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TESI DI LAUREA

Outpatient medicine: a comparison between low and high resource system settings

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Sommario

ABSTRACT

Background. In India, in addition to the national health care system, there are many non-profit Non-Governmental Organizations (NGOs) such as the Institute for Indian Mother and Child (IIMC) operating mainly in Kolkata and surrounding areas. In such settings, there are differences in the patient management, understood as the treatment of the disease and the whole person, compared to high-resource countries such as Italy where the health system provides services in different ways.

Aim. Compare two experiences tested in general practice settings in low and high resource settings.

Methods. Prospective comparative observational study. Data were collected by a single operator in two different settings with low and high resources. The low-resource setting refers to Kolkata, Dhaki, and surrounding areas, and was visited during a medical volunteering experience in September 2022. The high-resource setting refers to Abano, visited in May 2023, and Albignasego, where data referred to July 2022 were obtained using the Junior Bit 7 software. A predefined format was used for data collection, capable of capturing all clinical and non-clinical information pertaining to all the patients visited (or contacted by phone).

Results. The data of 2.078 patients were analyzed, with 1.208 in the low-resource setting (58% of the total) and 870 in the high-resource settings. Significant differences were observed in all the studied parameters. The number of patients visited per day by physicians in the two considered settings was significantly different. In India, the number of patients seen during working hours was on average more than twice as high as in Italy. Additionally, in India, there was a lack of accessibility and almost no follow-up, whereas in Italy, patients had the opportunity to be monitored over time. Dermatological problems (almost 30% of cases had tinea), as well as infectious and respiratory diseases, were the most common clinical conditions found in the low-resource setting. These conditions were also found in the high-resource settings with different proportions. The utilization of counselling services (medical consultations providing advice and addressing doubts) was relevant in high-resource setting, while was almost absent in India. Furthermore, there was a high number of prescriptions for antifungal,

antiparasitic, antibiotic, and especially antihistamine medications in India, while it was common to prescribe specialized visits, diagnostic examinations, and further tests in Italian settings.

Conclusions. There are significant differences between the Indian and Italian settings that were addressed in the study. A higher number of medical visits per day is not necessarily associated with better healthcare management, and the burden of infectious diseases is certainly higher in India, leading to specific patterns in medical prescriptions. In low-resource settings, prescribed therapies should be more carefully chosen and based on scientific basis. The quality of healthcare services provided in the Indian setting appears to be lower, and the implementation of information technology in the medical profession would improve this aspect, promoting greater healthcare accessibility with potential implications for public health in rural areas of the country. The presence of non-profit organizations, such as IIMC, that facilitate healthcare access for individuals who would otherwise not have the opportunity to receive treatment in low-resource settings, is certainly important.

ABSTRACT (ITALIAN VERSION)

Background. In India, oltre al sistema sanitario nazionale, vi sono molte Organizzazioni Non-governative (ONG) non-profit come l'Institute for Indian Mother and Child (IIMC) operante principalmente a Calcutta e nelle aree circostanti. In tali contesti, vi sono differenze nella gestione del paziente, inteso come trattamento della patologia e della persona nella sua totalità, rispetto ai paesi ad alte risorse, come l'Italia dove il sistema sanitario fornisce servizi con modalità differenti.

Scopo. Confrontare due esperienze sperimentate in setting di ambulatorio di medicina generale nelle basse e nelle alte risorse.

Metodi. Studio osservazionale comparativo prospettico. I dati sono stati raccolti da un unico operatore in due diversi setting a basse e ad alte risorse. Il contesto a basse risorse si riferisce a Calcutta, Dhaki e dintorni, ed è stato frequentato durante un'esperienza di volontariato medico nel settembre 2022. Quello ad alte risorse si riferisce ad Abano, frequentato nel maggio 2023, e ad Albignasego, dove sono stati registrati i dati riferiti a luglio 2022 utilizzando il software Junior Bit 7. Per la raccolta dei dati è stato utilizzato un format predefinito in grado di raccogliere tutte le informazioni cliniche e non, relative a tutti i pazienti visitati (o contattati telefonicamente).

Risultati. Sono stati analizzati i dati di 2.078 pazienti, di cui 1.208 nel setting a basse risorse (58% del totale) e 870 nei setting ad alte risorse. Sono state riscontrate grandi differenze in tutti i parametri studiati. Il numero di pazienti visitati al giorno è significativamente diverso nei due setting considerati. In India il numero di pazienti visitati in orario lavorativo era in media più del doppio rispetto all'Italia. Inoltre, in India l'accessibilità è risultata carente e il follow-up quasi assente, mentre in Italia i pazienti avevano l'opportunità di essere seguiti nel tempo. Le patologie dermatologiche (quasi il 30% dei casi era affetto da tinea), così come le malattie infettive e respiratorie, sono state le condizioni cliniche più comuni riscontrate nel setting a basse risorse. Queste ultime sono state riscontrate anche nel setting ad alte risorse in proporzioni differenti. L'utilizzo del servizio di counselling (consulenza medica, intesa come consigli e risoluzione di dubbi) è stato rilevante

nel setting ad alte risorse, mentre era quasi assente in India. Infine, in India è stato registrato un gran numero di prescrizioni di farmaci antifungini, antiparassitari, antibiotici e soprattutto antistaminici, mentre nei setting italiani era comune la prescrizione di visite specialistiche, esami diagnostici e test di approfondimento.

Conclusioni. Ci sono significative differenze tra il setting indiano e quello italiano comparati nello studio. Ad un maggior numero di visite mediche/die non è necessariamente associata una migliore gestione sanitaria e il carico di malattie infettive è certamente maggiore in India, con ripercussioni sulle prescrizioni mediche. Nel setting a basse risorse le terapie prescritte dovrebbero essere sottoposte a una scelta più accurata e basata su fondamenti scientifici. La qualità dei servizi sanitari forniti nel setting indiano sembra essere più bassa e un'implementazione informatica della professione medica migliorerebbe questo aspetto e favorirebbe una maggiore accessibilità sanitaria con possibili risvolti sulla salute pubblica nelle zone rurali del paese. È certamente importante la presenza di organizzazioni non-profit che, come IIMC, facilitano l'accessibilità sanitaria ai cittadini che altrimenti nei setting a basse risorse non avrebbero la possibilità di curarsi.

1. INTRODUCTION

1.1 THE INDIAN CONTEXT

India is one of the most populous countries in the world and presents a complex healthcare system. Its vast geography, combined with the lack of adequate economic resources and infrastructures, makes it extremely difficult to provide quality healthcare to all citizens. All of this is embedded in a suboptimal context under different perspectives that mainly affect the pediatric and female populations. Nonetheless, India is growing as a nation and there has been a positive development.

In fact, in recent years the country has seen a significant increase in the literacy rate, with a notable increase from 65.40% in 2001 to 74.80% in 2011 of the population aged 7 years and above. Although there is still a gap in the literacy rate between males and females, the gap has reduced from 20% to 16%. This demonstrates that there has been progress in reducing gender inequality in India, although there is still much work to be done to ensure full equality. In any case, female literacy is seen as an important indicator of social transformation and it is proposed that it will continue to improve in the future. To this end, in 2009 education was made compulsory for children aged 6 to 14 years(1).

