HEALTH PROMOTION

# A hard-to-heal wound: a case study on the collaboration between nonprofit and Public Health Sector in Southern Italy

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Keywords

Primary Health Care • Diabetic hand infections • Whole-of-health-system approach • EMERGENCY NGO • Italy

Summary

*This paper presents a case study of the barriers to care faced by a 44-year-old patient from Ivory Coast who has been living in Italy for 15 years. The patient visited his general practitioner (GP) in his neighborhood in southern Italy, seeking treatment for a complex workplace-related hand injury for which parenteral antibiotic therapy was recommended. During the medical examination, the physician also diagnosed the patient with diabetes mellitus and prescribed specialist examinations (i.e., diabetology, physiatry, surgery). Even if the patient was a regular resident in Italy, he encountered difficulties in navigating the health system to obtain the recommended services (i.e., administration of parenteral antibiotic therapy, serial dressings for the wound, booking several medical appointments). The local office of the Italian non-governmental organization EMERGENCY (EMR) stepped in to support the patient in facilitating the health system navigation and collaborated with his GP on a diagnostic and therapeutic strategy. The course was regular and the patient did not develop any complications (i.e., gangrene, sepsis). The synergy between EMR, the patient, and his GP has resulted in (1) an effective clinical pathway, (2) reduced barriers to access, and (3) increased patient empowerment. However, this approach proved to be extremely resource-intensive. Organizing these resources with more planning and forethought would have granted many more patients access to care. If the SSN were to provide comprehensive healthcare to all patients without relying on the presence of NGOs, outcomes for marginalized individuals would improve significantly, and healthcare resources would be utilized more efficiently and sustainably.*

## Introduction

Infections of the extremities in diabetic patients are often burdened by a longer healing time and a higher risk of complications and require comprehensive diagnostic and therapeutic management, with a multidisciplinary approach that is not easily achieved in the outpatient setting. Hereby, we report the case of a 44-year-old man with hand infection following a foreign body injury, who was newly diagnosed with diabetes mellitus (DM) and underwent a comprehensive therapeutic course entirely carried out in an outpatient setting in the eastern area of Napoli, Italia.

Despite the high risk of poor outcomes if treatment is delayed or inappropriate, evidence-based data about the correct management setting for diabetic hand infections (DHIs) is scarce. Some studies report that, under specific conditions, DHIs can be managed in the outpatient setting [1].

A multidisciplinary approach, a key factor in DHI management, should include infectious disease and expert hand surgery consultations, as well as ongoing case management (*i.e.,* wound management interventions), diabetes control and functional recovery. From the perspective of a primary healthcare (PHC) approach, all these interventions should be coordinated by the General Practitioner (GP), working together with specialist doctors, nurses and physiotherapists. In real life, several factors besides clinical issues can affect DHI management and outcomes, including barriers to healthcare access due to local context (*i.e.,* availability and affordability of services) or personal background (*i.e.,* limited access to healthcare and/or language barriers). In the eastern part of Napoli, in Campania region, South Italy, some associations and non-governmental organizations (NGOs) work to overcome the barriers to healthcare access. Among those, in 2015 EMERGENCY, an Italian NGO founded in 1994, established an outpatient center for people experiencing difficulties in accessing healthcare services provided by the Italian public National Health System (NHS; in Italian, *Sistema Sanitario Nazionale*, SSN), with the specific objectives of identifying the existing barriers to healthcare access, supporting people in overcoming those barriers, and providing primary healthcare when those barriers persist, with a multidisciplinary, integrated socio-sanitary approach. The overall goal of the organization is to end up integrating these individuals within the Italian National Health System, without providing parallel care, but, rather, to identify the barriers to access to care and the strategies to overcome these, while at the same time providing temporary care to


