

Original Article**Migrants rescued on the Mediterranean Sea route: nutritional, psychological status and infectious disease control**

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Abstract

Introduction: North Africa has become a key migratory hub where a large number of migrants attempt the journey by sea from the Libyan coastline to the south of Europe. In this humanitarian disaster scenario, the Mediterranean route has been one of the most used by illegal boats.

Methodology: In this report, the state of physical and psychological health of a cluster of Eritrean migrants, escaped from Libya and rescued in the Mediterranean Sea after a shipwreck, was described by epidemiological, clinical and laboratory investigations.

Results: Data suggest that despite the majority of the migrants being apparently in good health upon a syndromic surveillance approach, most of them suffered a decline in psychological status as well as severe malnutrition. The emergence of infectious diseases, related to poor living conditions during the journey, is not a rare event.

Conclusion: The present report highlights the risks of failures of the syndromic medical approach in the setting of the extremely challenging migration route and underlines migrant frailties consequent to a prolonged journey and long period of detention. These stressors, which can degrade the initial health condition of traveling migrants, can lead to a premature "exhausted migrant effect" that should be carefully investigated in order to avoid the early emergence of diseases related to frailty.

Key words: Surveillance; laboratory blood screening; migrants; healthy migrant hypothesis; exhausted migrant effect.

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Introduction

Since 2014, an unprecedented increase in the number of migrants, refugees and asylum seekers trying to enter Europe has been observed [1,2]. In this period, North Africa has become a key migratory hub

characterized by a large number of inter-regional movements of migrants. Many of them are fleeing protracted conflicts in the Middle East and Africa, and looking to attempt the journey by sea from the Libyan coastline to the south of Europe.

In this humanitarian disaster scenario, the central Mediterranean route (which refers to the sea journey from North Africa to Italy) has been one of the most consistently used by illegal boats carrying migrants [3,4]. According to Frontex data, from 2014 to 2018, more than 648,000 migrants arrived to Italy through this route; the top three nationalities involved in this migration flux were Nigerians, Eritreans and Guineans. [4]

The danger of the journey is documented by the frequent shipwrecks and daily rescue operations conducted by coastal guards, non-governmental organizations and commercial ships that cross on the same route. Moreover, before attempting to cross the Mediterranean Sea, migrants often stay for long periods in Libyan detention camps, victims of mistreatment and torture. Although most migrants leave their countries of origin in apparent good health, all these factors can contribute to a condition of vulnerability and fragility that can significantly compromise health assets [5,6].

This concept is partially summarized in the so-called “healthy migrant hypothesis”, stating that a self-selection of subjects better prepared to confront

Figure 1. The migrant boat travel across the *Mediterranean Sea* and the Italian “*Ubaldo Diciotti*” coast guard offshore patrol vessel rescue operation (Layout Shapefile from Environmental Systems Research Institute (ESRI) Free Distribution; <https://tapiquen-sig.jimdofree.com/english-version/free-downloads/world/>; mapping created by QGIS 3.10 ©Copyright 2002-now).



stressful situations takes place within the native community before departure in order to increase the probability of success of the migration project.

In this perspective, it is reasonable to assume that people in better health conditions have an advantage and therefore the state of health at the start of the journey can be considered a determinant of success.

In agreement, the so-called “exhausted migrant effect” describes that the healthy condition at the departure might decrease with time and after arriving at the destination of the migration route. This effect can probably be due to a combination of environmental and behavioural changes: different climate and eating habits, unemployment and lack of income, degraded housing, absence of community support, psychological discomfort, and finally difficulty in accessing both social and health services [7-8]. A bias against the “exhausted migrant effect” hypothesis is the possibility that the deterioration of the state of health occurred already before the arrival in the host country, as a result of the geographical, climatic, environmental, social, and political obstacles encountered during the journey.

For these reasons, the knowledge of the health status of migrants departing from the Libyan coasts is of fundamental importance for setting up policies that facilitate reception and the protection of public health. However, currently few medical data and no systematic studies are available. In this report, we describe, for the first time to the best of our knowledge, the state of health of a cluster of Eritrean migrants who had embarked in Libya and were rescued in the Mediterranean Sea while trying to reach the Italian coasts.