In 2009, India ranked 134th out of a total of 182 countries in the Human Development Index, an indicator that evaluates the health, education, and standard of living of populations worldwide. This placement was determined by the underdeveloped allocation of resources invested in the health and education sectors, which constitute the main components of human well-being(2).

In India, the expenditure on the National Health Service varies considerably across different states and regions and according to the level of healthcare services being provided to the citizens. Public spending on health in India is among the lowest in the world, accounting for only 1.15% of the country's GDP. This has significant implications on the quality of healthcare provided to Indian citizens, which could be improved with an increase in public spending on health(3).

Most healthcare expenses in India are borne by the citizens themselves, who

pay directly for private healthcare services or private health insurance. Therefore, Indian citizens struggle to afford healthcare, especially those coming from low-income households. For this reason, many people cannot access quality healthcare services. The challenges of the Indian healthcare system provide a highly resonant context that highlights issues that can potentially affect millions and millions of individuals.

1.1.1 THE INDIAN HEALTHCARE SYSTEM

The Indian healthcare system is highly diversified and includes a combination of public and private healthcare services. The responsibility for providing healthcare services is entrusted to the central governments, state governments, local governments, and private healthcare providers. The Indian healthcare system is divided into three levels: primary level, secondary level, and tertiary level, represented respectively by the central government, state governments, and private organizations.

The central government (**primary level**) is responsible for formulating policies and providing guidelines for the Indian healthcare system. The Indian central government has a crucial role in devising and implementing national healthcare policies. Additionally, the Ministry of Health and Family Welfare of the central government defines national healthcare policies, supervises the financing and implementation of national health programs, and monitors healthcare policies.

Prevention is considered an essential activity at the primary level of the Indian healthcare system. At the central level, numerous programs and initiatives have been put in place to promote prevention and public health at the primary level. For example, the National Rural Health Mission (NRHM), launched by the Indian government in 2005, aims to improve the health of rural populations. It was subsequently expanded to include urban areas and was renamed the National Health Mission (NHR) from 2013 onwards. Its main objectives include improving reproductive, maternal, neonatal, infant, and adolescent health services, as well as preventing and controlling infectious and non-infectious diseases. Additionally, its aim is to provide access to comprehensive and integrative primary healthcare, promote a healthy lifestyle, and stabilize the population by ensuring demographic and gender balance(4).

The central government also manages various national health care organizations, such as the All India Institute of Medical Sciences (AIIMS, established as an independent organization by the Parliament with the aim of becoming a hub for advancing and improving every aspect of healthcare thanks to

teachers and research workers(5). The primary objective is to enhance the standard of medical education through undergraduate and postgraduate teaching(6)), the Indian Council of Medical Research (ICMR is a medical research organization based in New Delhi with the task of promoting, coordinating, and formulating biomedical research in India. It is one of the oldest medical research bodies in the world. Founded in 1911 as the Indian Research Fund Association (IRFA) to fund and coordinate medical research in the country, after the independence, it also took on other functions and was renamed ICMR in 1949(7)) (Contributions of Indian Council of Medical Research (ICMR) in the area of Medicinal plants/Traditional medicine), and the National Health Authority (NHA, it is the top governing body responsible for implementing India's public health insurance program called "Ayushman Bharat Pradhan Mantri Jan Arogya Yojana."(8)). Firstly, the primary level is based on basic health facilities located throughout the whole territory, such as primary health centres (PHCs), community health centres (CHCs) and health sub-centres (SCs) that provide basic health services to Indian citizens. These services include immunisations, family planning programmes, prevention and treatment of common diseases such as diarrhoea, malaria and tuberculosis.

Secondly, state governments (hence, the **secondary level**) are responsible for providing healthcare services at the local level. This level consists of district hospitals and other specialized healthcare facilities such as pediatric clinics, infectious disease clinics, and mental health clinics. The services provided include hospital management, outpatient services, and public health programs. Healthcare is a primarily shared responsibility among the central government and state governments in India. State governments are particularly responsible for disease diagnosis, non-communicable disease care, and infectious disease control. Like the primary level, the secondary level of the Indian healthcare system also plays an important role in disease prevention and management. At this level, state governments manage and make available more advanced diagnostic, care, and treatment services, which allows for more effective disease management and prevention of complications. State governments also manage various healthcare institutions at the state level, such as district hospitals and community health

centers. State governments receive funding from the central government and also contribute with their own funds to finance healthcare programs.

Finally, private organizations (hence, **tertiary level**) include both healthcare providers and health insurance companies. Particularly, tertiary referral hospitals provide highly specialized healthcare services, such as cardiac surgery, neurosurgery, oncology, and transplant surgery. Not all tertiary referral hospitals are run by private organizations. For example, the All India Institute of Medical Sciences (AIIMS) is a tertiary referral hospital located in New Delhi and managed by the Indian central government(9). Private organizations run hospitals, clinics, and medical centers and provide high-quality healthcare services, but only to patients who can afford them. The cost of private healthcare services in India can be much higher than public services (PHC - Primary Health Centers), but the private sector is often chosen by patients seeking specialized or high-level care(10).

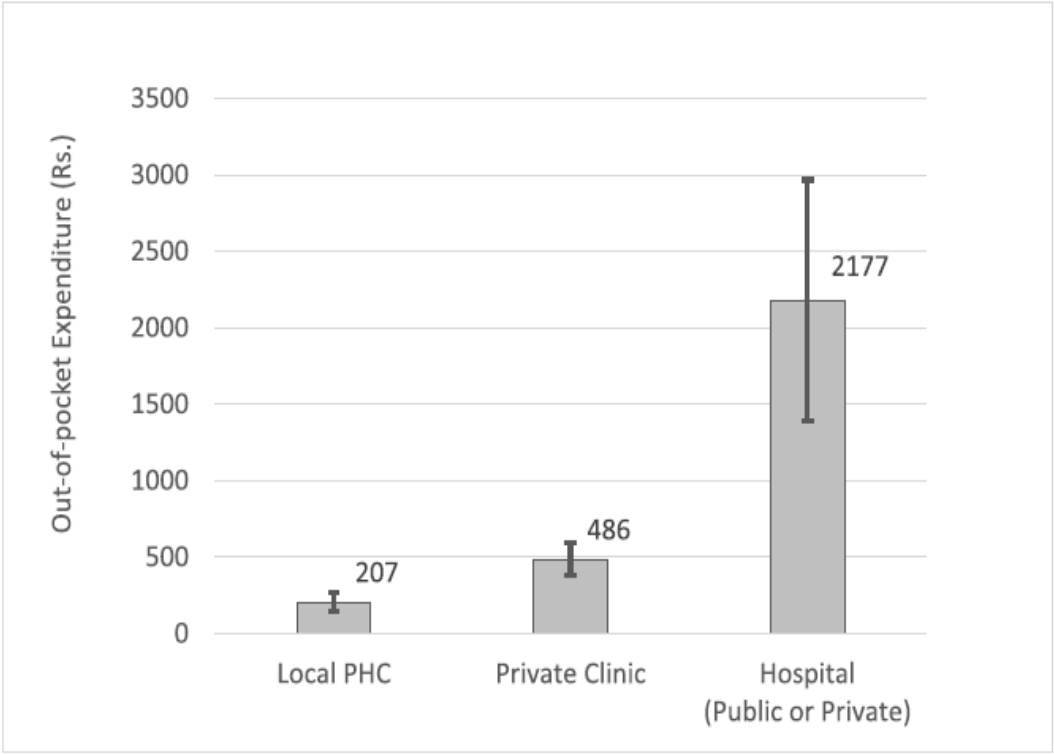


Fig. 4. Average out-of-pocket spending by type of facility where treatment sought.