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people who have been left out of the system or encounter substantial barriers in it. The Italian SSN is organized at the regional level (*Sistema Sanitario Regionale* - SSR) under the supervision of the Ministry of Health. Based on the three pillars of universality, equity and equality, it provides universal healthcare coverage to all citizens and residents. Local health authorities deliver services either free of charge or with a co-payment fee waiver (*i.e.,* ticket*).* Partial or total exemptions are available for individuals with chronic or rare diseases, low or no income, pregnancy, or disabilities. Coverage for non-European nationals is generally valid for the duration of their permit of stay. On the other hand, undocumented non-EU persons can apply for an STP (*Straniero Temporaneamente Presente*) code, which grants access to SSN services for six months and can be renewed as necessary [2, 3]. Over the years, EMERGENCY NGO [4] has forged cooperative relationships with local GPs and other non-profit associations. In the case presented here, positive outcomes were mostly due to a strong networking strategy between social and health providers in the local context, that mitigated the risk of poor outcomes linked to the existing barriers to healthcare access.

## Case presentation

On the 11th of February 2023 T.A., a 44-year-old man of Ivorian origin without previously known medical conditions, was admitted to the Emergency Department of a hospital in Naples, Italy, due to a left-hand injury caused by an unknown foreign body (possibly a rusty iron chip) penetrating the skin while working in a farm. On physical examination, the left-hand palm was swollen and painful, especially close to the proximal part of the third and fourth fingers. Oral therapy with amoxicillin/clavulanic acid and a non-steroidal anti-inflammatory drug (*i.e.,* ibuprofen) was prescribed and the patient was discharged. The patient was regularly registered with the public SSN, and after 5 days, given the lack of improvement, the patient presented himself at his GP for consultation. The oedema was spread from the left hand to the elbow, and the wound showed no improvement. Even if the patient was a regular resident in Italy, he encountered difficulties in navigating the health system to obtain the services that were originally recommended (*i.e.,* administration of parenteral antibiotic therapy, serial dressings for the wound, booking the several medical appointments). For this reason, the GP contacted the EMERGENCY NGO outpatient service in the same Napoli area. The aim was to undertake a multidisciplinary approach to care, with both medical and nursing care, including wound management and parenteral antibiotic therapy, if needed. This approach was not available at a standard primary care level in the east area of Naples (suburban neighborhood of Ponticelli) and EMERGENCY NGO offered the possibility to have nursing care and support in health system navigation in a free, quick and easily accessible way. During the evaluation at the EMERGENCY NGO clinic, DM was diagnosed, based on a glycemia of 268 mg/dl (normal values: 60-110 mg/dl) on a finger stick test, and metformin was initiated. Oral antibiotic therapy was initially switched to levofloxacin but, given no evident improvement, a broader spectrum and parenteral approach was adopted, with intravenous infusions and later intramuscular injections performed at the EMERGENCY NGO outpatient service.

Along with antibiotic therapy, bedside wound management interventions with excisional procedures were promptly started on 20th February and were regularly carried out at the EMERGENCY NGO clinic until 29th April (every other day, excluding weekends), monitoring clinical evolution. Figures 1 to 5 show progressive wound improvement from 22nd February to 29th April 2023 with combined pharmacological and wound management (*i.e.,* debridement, disinfection, and dressing). After debridement, disinfection and several days of antibiotic therapy, the forearm swelling was resolved. The initial injury was identified on the palmar surface, close to the proximal part of the third finger. The foreign body likely to be the causative agent

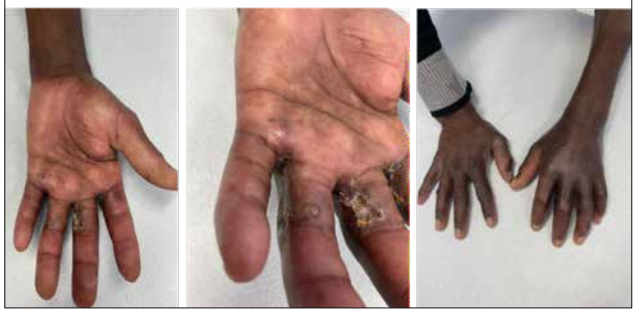
**Fig. 1.** Left hand lesion on February 22nd (day 2 of IV antibiotic therapy).