Description of the events

In August 2018, an international rescue operation by the Italian Coast Guard ship “*Ubaldo Diciotti*”, saved 190 migrants (almost all from Eritrea) who had embarked on an overcrowded boat, attempting to cross the Mediterranean Sea from Libya, between the islands of Lampedusa and Malta (Figure 1). This rescue operation, similar to many others in recent years, jumped to the headlines and was followed by international mass media as the migrants were held on board the military vessel for about ten days as a result of a diplomatic crisis between Italy and the European Union (EU). In order to solve the divergent views on the reception modalities and on the redistribution plan of the rescued persons among the EU member states, the Vatican State, Albania and Ireland offered their willingness to take care of the migrants.

While waiting for resolution of the diplomatic crisis, the migrants remained on board the ship, first sailing towards Sicily and then anchored in Catania's harbour. The medical evaluation of the migrants' state of health, carried out on board the ship, identified 30/190 (15.8%) people who were immediately disembarked and hospitalized for suspected transmissible pathologies or acute diseases. Besides these, a further 27/190 (14.2%) unaccompanied minors left the vessel early. The other migrants remained on board until the crisis was solved, having been judged to be in sufficiently good health by the syndromic evaluation [9-11]. The syndromic surveillance protocol used, created by the Italian Ministry of Health in collaboration with the National Centre for Epidemiology, Surveillance and Health Promotion of the National Institute of Health, was based on a total of 13 syndromes defined as potentially indicative of infectious diseases and/or unusual adverse health events (syndromes under surveillance included: respiratory tract disease, suspected tuberculosis, bloody diarrhoea, watery diarrhoea, fever and rash, meningitis/encephalitis or encephalopathy/delirium, lymphadenitis with fever, botulism-like illness, sepsis with or without shock, or unexplained shock, haemorrhagic illness, acute jaundice, parasitic skin infection, unexplained death) [12].

Ten days after arriving in Catania, all migrants on board were disembarked and temporarily hosted at the Asylum Seekers Center (ASC) of Messina; of these, 100 (52.6%) Eritrean migrants welcomed by the Italian Catholic Church were transferred to the Extraordinary Reception Center (ERC) "Mondo Migliore" of Rocca di Papa. The other 31.6% were hosted in reception centres outside of Italy, in European Countries.

Methodology

Epidemiological and clinical data collection

At their arrival at the ERC Mondo Migliore, all migrants received medical and psychological evaluation by individual interview with the support of a cultural mediator. Clinical data were recorded at the medical ambulatory clinic managed by a team of physicians accredited in internal medicine and infectious diseases, psychologists, nurses and cultural mediators. A medical screening visit was performed on arrival for all migrants [13-16].

Tuberculosis screening

A specific interview for tuberculosis (TB) included information on the following eight items: history of previous TB, contact with TB, cough in the last 3

weeks, fever in the last 7 days, night sweats, loss of weight > 10%, haemoptysis in the last 3 months, and thoracic pain. Moreover, the Mantoux skin test and interferon-gamma release assay (IGRA) were used to screen for tuberculosis. Tuberculosis screening was conducted by a two-stage process beginning with a test for tuberculosis infection. The second stage, consisting of the chest radiography (X-ray), was performed only among migrants with Mantoux skin test indurations > 5 mm in diameter, and/or a positive IGRA and/or on the basis of a positive results of TB questionnaire and physical examination [17].

Psychological screening

The psychologist team administered the Refugee Health screener-15 (RH-15), a new approach based on a fifteen-item screen for symptoms of depression, anxiety, and post-traumatic stress disorder (PTSD) [18-20].

Items 1–14 ask respondents to rate the frequency of psychological and somatic symptoms on a 4-point Likert scale scored 0 ('not at all') to 4 ('extremely') and diagrammatically annotated with a beaker filled to varying degrees. Item fifteen is a distress thermometer (DT), which asks respondents to rate their level of distress from 0 ('no distress') to 10 ('extreme distress'). A total score ≥ 12 on items 1–14 and/or a score of ≥ 5 on the DT are considered to be a positive screen requiring further assessment.