Many Indians, especially those living in cities, choose to use private health services, which are generally more expensive but offer a more efficient and modern service. At the same time, the quality of private health services can vary greatly depending on the organisation and the cost of treatment. In addition, there are several non-governmental organisations (NGOs) and non-profit organisations, including IIMC (Institute for Indian Mother & Child), that operate in the health sector and provide free or low-cost services.

In addition to the three levels mentioned above, the Indian health system also includes medical research institutions such as the aforementioned Indian Council for Medical Research (ICMR), the National Pharmaceutical Development Organisation (NIPER) and the National Institute for Health and Family Welfare (NIHFW). These institutes are involved in research, training and development of innovative drugs and health products.

The Indian government has also introduced several public health programs such as the National Vector Borne Disease Control Program (NVBDCP), Universal Immunisation Program (UIP), and National AIDS Control Program (NACP). These interventions aim to prevent and treat common diseases and to prevent the spread of infectious diseases.

In summary, India's health system consists of a wide range of health institutions and public health programs, managed by both the central and state governments, and is organised in such a way that the central government mainly deals with policy and planning, the state governments mainly provide primary health services, and the private sector provides specialised and high-quality health services to those who are able to afford them.

However, the Indian health system has come under much criticism for its unevenness, shortage of health personnel, lack of medical equipment and poor quality of health services in some parts of the country.

1.1.2 Specific features of the West Bengal health system in India

The West Bengal government has implemented several strategies to improve the health of its citizens, including the Swasthya Sathi Programme that aims to provide health insurance to all West Bengal residents(11). The socialist orientation to healthcare recognises healthcare as a basic human right and this in practice translates into an increased commitment to free or low-cost healthcare programmes, particularly for the most disadvantaged sections of the population.

The West Bengal government has invested in community-based healthcare programmes, such as the aforementioned National Rural Health Mission (NRHM), to improve access to healthcare services in rural areas of the country.

Nevertheless, the Percentage of households that do not generally use a government health facility in West Bengal is only 44.7%. This value is lower when compared to the Indian average (55.1%). In West Bengal, the main reasons for not using public health services are: no nearby facilities (49.6%), excessive waiting time (46.5%) and poor quality of care (35.0%)(12).

Table 11.17 Reasons for not using a government health facility by state/union territory

Percentage of households whose members do not generally use a government health facility when they are sick, and among households whose members do not generally use a government health facility when they are sick, percentage giving specific reasons for not utilizing a government health facility, according to state/union territory, India, 2015-16

State/union territory	Percentage of households that do not generally use a government health facility	Reasons for not generally using a government health facility among households that do not generally use a government health facility				
		No nearby facility	Facility timing not convenient	Health personnel often absent	Waiting time too long	Poor quality of care
India	55.1	44.6	26.4	14.8	40.9	48.0
North						
Chandigarh	40.9	22.2	24.8	5.5	78.4	40.8
Delhi	42.5	44.4	33.4	13.3	67.1	34.1
Haryana	60.9	47.4	33.3	23.3	59.1	53.8
Himachal Pradesh	19.3	40.5	29.6	16.1	44.9	44.4
Jammu & Kashmir	19.7	39.4	21.6	13.8	48.5	46.9
Punjab	72.9	41.9	26.4	17.1	66.3	57.5
Rajasthan	34.6	37.6	23.7	13.7	39.9	57.0
Uttarakhand	50.5	41.0	31.1	18.1	47.9	47.1
Central						
Chhattisgarh	49.5	49.8	20.0	13.3	31.1	50.2
Madhya Pradesh	59.6	44.7	28.4	18.0	40.6	48.3
Uttar Pradesh	80.1	47.7	16.9	11.5	35.7	61.1
East						
Bihar	77.6	42.6	33.8	17.8	38.6	59.6
Jharkhand	71.7	59.7	24.3	15.8	33.9	45.9
Odisha	11.3	48.4	13.9	8.7	23.1	34.6
West Bengal	44.7	49.6	22.2	10.2	46.5	35.0

The West Bengal government established the West Bengal Clinical Establishment Regulatory Commission (WBCERC) in 2017 to oversee and increase transparency in the state's clinical establishments(13).

Overall, the West Bengal health system strives for good accessibility, equity and quality of health services, and transparency in management. The West Bengal government has invested in free or low-cost health care programs and a network of public hospitals and clinics to ensure that all citizens have access to basic health care, although a large proportion of citizens are reluctant to use these services. In addition, measures have been introduced to improve the quality of health services and to ensure that they are also accessible in rural areas of the country.

1.1.3 Critical issues in the Indian healthcare system

The Indian health system faces many challenges and critical issues, including:

1. **Accessibility**: one of the major problems of the Indian health system is accessibility to health services, especially in rural and poorer areas of the country. Access to basic health care, as well as to clean water, hygiene and primary health care, remains limited for many people. Accessibility to the health care system in India can vary greatly depending on region and social class.

According to the WHO, the number of medical doctors in India was 1,014,538 in 2020, including both generalists and specialists, as well as those not further defined in the given national and/or subnational area(14). However, the ratio of doctors per 10,000 population in 2020 was only 7.27, which is significantly lower than the figures observed in Western countries(15).

In addition, it should be noted that the number of hospital beds available per 100,000 people in India is 5.3. This figure reflects a situation characterized by a shortage of healthcare infrastructure throughout the country, particularly in certain specific regions, which, being significantly populous (such as West Bengal), may require greater assistance(16).

In India, the differences in accessibility to medical care between urban and rural areas are evident. This varies depending from state to state, and it is usually better in cities, thanks to the presence of more healthcare facilities and medical professionals. On the contrary, in rural areas, there is often a scarcity of qualified healthcare personnel and adequate healthcare infrastructures(17).

Furthermore, a crucial factor to consider when evaluating accessibility to the Indian healthcare system is that many individuals are unable to afford the high tuition fees charged by private medical universities. As a result, like healthcare, medical education is accessible only to those who are economically privileged(18).

