.3%)	0	1 (0.5%)	
Missing	99 (33.3%)	37 (34.9%)	62 (32.5%)	

Table 7. Authority that ordered hospitalization of patients affected by pellagra admitted to San Lazzaro psychiatric hospital in years 2001-2010

Authority	N (% on entire population suffering from pellagra)	Male	Female	Difference between male and female population
		N (% on entire male population suffering from pellagra)	N (% on entire female population suffering from pellagra)	
Mayor	186 (62.6%)	65 (61.3%)	121 (63.4%)	$\chi^2=1.41; df=2; p=0.50$
Magistrate	70 (23.6%)	24 (22.6%)	46 (24.1%)	
Other authorities	21 (7.1%)	10 (9.4%)	11 (5.8%)	
Missing	20 (6.7%)	7 (6.6%)	13 (6.8%)	

Table 8. Patients affected by pellagra admitted to San Lazzaro psychiatric hospital in years 2001-2010 who have had a relapse once discharged

Relapse	N (% on entire population suffering from pellagra)	Male	Female	Difference between male and female population
		N (% on entire male population suffering from pellagra)	N (% on entire female population suffering from pellagra)	
Yes	48 (16.2%)	25 (23.6%)	23 (12.0%)	$\chi^2=6.70; df=1; p=0.01$
No	249 (83.8%)	81 (76.4%)	168 (88%)	

ing an in-depth historical and nosographical analysis which was beyond the scope of the paper; 2) The data were collected from the archived records of the “San Lazzaro” psychiatric hospital and some variables had several missing values; 3) The population under study concerns a precise geographical location, therefore findings may not be generalised at a national level.

The pellagrous patient population of San Lazzaro psychiatric hospital in the decade 1901-19010 was characterised by a higher rate of hospitalisation for women (64.3%) than that for men (35.7%). The data confirm what has already been described for the overall admitted population by Ferrari (22) who observed that in the period 1901-1907, the women hospitalised at San Lazzaro represented 62.3% against 34.7% of men. The results are also consistent with the motivations proposed by De Bernardi: at the beginning of the century, peasant families were mostly in economic hardship and were therefore forced to ration food. Priority

was therefore given to men as they needed stamina to work in the fields and be able to guarantee a minimum supply to their families (23). It is therefore not surprising that women were more affected by conditions, such as mental disorders related to pellagra, caused by nutritional deficiencies.

About half of the population with pellagra admitted in the decade under study consisted of patients residing in the Reggio Emilia (49.8%) or Modena (45.1%) provinces: these two provinces were in fact the catchment area of the Psychiatric Hospital. The remaining patients mostly came from the provinces of Mantua, Bologna, Ferrara and Padua which also, with the two already mentioned provinces, were part of the so-called “pellagra triangle” considering the high prevalence of the disease (24). 1903 was the year with the most admissions of pellagrose patients coming not from Reggio Emilia and Modena, but mostly residing in the Veneto region. This finding can be associ-

Table 9. Patients diagnosed with pellagra admitted to San Lazzaro psychiatric hospital in years 2001-2010 who died during hospitalization

Patient died	N (% of the entire population suffering from pellagra)	Male	Female	Difference between male and female population
		N (% of the entire male population suffering from pellagra)	N (% of the entire female population suffering from pellagra)	
Yes	148 (49.8%)	51 (48.1%)	97 (50.8%)	$\chi^2=16.29; df=15; p=0.36$
No	149 (50.2%)	55 (51.9%)	94 (49.2%)	

ated to the scandal that in 1902 hit the “San Servolo” Psychiatric Hospital in Venice where Father Camillo Minoretti was exonerated as director and removed from the asylum together with the other friars who worked there, following a governmental inspection which found that inpatients were kept in inhumane conditions. Until the appointment of the new director (1904), the pellagrose patients of the region probably had to move to the neighbouring psychiatric hospitals including the “San Lazzaro” in Reggio Emilia (25).

It is interesting to note that the number of hospitalised patients suffering from pellagra gradually decreased (except for 1904 and 1905) from 1901 to 1910. We can hypothesise that the decrease is in relation to the enactment, in 1902, of the law 427 entitled “Prevention and treatment of pellagra” (26) which acted on two fronts: the ban on trading milled corn, which was thought to be an etiological factor, and the improvement in farmers’ quality of life. The reduction in the number of hospitalised patients suffering from pellagra is also in line with the observations present in the literature which showed that in Italy, in the period 1881-1910, there was a reduction of 66.67% in the cases of pellagra (24). Moreover, it could be supposed that this reduction is the result of the enactment of the Giolitti Law (“Disposizioni sui manicomi pubblici e privati”, Instructions for public and private asylum) (27) which limited the access to the asylum only to people believed dangerous for themselves and the others or of public scandal, thus limiting the possibility to admit patients needing care, though not dangerous, as might be some of those affected by pellagra (28).