Laboratory blood screening

Besides medical and psychological evaluation, in 70/100 Eritrean migrants laboratory blood screening was also carried out, including biochemical and hematologic exams. Written informed consent was obtained from all the subjects in presence of cultural-linguistic mediators. After collection, blood samples were received and analyzed at the Laboratory Unit of the University Hospital Campus Bio-Medico of Rome. The laboratory screening included blood cell count, C-Reactive Protein (CRP); Aspartate Aminotransferase (AST) and Alanine Aminotransferase (ALT); blood urea nitrogen (BUN) and creatinine; lactate dehydrogenase (LDH); serum total protein (TP), albumin; folic acid; cobalamin and vitamin D-25OH. For laboratory screening, normal reference intervals validated for the Eritrean population were used [21,22]. These blood tests allowed us to detect issues related to anaemia, iron deficiency, inflammation, malnutrition, renal and liver function. Furthermore, serological screening for hepatitis B/C and HIV was performed [23].

Results

Migrants hospitalized early for acute diseases or suspected transmissible pathologies

As previously reported, 30 (15.8%) migrants were disembarked early and hospitalized for suspected transmissible pathologies or acute diseases. Among these, 13 people were initially landed in Lampedusa and Porto Empedocle in Sicily to attend to their clinical conditions: three children with scabies together with their family, a woman who had a miscarriage, and three men, one with lymphedema, one with severe abdominal pain and one in a hypotensive state due to dehydration. When the ship reached Catania's harbour, an additional six men and seven women were ordered off the boat by the medical staff and taken to Catania's Garibaldi hospital. The women were admitted for the treatment of trauma caused by repeated rapes. Three men were isolated for suspected tuberculosis, five for suspected scabies, two for pneumonia and one for urinary infection. After preliminary medical evaluation, two migrants were admitted to the Infectious Diseases Department for pulmonary tuberculosis, and one to the Pneumology Department for community acquired pneumonia.

The syndromic surveillance did not reveal signs and/or symptoms compatible with emerging pathologies.

State of health of migrants assessed in good clinical condition by syndromic evaluation

About two weeks after the rescue operations, all the migrants who had at first been assessed as being in good health through the syndromic evaluation carried out on board the ship, were landed. Of these, one hundred Eritrean migrants were transferred to and hosted by the Italian Catholic Church at the ERC "Mondo Migliore" of Rocca di Papa near Rome where the medical team had the opportunity to evaluate their state of health in more depth, as described in the following section.

Medical history and clinical evaluation

The demographic characteristics and data from the clinical examination on arrival at the ERC are reported in Table 1. Migrants had a median age of 24 years and were mostly men (92%) of Christian religion (99%) with good school education (10 years of education on average); the most common occupations were students (52%) and soldiers (35%). They declared to have left their country of origin between 11 and 21 months before their arrival at the ERC. This period was mostly spent in Libya as prisoners, where they were held in the dark,

eating once a day a shared meal divided among many, and being repeatedly beaten.

Regarding their past medical histories, one person had visual impairment due to childhood trauma, two had gunshot wounds, one had gastritis, and two, malaria episodes. In their recent medical histories, 55% had had scabies treatment, one underwent chest X-ray for cough (which was negative), one person had had treatment for impetigo and one for tonsillitis when they arrived at the first aid and reception center in Messina. At the first medical evaluation performed upon migrants' arrival at the ERC, there were no patients with alteration of vital parameters nor symptoms or signs indicating heart, respiratory, hepatic or renal diseases (Table 1).

Half of the migrants were underweight (BMI < 18.5); among these, 62% had a moderate/severe thinness (BMI < 17) of which 16% severe thinness (BMI < 16).

TB screening

The BCG immunization history was evaluated in all migrants, but reliable data were not obtained from the majority of subjects; for this reason, we assumed that all were potentially immunized with BCG at birth. None of the migrants resulted positive in the 8 item-interview specific for TB. The Mantoux skin test and IGRA were positive respectively in 43% and 36% of migrants hosted in the ERC, but none of the subsequent chest radiographs were suggestive of tuberculosis.

Table 1. Demographic Characteristics and Clinical Parameters of the "Diciotti" Eritrean Migrants on their arrival at the Extraordinary Reception Centre (ERC) "Mondo Migliore".