An additional significant concern is found in the phenomenon of brain drain, which poses the risk of impoverishing the country's healthcare workforce due to the emigration of highly qualified physicians to countries offering superior economic and professional prospects(19). (Plugging the medical brain drain)

In recent years, the government of India has implemented several policies aimed at enhancing healthcare accessibility. Notably, the "Ayushman Bharat" program was launched during the 2018-19 fiscal year through the Government of India's Union budget, with the goal of implementing proposals outlined in the National Health Policy 2017 (NHP-2017). This program consists of two initiatives

- Health and Wellness Centers and the National Health Protection Scheme - designed to improve the accessibility, availability, and efficiency of primary, secondary, and tertiary healthcare services across India. The second component was subsequently renamed the Pradhan Mantri Rashtriya Swasthya Suraksha Mission. Nevertheless, significant challenges remain in ensuring equitable and universal access to healthcare services in India(20).

2. **Inadequate healthcare infrastructure**: The high rate of population growth in India has resulted in an insufficient number of healthcare facilities to support the population, particularly in terms of hospital beds, medical personnel, and modern healthcare technologies. Furthermore, a significant health disparity exists in India due to the unequal distribution of healthcare infrastructure among Indian states. Many hospitals and healthcare centers lack adequate equipment and qualified personnel to provide proper healthcare services(21).
3. **Insufficient investment in public health**: the public health expenditure in India is very low due to limited availability of financial resources. The policy presents a feasible objective of augmenting the public health expenditure from 1.15% to 2.5% of GDP, within a predetermined time frame. It envisages that state resources will be correlated with state development indicators, absorptive capacity, and financial indicators. States would be incentivized to allocate incremental resources to public health expenditure. General taxation will continue to be the predominant mode of financing healthcare. The government may contemplate the imposition of specific levies on commodities, such as tobacco, alcohol, and unhealthy foods, in addition to taxes on extractive industries and pollution cess. Corporate Social Responsibility funds would be utilized for well-crafted programs aimed at realizing health goals(3).
4. **Infectious diseases**: Infectious diseases such as tuberculosis, malaria, and HIV/AIDS still pose a major threat to public health in India. Despite progress made in the fight against these diseases, they still represent an enormous burden on the healthcare system and remain a significant challenge to be fought. While control of HIV infection and leprosy is on

track, the same cannot be said for malaria, whose initial success has been frustrated, and for visceral leishmaniasis, whose prevalence has increased. Moreover, the lack of effective vector control has led to recurring epidemics of dengue fever and the re-emergence of diseases such as Chikungunya virus and typhoid fever. Other fecal-oral transmitted infectious diseases such as enteric fevers, cholera, and hepatitis A and E viruses, as well as zoonoses such as rabies, leptospirosis, and anthrax, are not under systematic control. There are significant gaps in the infectious disease surveillance and response system that require urgent attention. The Indian government employs two distinct approaches in managing infectious diseases. The first strategy involves special centralized programs and is used for those diseases that are considered a priority for control, including tuberculosis, malaria, filariasis, visceral leishmaniasis, leprosy, HIV, and vaccine-preventable diseases in children. Among these programs are the Revised National Tuberculosis Control Programme, National AIDS Control Programme, National Vector-Borne Diseases Control Programme, National Leprosy Eradication Programme, Universal Immunisation Programme, and National Poliomyelitis Surveillance Project. These programs use selective (vertical) disease control and are controlled by either the Department of Health Services or the Department of Family Welfare. However, these programs function autonomously, with separate central, state, and district officers and field personnel. Implementing this approach for controlling all other diseases would be prohibitively expensive. The second strategy involves the provision of ad-hoc assistance for outbreak investigations and control. Upon invitation from the states, teams from the National Institute of Communicable Diseases, a semi-autonomous institution controlled by the Department of Health, go to the field. However, one of the disadvantages of this method is the detection of signals, which may not be noticed through case-based disease surveillance, resulting in a delay in recognizing epidemics(2).

5. **Quality issues**: in India, there has been a significant improvement in the quality of healthcare over the past 60 years, as evidenced by the doubling

of life expectancy during this period. However, the health outcomes are still not at the same level as other countries with similar economic conditions(22). Nonetheless, India still bears a disproportionately high burden of disease, with widespread malnutrition and other risk factors contributing to illness and injury. India's health outcomes are significantly poorer than those of neighboring countries such as Sri Lanka (DALY 26,178) and Bangladesh (DALY 27,077), with a DALY of over 33,000(23). Additionally, Indian healthcare is not equitable across all social classes and territories of the country, and as a result, the burden of preventable diseases is still high. Furthermore, the economic system underlying healthcare is outdated, inefficient, and of low quality: healthcare costs are primarily borne by directly affected families, and costs are constantly rising. These costs further exacerbate poverty, resulting in worse health and sanitation conditions(22).

It should be noted that In India, 70% of healthcare workers are employed in private facilities, while there are vacant positions (52% of specialist positions and 18% of nursing positions) in public facilities, and 18% of primary care centers are critically lacking in doctors. Furthermore, the quality of care provided by the public system is hampered by various issues, including limited hours of operation, high absenteeism (>40%), inadequate availability of drugs, and poor quality work environments (this problem is sometimes reported in the private system as well). In private facilities, the situation is certainly better, but especially in rural areas, the population

does not have access to appropriate and quality care even when they turn to the private sector. As a result, those who are poor receive low-quality services in any case(24).

In conclusion, India deals with numerous challenges in its healthcare system, including access to healthcare services, inadequate healthcare infrastructures, low public health funding, infectious diseases, and quality issues.

1.1.4 Health insurance

In India, many families face financial difficulties related to the fact that most healthcare expenses are borne by patients who directly pay private providers. Additionally, many other families, who are already living in poverty, do not seek healthcare services because they are aware that they cannot afford the costs. Since the 1990s, India has increasingly adopted neoliberal health policies, making it difficult to achieve the goal of providing quality healthcare to all citizens, in favor of incremental growth of the private healthcare sector (rather than public infrastructure). Therefore, the need to introduce health insurance for the poor, emblematic of this political attitude, has become stronger and stronger.

Some governments' efforts successfully increased out-of-pocket health expenses in recent years, both in urban and rural areas. However, the costs are still high enough to lead millions of families to poverty, ultimately undermining their health and living conditions. For this reason, the government has decided to further help the poorest households through hundreds of government-funded health insurance schemes that have been introduced in the last twenty years. However, the needs of these families are often not met because it has been shown that these insurance schemes often do not provide what was promised. Due to this lack of effectiveness, mainly due to deep-seated mistrust towards the poorest, it is precisely the latter who pay the price.

Social inequalities in healthcare have never really been addressed due to these political positions, which have seen insufficient direct investment from the government. Personal interests have prevailed over the need for access to care for all(25).

1.1.5 Public health programs

The Indian government has launched several public health programs to improve access to healthcare for Indian citizens, such as the National Vector Borne Disease Control Programme which contains three programs called National Anti-Malaria Programme, National Filaria Control Programme and National Kala-azar Control Programme. Other programs launched by the government include the Universal Immunisation Programme and the National AIDS Control Programme. However, these programs often suffer from implementation issues and low coverage.