It is also not surprising that the profession most practiced by admitted men with pellagra is that of the farmer/agricultural labourer which confirms that pellagra was, to a considerable extent, a professional disease. The peasants, sharecroppers or labourers were deprived of a considerable part of the fruits of their labour which were destined to the landowner. In this way, they were not even able to secure the minimum income to support themselves (22). Among the jobs carried out by the patients, there are no clerical or professional jobs that at the time were the prerogative of the wealthy: different studies (22,23,29) have shown that labourers were the main category of the popula-

tion affected by pellagra due to the socio-economic conditions in which they lived.

A characteristic shared by both the male and female population under study is very high rate of illiteracy: of the whole sample, only one patient is recorded as being able to read and write. The legislation prevailed in period 1901-1910 actually provided compulsory schooling up to the age of 12. Notwithstanding, looking at the mean age of the sample (55.2, SD=±12.2 y.o.) clearly figures out that when they were children of academic age, school was not mandatory yet (30).

Before considering psychiatric diagnoses associated with pellagra in the admitted population, two remarks will be useful. In the decade 1901-1910, there were no operational diagnostic classification systems such as the Diagnostic and Statistical Manual of Mental Disorders (DSM) (31) or the International Classification of Diseases (ICD) (32). Moreover, until 1976, in Italy, the medical specialisations in neurology and psychiatry were not separated (33). In the population analysed, multifaceted neuropsychiatric symptoms have been described. The generic diagnoses of mental illness from pellagra (“Frenosi pellagrosa”) and the subtype severe mental illness from pellagra (“Frenosi pellagrosa grave”) are predominant overall (70% and 3.7% respectively). These forms of disease are characterised by not specific neuropsychiatric manifestations, mostly hallucinations and impaired consciousness, due to a cerebral suffering by malnutrition and physical frailty, which is what we call today “psychiatric disorder due to a medical condition” (23). The form of illness termed as severe cognitive impairment (severe senile dementia from pellagra - “Demenza senile pellagrosa grave”) accounts for 17.9% of the admission diagnoses, not surprisingly, since dementia is part of the diagnostic triad of the pellagra disease along with Dermatitis and Diarrhoea (34). Accordingly, diagnoses describing primary intestinal involvement are also represented among the sample, namely Typhus from pellagra (“Tifo pellagroso”, 3.4%) and Mental illness in cachectic pellagra (“Frenosi pellagrosa cachettica”, 0.7%), whose neuropsychiatric manifestation were probably alike to those documented for the epidemic typhus, thus initial weakness and encephalitis-like progression with impaired consciousness and delirium (35). Finally, lower percentages of affective disorders

(Melancholy from pellagra - “Lipemia pellagrosa” or Maniacal state from pellagra - “Eccitamento maniacale pellagroso”) were found (3%, and 0.7%, respectively). According to Esquirol, who coined the term, “Lipemia” was a disease of the brain characterized by sadness which is often debilitating and overwhelming, corresponding to modern severe depression (36). Conversely, “Mania” appears as a condition marked by excitement of the psychological and motor functions. In mania ideas are fast and mixed up and there are descriptions of manic women in the asylum often screaming or singing, and of men usually speaking of themselves with prominence in contrast with reality, being mostly poor peasants, without culture or literacy (37). Even though the concept of manic-depressive psychosis had been already introduced by Kraepelin at the end of the XIX century (38), at San Lazzaro asylum, the two manifestations of the disorder have been classified and treated as separate basing on the symptomatic criterion. Some of the people affected by these forms of neuropsychiatric disorders associated to pellagra died by committing suicide (23).

To understand the number of relapses with re-admission (16.2%), it might be interesting to reflect on the season in which the patient needed a further hospitalisation. The incidence of pellagra had a strong connotation of “seasonality”, wherein there was an increase in cases in spring due to the need, on the part of farmers, to reduce their diet to the few foods available after the long and harsh winter (22).

Finally, we consider it necessary to reflect on the extremely high mortality rate that distinguishes the mental hospital population affected by pellagra. The patients with pellagra admitted did not have many possibilities to improve or heal due to the inadequacy of the treatment given the unknown aetiology of the condition. The asylum admission represented often a “refuge” more than an effective treatment option for the multitude of peasants who suffered from pellagra at the beginning of the last century. They represented a burden for the family (they could not work but had to eat) which forced family members to have them admitted: the hospitalisation of their family member thus became a real survival strategy for the entire family. However, most of these patients received in the asylum a better and more balanced diet than what they

received at home, which explains the improvement allowing discharge shown by many patients.

Conclusions

This study confirms previous findings about the case mix of patients with pellagra admitted to psychiatric hospital in a specific decade in the region where authors live (Emilia-Romagna). These results are a good example of two important characteristics of the psychiatric discipline that are always useful to keep in mind: psychiatry addresses conditions closely connected with all the other medical disciplines and strongly linked to the socio-economic context where people live.

Conflict of interest

The authors have no financial interest in the subject matter or materials discussed in this manuscript. The authors declare that there is no conflict of interest regarding the publication of this article.

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