Demographic characteristics	Values
Age, median (min-max)	24 (18-50)
Male gender n (%)	92 (92%)
Christian religion n (%)	99 (99%)
Year of education, median (min-max)	10 (0-16)
Unmarried n (%)	67 (67%)
Occupational status n (%)	
Students	52 (52%)
Soldiers	35 (35%)
Farmers	9 (12%)
Workers	2 (3%)
Unemployed	2 (2%)
Clinical parameters	
Systolic arterial pressure mmHg, median (min-max)	100 (90-160)
Diastolic arterial pressure mmHg, median (min-max)	60 (50-90)
Heart rate	72 (53-100)
BMI	
> 18.5	50 (50%)
< 18.5	50 (50%)
Scabies rash	55 (55%)

Nevertheless, one young male, two days after his arrival in the ERC (before the screening results), presented with high fever and cough requiring hospitalization. A computed tomographic scan of the thorax revealed coarse mediastinal and hilar solid tissue of lymph node origin, pleural parietal thickening, blurred bilateral apical parenchymal thicks and some pulmonary nodules. Sputum, urine and blood were all negative for bacteria and acid-fast bacilli on both smears and mycobacterial cultures; however, IGRA was positive. Concurrent orchitis and epididymitis were also diagnosed. The discharge diagnosis was “disseminated tuberculosis” in an immunocompetent patient with clinical improvement after starting the anti-tuberculosis treatment.

Psychological screening

All migrants hosted at the ERC received a psychological evaluation by individual interview and the Refugee Health screener-15 (RH-15). Particular attention was paid to the mental health assessment with a special focus on experiences of torture, sexual abuse, post-traumatic stress and anxiety disorders, and on

chronic diseases. All patients reported a RH-15 > 12 and/or > 5 on the Distress Thermometer, considered to be a positive screen requiring further psychological assessment (the scale Cronbach α was 0.95).

Laboratory blood screening

Results of the laboratory screening, reported in Table 2, confirmed the signs of malnutrition previously observed at the medical evaluation: folic acid, cobalamin, and vitamin D-25OH levels were significantly lower than normal, and albumin levels were also at the lowest limits of normality. Even though the median values of the laboratory markers resulted within the normal range [21,22] in 50/70 people (71%), transaminases elevation and/or alteration of the leukocyte proportions (leukocytosis, neutropenia and eosinophilia) were observed. Thus, further serological screening for hepatitis B/C and HIV was performed. All subjects tested were negative for anti-HIV1-2 serological screening. Among 50 subjects screened for Hepatitis B and C, five resulted positive for both anti-HBs and total anti-HBc antibodies (resolved infection) while another 5 migrants presented with total anti-HBc

Table 2. Biochemical and hematologic screening for participants of the study.

		Nr	Arithmetic mean	SD	Median	95% CI for the median	25 th - 75 th percentile	Caucasian normal Reference Range	Normal reference intervals validated for Eritrean population ⁽²⁾
RBC (10 ⁶ /uL)	males	63	4.54	0.515	4.47	4.38 to 4.72	4.13 - 4.87	4.50 - 5.50	4.2 - 6.07
RBC (10 ⁶ /uL)	females	6	3.95	0.459	3.97	3.38 - 4.50	3.61 - 4.23	4.30 - 5.50	4.00 - 5.70
WBC (10 ³ /uL)		69	6.11	1.985	5.71	5.20 to 6.39	4.73- 7.26	4.00 - 10.00	3.40 - 9.00
Hb males (g/dL)		63	13.62	1.238	13.50	13.30 to 13.90	12.75 - 14.40	13.50 - 17.50	12.60 - 17.80
Hb females (g/dL)		6	11.18	2.105	11.55	8.27 to 13.55	9.80 - 12.50	12.00 - 16.00	12.50 - 17.60
MCV (fl)		69	93.94	7.600	92.90	91.44 to 95.50	90.40 - 97.97	83.00 - 101.00	85.80 - 100.00
PMN %		69	56.69	11.414	58.50	55.60 to 61.86	48.75 - 65.22	41.30 - 87.00	32.40 - 72.60
L %		69	34.86	10.857	31.90	29.88 to 36.52	27.10 - 41.52	20.00 - 40.00	22.00 - 59.20
PLT (10 ³ /uL)		69	322.90	107.037	299.00	280.00 to 323.00	259.50- 382.50	150.00 - 400.00	134.00 - 344.20
CRP (mg/L)		70	4.24	8.812	1.83	0.50 to 2.46	0.50 - 3.74	≤ 3	-
AST (U/L)		70	28.50	30.632	21.00	16.33 to 24.00	15.00 - 30.00	≤ 37	13.8 - 33.2
ALT (U/L)		70	37.96	38.807	25.00	23.00 to 32.00	19.00 - 43.00	≤ 78	9.0 - 35.4
BUN (mg/dL)		70	20.71	5.592	20.00	19.00 to 22.00	17.00 - 23.00	12.80 - 42.80	7.1 - 22
Creatinine males (mg/dL)		64	0.65	0.101	0.64	0.61 - 0.66	0.59 - 0.71	0.67 - 1.17	0.7 - 1.9
Creatinine females (mg/dL)		6	0.53	0.107	0.51	0.43 - 0.69	0.46 - 0.53	0.51 - 0.95	0.6 - 1.5
LDH (U/L)		70	202.48	56.619	190.00	182.66 to 200.68	163.00 - 217.00	0 - 248	NA
Albumin (g/dL)		70	3.86	0.398	3.91	3.80 to 3.97	3.56 - 4.09	3.5 - 5.2	4.5 - 5.3
TP (g/dL)		70	8.09	0.523	8.05	7.90 to 8.20	7.70 - 8.40	6.40 - 8.30	NA
Folic acid (ng/mL)		70	1.66	0.572	1.55	1.40 to 1.70	1.30 - 1.90	> 5.38	NA
Cobalamin (pg/mL)		70	287.82	128.930	264.50	223.64 to 303.68	206.00 - 348.00	300 - 1320	NA
Vitamin D-25OH (ng/mL)		70	23.83	6.638	23.25	21.23 to 25.97	19.20 - 28.00	30 - 100	NA