In addition to these organizations, there are currently major efforts underway by the Indian government, which since 2018 has introduced the National Health Protection Scheme, through the Union Budget 2018/2019. This program aims to provide universal health insurance, therefore health coverage to low-income Indian citizens. This project has been defined by the government as "the world's largest government-funded health-care programme"(24).

1.2 THE ITALIAN CONTEXT

The Italian population enjoys a high standard of living and, overall, an excellent quality of life. This positive status is the result of healthcare policies and welfare measures that have become well-established over the decades. In fact, when looking at the data over the past 40 years, the health status of Italian citizens has improved. Among the statistics, there is a particularly notable increase in life expectancy at birth, which, after Switzerland, was the second highest in Europe in 2011. All these achievements would not have been possible without the implementation of intelligent healthcare strategies that have led to an improvement in living conditions, increased access to education, enhanced quality and accessibility of healthcare, and greater availability of healthcare services. Despite these advancements, there is a significant difference in life expectancy between men and women, with women living on average 5.1 years longer than men. Furthermore, there is considerable variability in life expectancy among different Italian regions, with a gap of 2.8 years between the region with the highest life expectancy and the region with the lowest life expectancy, both for men and women(26).

Currently, Italy stands out for its high life expectancy and relatively low healthcare expenditure compared to GDP. This positions the country in an enviable situation. However, there are challenges closely linked to the complex history of the country and its healthcare system, where innovation and initiatives have often led to increased costs and difficulties, followed by rigorous cost containment measures that have sometimes been subject to criticism. In recent years, several challenges have emerged: population aging, the rise of chronic diseases, and increasing demand for care. The most recent and significant healthcare challenge is undoubtedly the COVID-19 pandemic and its impact on healthcare personnel, which has further strained the already fragile working conditions of healthcare professionals. Another aspect is the delicate balance between centralized control and regional control over time, which has resulted in the creation of not a single healthcare system, but rather 20 different healthcare systems, thus exacerbating disparities in access to care across regions(27).

For the management of organization and service delivery within each region, local institutions called ASLs (Local Health Authorities) have been established. These ASLs depend on the financing schemes formulated by the government of their respective regions, which vary from region to region. Preventive medicine, public health, primary care, and secondary care fall within the scope of ASLs. Each ASL is further divided into Districts, with each district serving approximately 60,000 inhabitants. Districts represent the institutional level directly involved in the provision of public health and primary care services. Additionally, health planning must align with the National Health Plan. Each region adopts a Regional Health Plan within 150 days of the introduction of the National Plan and receives feedback from the Ministry of Health regarding its consistency with the national plan(26).