**Fig. 2.** Left hand lesion on 24th February (day 4 of IV antibiotic therapy).

**Fig. 3.** Left hand lesion on 6th March (day 14 of IV antibiotic therapy).

**Fig. 4.** Left hand lesion on 20th March 2023 (10 days after substitution of IV with IM antibiotic therapy).

**Fig. 5.** Left hand lesion on 29th April 2023 (end of wound management treatment).



was not identified in the wound. Purulent drainage from the initial injury and purulent accumulations around appeared early in the wound treatment session, followed by interdigital cutaneous fistulas among the last four fingers (Fig. 3). Regular wound treatment sessions were carried out, with debridement and local application of alginate dressing and, later, polyurethane pads. Antibiotic therapy was stopped on 31st March, due to completion of the therapeutic course and clinical improvement. Left hand ultrasound scan (performed on April 19th in a third sector association that provides free ultrasound scans in the area for people in need) still showed widespread oedema of the intermetatarsal muscles, with some small anechoic collections, and some additional non-homogeneous collections close to the metatarsophalangeal joints. However, a further clinical improvement of the lesions was evident in the weeks after, and on 29th April (Fig. 5) wound treatment sessions were concluded. In the last session, all the lesions appeared closed with no clear signs of active infection but persistent left-hand swelling, hypotrophy of the forearm and hand and finger movement impairment. While local and systemic therapies were performed, a specialist hand surgery consultation was obtained (7th March 2023), but no surgical indication was set at that time. After multidisciplinary consultation at the EMERGENCY NGO clinic, a basic physical therapy approach was initially chosen, and the patient and a friend of his (who acted as his caregiver on several occasions) were trained on active mobilization exercises by the nursing staff.

However, given the persistent movement impairment, in the following months, a hand MRI was performed (2nd May 2023), with evidence of widespread subcutaneous palmar oedema of the hand and fingers, especially involving the third and fourth proximal phalanges. A new hand surgery specialist consultation was performed in the private sector (31st May 2023, sponsored by the patient's employers), which suggested a physical therapy approach. The physiatric assessment was carried out within the public health system in July 2023, followed by physiotherapy and ultrasound therapy, with only partial improvement. The patient underwent a further hand surgery evaluation in December 2023 within the public health system, and eventually a surgery approach was suggested (tenoarthrolysis) to solve the mobility

issues, likely due to post-inflammatory adhesions, not objectified on imaging. The patient is currently on the waiting list for surgical intervention that will be provided by the SSN.

Concerning the new diagnosis of diabetes mellitus, specialist consultation was performed within the SSN. Insulin subcutaneous therapy and oral metformin were prescribed, together with the complete investigation panel to assess the presence of diabetes-related organ damage. Health education about the disease and glycemic control training was provided by the nursing staff of the EMERGENCY NGO clinic. Follow-up is currently ongoing and managed by his GP.

Given some clear difficulties throughout the entire care process in navigating the SSN and the bureaucratic issues related to the incident in the workplace, the patient was supported by the social staff of the EMERGENCY NGO clinic in booking medical appointments, requesting fee waivers (diabetes- and income-related), and in applying for an invalidity pension in collaboration with the patient's GP, with the ultimate aim of a gradual empowerment of the patient.

## Discussion

This case study sheds some light on some interesting management aspects. From a clinical point of view, outpatient management of hand infection in diabetes has shown to be feasible and effective under some conditions, according to previous literature [1]. In this case, timely therapy and the combined approach with systemic antibiotic therapy and wound management intervention were crucial elements for the positive outcome. However, several other aspects in addition to the clinical features could have influenced the patient's outcome. Although he has been living in Italy for more than 15 years, is quite fluent in the Italian language, and regularly registered with the Italian SSN, he showed some difficulties in navigating the health system, particularly in booking medical exams and applying for fee waivers, due to poor knowledge about how booking and referral pathways work within the SSN. In addition, the accessibility to the local health system was also impaired by the scarce availability of outpatient services combining the possibility of receiving parenteral antibiotic therapy and wound management services in an outpatient setting. Primary care, as currently organized in the area, has inadequate resources to improve healthcare access and provide appropriate care for cases that need more complex outpatient management.