SD: standard deviation; RBC: Red Blood Cell; WBC: White blood cell; Hb: Hemoglobin; MCV: Mean Corpuscular Volume; PMN: Polymorphonuclear Leukocytes; L: Lymphocyte; PLT: platelet count; CRP: C-Reactive Protein; AST: Aspartate Aminotransferase; ALT: Alanine Aminotransferase; BUN: Blood Urea Nitrogen; LDH: Lactate dehydrogenase; TP: Serum total protein; NA: not-available, reference interval was not tested for the Eritrean population.

antibodies in the absence of anti-HBc IgM/anti-HBs and with undetectable plasma HBV DNA, suggesting a possible occult HBV infection. Only one migrant had detectable serum HBV-DNA levels (10^8 UI/mL) with positivity also for HBsAg, HBeAg and total anti-HBc [24]. Finally, one subject was positive for anti-HCV antibodies with undetectable viral genome (Table 3).

Discussion

Italian ports remain a primary gateway for thousands of migrants seeking asylum in Europe [3,4]. For this reason, the availability of appropriate health policies to facilitate the reception process while protecting public health, is considered a priority in the political and public health agenda. Since few medical data and no systematic studies are currently available on the topic, this report presents an interesting picture of the health status of migrants upon arrival on the coasts of southern Europe after detention in Libya and a sea journey.

Syndromic surveillance systems are generally used within national surveillance programmes to detect a wide variety of diseases in migrant populations on their arrival [25,26]. A possible bias of this approach is the health selection effect due to the demands of migration, so called “Healthy Migrant Effect” (HME), reported for a large number of migrants on departure from the country of origin [27-30]. Furthermore, HME has also been reported in migrants when they arrive in the host country: in fact, several studies describe that migrants arrive in Europe substantially in good health [7,8,31,32].

This report shows that, despite the fact that initially 30 of the 190 migrants (15.8%) were prudently hospitalized for acute or suspected transmissible diseases, only 3/30 (10%) migrants remained in hospital for tuberculosis or pneumonia. This low rate of

hospitalization apparently confirms the theory that migrants left Eritrea in good health status and did after all conserve it, despite the long travel, the imprisonment and the abuses suffered.

However, data from the present study suggest that this specific cluster of migrants, apparently in good health if evaluated with a syndromic surveillance approach, did suffer a decline in psychological status with significantly high scores on the psychometric tests (RH-15 > 12 and/or > 5 on the Distress Thermometer) suggesting a positive screen that requires further assessment [18]. Moreover, all migrants hosted at the ERC had malnutrition with abnormal levels of hemoglobin, serum creatinine, cobalamin, folic acid and vitamin D (Tables 2). Regarding their poor nutritional status, the data are consistent with the poor living conditions experienced during their travel and the long period of imprisonment when they reported living in the dark and eating poor meals. Since dark-skinned people require more exposure to sunlight than white-skinned people to maintain adequate vitamin D levels, refugees from Sub-Saharan Africa are considered particularly vulnerable to vitamin D deficiency due to inadequate sunlight exposure linked to staying indoors in the refugee and detention camps [33-36]. Interestingly, the majority of migrants from the “Diciotti” vessel reported a long period of detention in Libya in closed and dark spaces, which could explain the low levels of vitamin D found in these subjects. Finally, vitamin D levels appear to be closely related to health status and represent a potential marker of vulnerability in these populations [37].