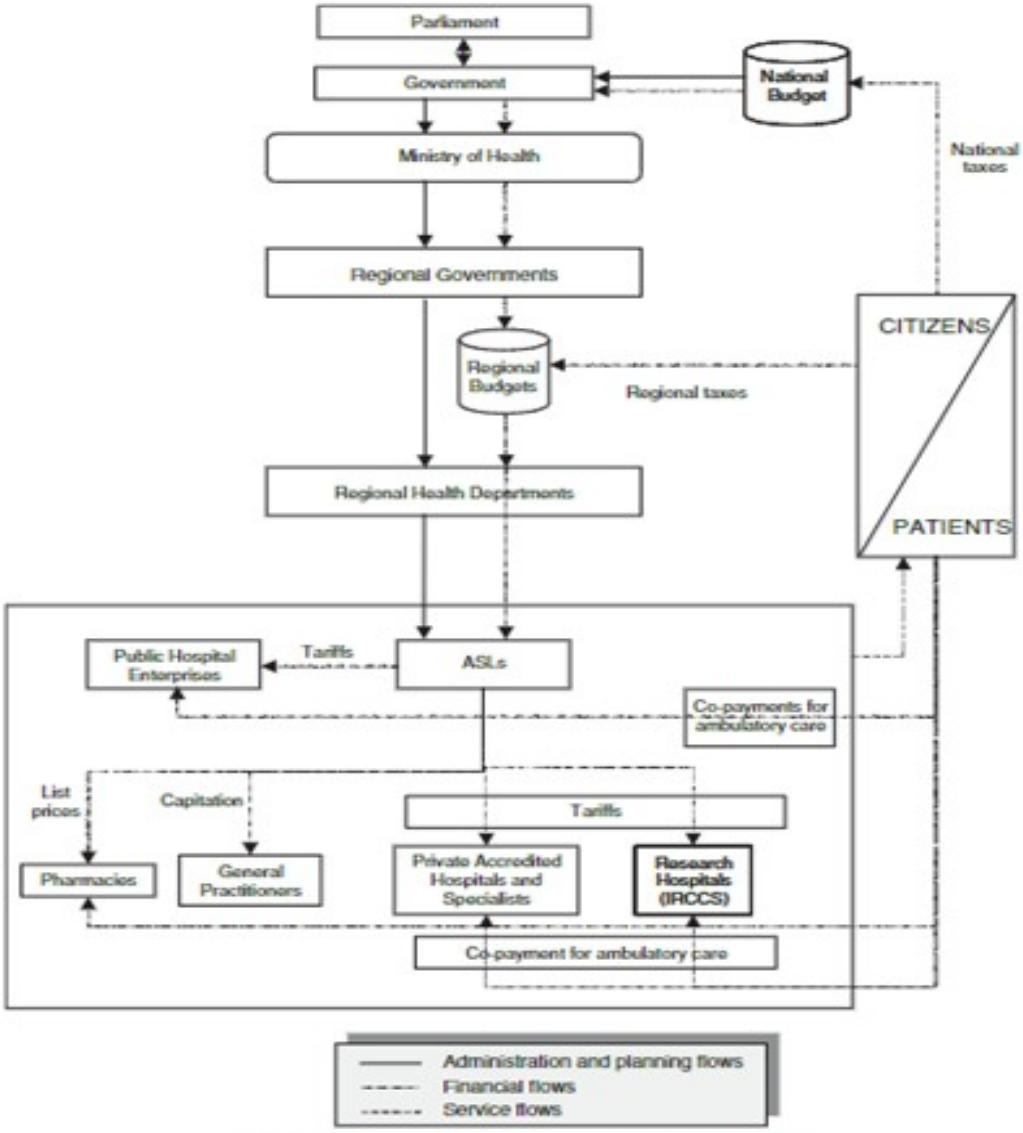


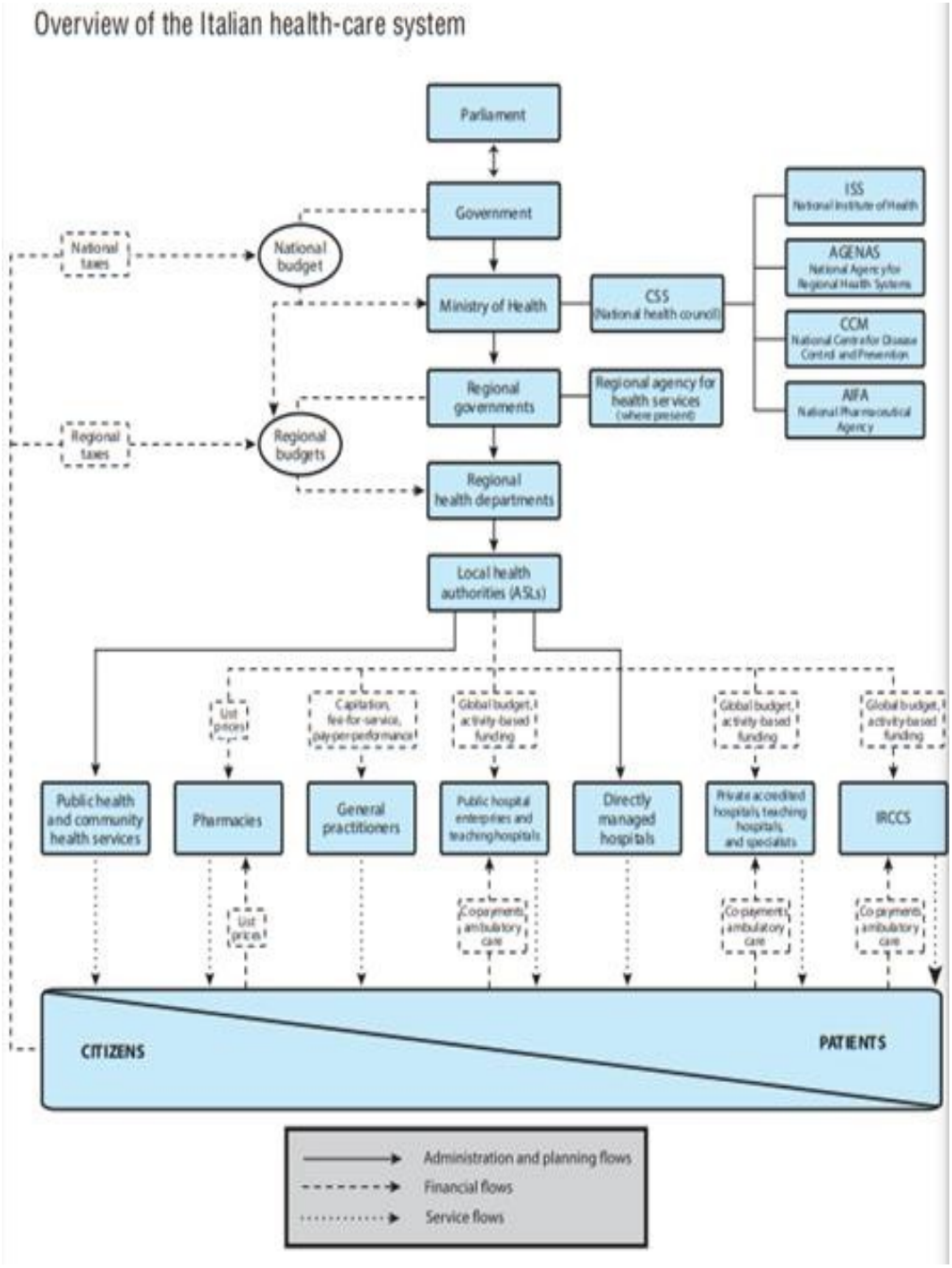
Chart 1. The Italian National Health Service (2002)

On January 31, 2020, the Italian government declared a national state of emergency lasting six months following the discovery of the first two cases of COVID-19 imported from Wuhan. From that moment until the complete lockdown of the country on March 22, 2020, the Italian healthcare system had to face an unprecedented crisis. No other nation in Europe had experienced a similar crisis yet. Italy was the first European country to be severely hit by the COVID-19 pandemic. Prompt and stringent lockdown measures were implemented, which served as a model for other European countries. The SARS-CoV-2 epidemic and the subsequent COVID-19 pandemic represent the most severe and challenging public health crisis that Italy has ever faced in its recent history. Two months after the start of the first wave, Lombardy, the most affected region in the country, recorded a peak of over 23,000 excess deaths(28).

1.2.1 THE ITALIAN HEALTHCARE SYSTEM

The National Health Service (SSN) in Italy was established in 1978 with Law No. 833. The system is organized in such a way that the majority of responsibilities in healthcare are entrusted to the regions, while the role of the central government is limited to coordination and supervision. The State has financial responsibility for the SSN; however, state contributions are limited. Regions may also exceed their allocated budget with additional expenses that must be financed through other sources(29). In addition to being responsible for determining overall funding needs, the central government defines the objectives and priorities of the SSN, primarily through the definition of "Essential Levels of Care" (LEA) and ensures that healthcare expenditures in each region do not exceed the allocated budget, in the absence of additional funds. Through various regional taxes, the regions may be able to sustain the basic package of healthcare services independently or with the assistance of additional funding provided by a newly established National Solidarity Fund.

In summary, while the trend in many other European nations is to centralize control of the healthcare system, Italy has adopted a highly decentralized model with complementary responsibilities assigned to the central and regional levels of government. At the local level, the entities operating within the framework of the SSN, known as local health authorities, provide community healthcare services, primary care, and public health services, while specialized and hospital care is provided either through public hospitals or accredited private providers(26).



The confusion regarding the division of responsibility and the inconsistency in healthcare planning at the national and regional levels have contributed to conflicts of jurisdiction between different levels of authority. Regional governments, which receive certain funds and economic resources from the central government, have repeatedly deemed these resources insufficient to meet the healthcare needs of their intra-regional populations. In many regions, public deficits were increasing and accumulating over time until intervention from the central government was required to cover the debts. The clear separation between funding responsibilities (central government) and spending powers (regional level) can be considered the main cause of the steady increase in healthcare expenses. Furthermore, there is a marked difference in the quality of healthcare between the northern and southern regions of the country. As a result, ensuring equal rights and accessibility to citizens across the country poses a problem. Another problematic factor regarding the structure of the SSN is the excessive politicization of the entities, as in some local health authorities, management was entrusted to politicians who administered resources and activities based on their electoral strength(26).

The central issue lies in the heterogeneity of regional arrangements. While northern and central regions are in line with international best practices and keeping up with institutional developments, southern regions seem to be lagging behind. This divergence between north and south reflects socio-economic and cultural factors that go far beyond the health care system. Moreover, the decentralization policies of the past two decades have not fostered homogeneity in regional systems, as they have selectively provided opportunities for further improvement to the best-equipped regions, leaving the southern regions behind.

The italian National Health Service has been subject to criticism due to the tendency to reduce healthcare expenditure without decreasing the provision of healthcare services to patients. Such fiscal constraints posed a risk of collapsing the system. However, thanks to the competence and efforts of healthcare professionals, the healthcare services have been able to be maintained and delivered according to the prescribed national benefit package. Nevertheless, there is still a risk that highly decentralized regional healthcare systems will continue to operate differently, further widening the gap between the southern and northern parts of the country.

1.2.2 Structure and organization

The Ministry of Health is assigned the role of coordinating and overseeing the entire national healthcare system.

At the national level, the main healthcare priorities are essentially immunization and screening. There are many voluntary and mandatory opportunities that are offered free of charge to healthy citizens with certain age and gender characteristics. The main programs are Pap tests, mammography, and colorectal screening.