Taking these barriers into account, and aiming to overcome them, in the case hereby presented we adopted an approach inspired by the PHC model. PHC is a whole-of-society approach to health that aims at ensuring the highest possible level of health and well-being and its equitable distribution, with three main components: 1) comprehensive integrated health services to meet people's needs; 2) multi-sectoral policies and actions to address the upstream and wider determinants of health; 3) engaging and empowering individuals, families, and communities [5]. In addition, multidisciplinary is another key factor of the PHC approach, which has proven to be effective and efficient in terms of health outcomes [6]. Bearing this model in mind, our approach was characterized by:

- multidisciplinary and teamwork: the therapeutic path was coordinated by the patient's GP and involved different professionals, including specialist doctors, nurses, radiologists and social workers, that took charge of the different health and administrative needs;
- networking between the public health provider (*i.e.,* the GP), an NGO (*i.e.*, EMERGENCY) and other non-profit private providers, which led to overcoming the barriers to timely and appropriate health care provision;
- integration between social and health-related interventions that allowed the patient to face both the administrative barriers and those related to healthcare access while receiving appropriate and timely therapeutic interventions;
- involvement of caregivers in health education interventions and patient empowerment, to give the patient adequate tools to improve his health status.

However, our approach presents some limitations. First, barriers to healthcare access were temporarily circumvented, relying on the non-profit private sector, but not solved: in fact, parenteral therapy and wound management activities are still scarcely available in the public sector at the primary care level, as well as radiological services. In addition, the strategy adopted is strictly tailored to the locally available resources and network and not easily generalizable to other contexts. Moreover, other barriers (*i.e.*, language and bureaucratic) are systemic in the SSN and remain, despite the local NGO efforts. This study demonstrates the inefficiency of working without a *whole-of-health system* approach. A clear and established PHC strategy was lacking. Considerable human and material resources were mobilized and deployed for the management of a single case. Traditionally, primary care routes were underutilized or not utilized at all. All of this goes to show the unsustainability of working from a piecemeal perspective, ignoring the need to integrate interventions throughout the health sector. These drastic investments yielded positive results for one patient. However, this outcome could have been multiplied to affect many other health-seekers without further investment, if this PHC strategy, deeply rooted in a whole-of-health system approach, had been formalized.

## Conclusions

We presented a clinical and management case providing several starting points for reflection on the potential of a PHC approach applied to a complex clinical case. Currently, in Campania region, the SSR is not yet equipped with a PHC organization as it is in terms

of accessibility to assistance, of comprehensiveness, of consideration of biopsycho-social factors, of coordination between different actors involved in the system, of the temporal-continuity of assistance. The patient's condition required territorial, medical-nursing and administrative management. In these cases, the synergy between public providers and the NGOs can be strategic to improve primary care management in the light of the PHC principles. In this light, NGOs act as temporary support to the SSN, providing health and administrative services and, at the same time, highlight patients' unmet needs and barriers to access basic care. Furthermore, they carry out advocacy actions whose aim is to prompt the SSN to provide needed primary care services. In December 2023 a formal cooperation project between two local GPs and the NGO EMERGENCY was started in Naples, as an experimental form of healthcare provision with a PHC approach. While innovative and promising, this strategic synergy cannot be seen as an end, but as a powerful tool to promote evidence-based advocacy actions to remove the existing barriers to healthcare access at a broader level, with the ultimate goal of public, equitable, accessible and sustainable care for everyone, recognizing and protecting health as a human right.

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## Informed consent

Written informed consent was obtained from the patient for publication purposes of his case report and the related images. A copy of the written consent is available for review.

## Conflict of interest statement

Authors have no conflicts of interest to disclose.

## Authors' contributions

VG conceived and designed the case report. VG and GR drafted the manuscript. SF collected the clinical data and images. EL and ALC critically revised the manuscript for intellectual content. All authors read and approved the final version of the manuscript.

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