In fact, an increasing body of evidence has shown that vitamin D plays a key role in modulating the immune response to infections; vitamin D deficiency increases the risk for susceptibility to several common infectious diseases (like pneumonia, tuberculosis,

Table 3. HBV and HCV markers profile in patients positive at the viral screening.

ID	Age	Sex	HBsAg	Anti HBc IgG + IgM	Anti HBc IgM	Anti HBs	HBeAg	HBV DNA (UI/mL)	Anti HCV	HCV RNA (UI/mL)
M013	28	M	-	+	-	+	nd	na	-	na
M015	24	M	-	+	-	+	nd	na	-	na
M043	21	M	-	+	-	+	nd	na	-	na
M048	26	M	-	-	nd	-	nd	na	+	Undetectable
M050	24	M	-	+	-	+	nd	na	-	na
M060	26	M	-	+	-	-	nd	Undetectable	-	na
M063	29	M	-	+	-	-	nd	Undetectable	-	na
M066	34	M	-	+	-	-	nd	Undetectable	-	na
M068	24	M	-	+	-	-	nd	Undetectable	-	na
M083	21	M	-	+	-	-	nd	Undetectable	-	na
M085	29	M	+	+	-	nd	+	10^8 UI/mL	-	na
M090	22	F	-	+	-	+	nd	na	-	na

na: not applicable, nd: not determined.

influenza, and others) and to depression [37-40]. Moreover, if results of serological screening for HIV showed that there were no subjects suffering from secondary immunodepression, on the other hand screening for viral liver diseases showed that a proportion of the patients were suffering from hepatitis B requiring counseling and treatment.

Although many migrants leave their country of origin in good overall health, they can get sick because of the length and difficulty of the journey. For these reasons, the presented data show that the "healthy migrant" theory is not always applicable to those arriving in Europe by sea, even for people coming from countries where there are no humanitarian or environmental emergencies. For migrants with a history of a long journey and of transit in countries such as Libya, it is necessary to consider that the health status at the start of the travel can deteriorate because of several tragic events (length of travel and periods of forced rest, detentions, absence of health care, hunger, physical and psychological violence) [5-7].

In these cases, it should always be kept in mind the need to look carefully for severe diseases linked to the deterioration of the health condition to safeguard both individual and public health. Health strategies should take into account that in these cases the syndromic assessment may not be sufficient to show the actual level of health deterioration present in these people because of their medical history. We believe that the availability of these data may help to promote targeted interventions to protect the health of migrants and at the same time safeguard public health.

Finally, from an epidemiological point of view, the opportunity to examine a cluster of immigrants just landed from a ship that transported them to European shores was a unique opportunity. Furthermore, being all of the same nationality, they represented a homogeneous population sample. The data obtained from the interviews with the migrants made it possible to observe that all had followed a common migration route, making the group that we analyzed not only complete but also epidemiologically unique.

Conclusions

Currently, the health strategies at the time of reception are largely based on syndromic evaluation. However, this symptom-based approach does not take into account the frailties that may have been resulted from travel and detention. This dissipation of the initial strong health, although not yet transformed into a disease, could generate greater vulnerability to the development of subsequent health problems in this

specific population [12-15,41-46]. This is confirmed by the severe malnutrition and significant decline in psychological status commonly detected in our study. Although syndromic evaluation remains the primary approach in the health care reception strategies, this report highlights the risks of failures of this type of approach and stresses that the migrant population experiences a deterioration of health and becomes fragile when subjected to the stress of a prolonged journey and the deprivation consequent to a long period of detention. These stressors, able to degrade the initial health patrimony of traveling migrants, can lead to a premature "exhausted migrant effect" that should be carefully investigated in order to avoid the possible early emergence of diseases significant related to frailty which are a threat both to the individual and to public health.

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