In Italy, general practitioners and pediatricians (the latter of whom deal with children up to the age of about 6-10 years or, upon request from parents, up to the age of 14-16 years) essentially act as a filter in order to avoid overloading the Emergency Departments of public hospitals and to provide a more effective counseling service. Despite a well-defined organization and logistics, there has been a progressive increase in Emergency Department admissions in recent years(26). This phenomenon is due to the inappropriate use of SSN services by patients who, for example, go to Emergency departments for minor illnesses or preventive interventions that are instead the responsibility of general practitioners. To limit this problem, a co-payment of €25 has also been introduced.

The Italian healthcare system can be divided into three organizational levels.

Primary healthcare - The first level consists of basic services, such as general practitioners, pediatricians, and territorial care facilities. These professionals are the first point of contact for patients and provide medical visits, basic diagnoses, prescription of medications, counseling services, general health monitoring, and referrals to specialists when necessary. They are responsible for managing health at a preventive, curative, and patient monitoring level. These services are primarily provided by the National Health Service (SSN) and are free for all Italian citizens and legal residents.

Specialized healthcare - The second level includes hospitals and specialized clinics that provide more advanced and complex healthcare services.

The second level aims to ensure access to outpatient visits, diagnostic tests, specialized therapies, and surgical interventions. Another objective is to provide access to medical specialists, such as cardiologists, dermatologists, neurologists, and other specialized healthcare professionals. These services can be provided in both public hospitals and accredited private facilities, which may also have emergency departments. These services are primarily provided by the SSN, but there are also private facilities that offer similar healthcare services for a fee.

Hospital Care - The third level involves access to specialized hospital care, such as surgical procedures, intensive care, oncology treatments, rehabilitation, and palliative care. Public hospitals are the main providers of hospital care. Another viable option available to Italian citizens is represented by private hospitals that offer services for a fee. However, hospitals are equipped with emergency services to handle specific medical emergencies. Additionally, the third level comprises research and training centers that focus on scientific research and the training of medical and healthcare personnel.

According to the SSN, patients who present a specific condition can be referred by primary care physicians to the subsequent levels, such as specialist consultations or hospitalization, based on medical needs. Furthermore, the Italian healthcare system is managed at the regional level, with each Italian region being responsible for organizing and managing its own system. This means that the structure and organization of the healthcare system can vary significantly from one region to another(26,30).

1.2.3 Ensuring accessibility in the Italian Healthcare System

In Italy, healthcare is provided by the National Health Service (SSN), which guarantees automatic access to healthcare services for all Italian citizens and legal residents, regardless of any factors such as income or health status. The funding necessary to deliver these services primarily comes from taxes and social contributions paid by all Italian citizens and Italian businesses. However, individuals also have the option to independently arrange private health insurance coverage at their own expense.

Equity of access to healthcare is certainly one of the cornerstones of the healthcare system. The first major healthcare reform in this direction clearly outlined a system that, since the 1980s, has ensured universal access – accessibility that is not dependent on income or location and is capable of developing and providing disease prevention programs. The SSN covers all citizens and legally resident foreign nationals. Coverage is automatic and, since October 2013, includes citizens of the European Union who are in Italy. Both EU citizens/residents and citizens of countries with which bilateral or multilateral agreements have been made have the right to receive direct access to public healthcare services under the same conditions as Italian citizens or residents. Finally, since 1998, undocumented immigrants have also been included, initially granted access only to basic services. However, specific legislation has subsequently ensured that immigrants (both documented and undocumented) are eligible to receive the same public healthcare services available to Italian citizens. This has led to improvements in terms of services for children and mothers, as well as for certain infectious disease incidence rates.

Despite this premise, there are relevant disparities in the provision of healthcare among different socioeconomic groups. Both specialist care and hospital care are characterized by evident inequalities that favor the wealthy at the expense of the poor. It has been observed that there is an inverse correlation between interregional income variation and healthcare utilization. In other words, inequity is found in environments where the regional average income is lower. Hospital care presents less concerning data. However, in the case of access to general practice, access to specialist care, and access to emergency care, inequity is severely evident.

Other possible sources have also been studied to explain the differences in access. An important role is attributed to waiting times in public healthcare facilities and the regulation of private specialist care. Comparing the frequency of recourse to private care, which is paid out-of-pocket, for services that are also available free-of-charge from the national healthcare system in different countries, it has been found that the use of private facilities is much more common in Italy compared to England. This popular behavior has been justified by long waiting times.

The existence of the interregional divide takes on more defined boundaries between the north and south of the country, but the true origin of this inequity is socioeconomic class. Southern regions have a lower number of hospital beds, a greater presence of private facilities, and a poorer endowment of advanced medical equipment(26,30,31).

1.2.4 Classification of medications in the Italian Healthcare System

Within the Italian healthcare system, a classification has been introduced to clarify, establish, and regulate the level of reimbursement for medications. The three main classes are:

• **Class A**, which includes essential drugs. These drugs are reimbursable, but often require a co-payment that varies from region to region. This co-payment is intended for cost-sharing by the citizen. Class A drugs include those indicated for the treatment of severe, chronic, or acute diseases.

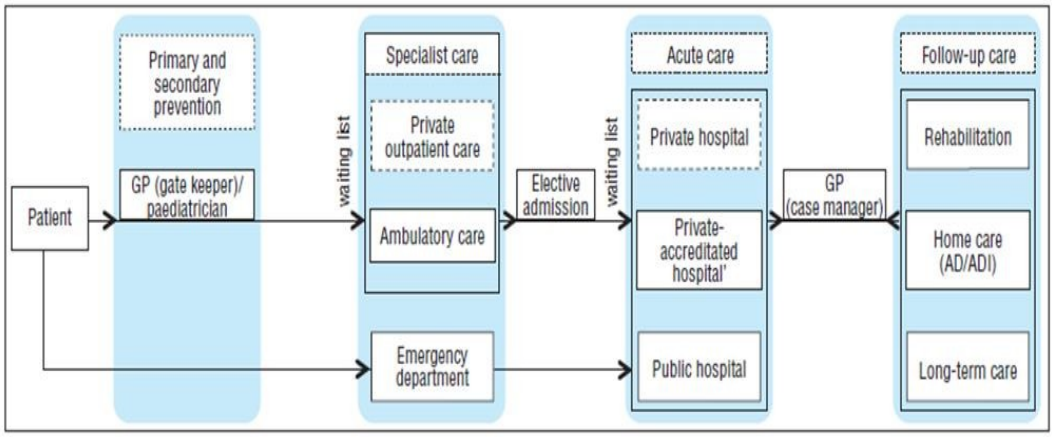
• **Class C** includes pharmaceutical products for which the cost is entirely borne by the citizen. Although these drugs are non-reimbursable by definition, some regions may choose to offer reimbursements for certain medications. Class C drugs are not considered life-saving or essential, but rather pertain to mild conditions.

• **Class H**, created for completeness, includes pharmaceutical products delivered exclusively in hospitals. This may be due to their mode of administration or their relevance to public health.

1.2.5 Patient pathway

A typical patient's care pathway is developed through various levels that include general practitioners, outpatient care, inpatient care, and primary care follow-up after discharge. In practice, the patient's first contact with the health care system occurs when his or her health problems become apparent. In these cases, the severity and nature of the health problem directs the patient to the main points of access to care. General practitioners (GP) often play a filter role and are the first point of contact for patients.

Fig. 5.2
Typical patient pathway



Source: Based on Ministero della Salute, Direzione Generale del Sistema Informativo e Statistico Sanitario, 2012.

Figure 5.2 illustrates a typical patient pathway for nonemergency health care. Each patient has access to free visits and the freedom to choose a general practitioner. In general, when GPs prescribe a specialist consultation, they may recommend a specific facility, taking into account the patient's particular needs in terms of urgency of care, proximity to the place of residence and quality of services.

For specialist care, patients can choose both public and private providers, according to their willingness to pay and to wait. After preliminary contact with a GP, patients can enter ambulatory care through public facilities located either in a hospital or in ASLs. The required intervention can be requested via a central booking point (Centro Unico di Prenotazione – CUP), in most cases by calling a special telephone number. CUP operators can suggest providers where the service would be available sooner, thus reducing waiting times. Such information about waiting lists covers both public and private accredited hospitals that provide reimbursable services. Services provided in public or private-accredited facilities require a referral and are covered by the SSN (apart from any co-payments due for outpatient services). For those who want to skip waiting lists or choose an individual specialist, and are ready to pay, care is also available outside statutory coverage through private providers or SSN specialists operating intra-moenia (who also have their own information systems for bookings and waiting lists). In such cases (private visits), patients have direct access to the facility without a referral from a GP and pay the total cost without any reimbursement from the SSN.

Ambulatory activities consist of complex specialist services, such as visits, diagnosis, laboratory services, curative therapy and rehabilitation care for patients who do not require hospitalization (Ministero della Salute, 2012d). In particular, they include specialized care services within the SSN that are accessible only with a GP's referral, except for dental care, obstetric and gynaecological services and paediatric care, which are services that can be directly accessed. Direct access is also guaranteed for private (intra-moenia) specialist services. All day care services consist of hospital admissions (one or a set of admissions) that are accessible through hospital clinicians and ambulatory specialists (both public and private) or through a GP's referral. The most frequent day care procedures are medical while surgical services have a lower average admissions rate(26).

1.2.6 Financing the Italian Healthcare System

To fund such a broad and complex set of services, it was necessary to establish a mixed system that combines different components. Part of the funding comes from general taxation and mandatory contributions, while another part comes from the national health fund. Funding also comes from patient co-payments for healthcare services, regional funds (as regions have partial management autonomy), and funds allocated by the European Union(26,32).

1.3 INSTITUTE FOR INDIAN MOTHER AND CHILD - IIMC

The Institute for Indian Mother & Child, in short IIMC, is an Indian non-governmental organization. The main aim is to improve the situation of people living below poverty line (BPL) through educationally, medically, economically & socio culturally. Since its inception, IIMC has worked with various international communities such as the International Medical Students Association (IFMSA) and individuals with a passion for development and solidarity, including students, teachers, economists, and social activists. The organization collaborates with these groups to support its mission. IIMC's projects regularly see participation from 15 to 25 international volunteers each month. It is committed to promoting literacy, women's empowerment and maternal and child health, as well as an economic program for the welfare and support of families. The organization is dedicated to advancing education, empowering women, and improving the health of mothers and children. Additionally, it has an economic plan aimed at benefiting and aiding families.

1.3.1 IIMC: history, context, and impact of the association

IIMC was established in 1989 by Dr. Sujit Kumar Brahmochary, an Indian physician, with the primary objective of offering fundamental healthcare to the rural underprivileged population. Over time, the organization has grown and diversified its operations to encompass various programs such as training and sponsorship initiatives, socio-cultural and economic projects, and agriculture and production activities. Presently, IIMC has evolved into a comprehensive development project that serves a community of over 300.000 individuals, thanks to over 30 schools and various healthcare facilities spread across the territory.

West Bengal is the fourth most populous Indian state, with a total population of over 91 billion individuals as of 2011. However, the impressive statistic is its population density: with a density surpassing 1.029 people per square kilometer (2.670 per square mile), West Bengal is the second most densely populated state in India. The focus of IIMC's efforts is on two highly populated districts in West Bengal, namely North 24 Parganas and South 24 Parganas. The two districts, North 24 Parganas and South 24 Parganas, are facing economic challenges, underdevelopment, and poverty. IIMC's mission campus is located in Tegharia, Sonarpur, which is south of Kolkata, West Bengal.

1.3.2 IIMC's objectives

The association has specific objectives, which include providing traditional education to rural communities, empowering women and families through microcredit, small businesses, social enterprises, etc. Additionally, the association seeks to improve primary healthcare, healthcare education, healthcare networks, and overall health promotion. It places emphasis on uplifting the social standing of rural women by prioritizing their economic, social, cultural, and intellectual advancement. The association aims to create women's groups to recognize social responsibility and encourage them to take initiative. Furthermore, the association intends to create a microcredit program to provide economic resources and motivation to women in need. It also advocates for other authorities to promote the values of various communities. Lastly, the association strives to make basic and affordable healthcare accessible and provides basic healthcare education.

IIMC operates in South 24 Parganas, a district in West Bengal that spans from the metropolitan area of Kolkata to remote villages in the Ganges delta. In West Bengal, the majority of the population (around 75-80%) resides in rural areas where transportation and communication infrastructure are not well-developed, leading to several related issues. Sanitation facilities are lacking, and the population often lacks access to potable water, which increases the risk of disease transmission.

Despite government efforts to implement village development projects, such as the construction of water pumps and sanitation facilities, poverty is still prevalent, with around 37% of people living below the poverty line. Moreover, the region is vulnerable to cyclonic storms, leading to annual crop destruction that further impoverishes farmers. The literacy rate in the area is 68% for men and 50% for women(32).

2. OBJECTIVES

This study aimed to describe the management of ambulatory patients in settings with low and high resources.

3. METHODS

3.1 Settings

The present study was conducted in three different settings (one low-resource and two high-resource settings) and in three different periods.

1. **Kolkata, West Bengal, India**
   In India, data were collected from various clinics belonging to the Institute for Indian Mother & Child (IIMC) in West Bengal, India: the indoor clinic in Kolkata and four different outdoor clinics in Kolkata and surrounding areas. The work was carried out in collaboration and with the assistance of Indian health personnel, particularly with the participation of Dr. Subash Mukherjee, who was helpful in overcoming the significant language barrier with patients and in formulating diagnoses and treatments.
2. **Abano, Italy**
   In Italy, for the data collection of adult patients, Dr. Ceron's medical practice in the city of Abano (PD) was chosen, and patient visits were conducted in collaboration with him during the specified period.
3. **Albignasego, Italy**
   To collect data from pediatric patients, Dr. Trevisan's medical practice in Albignasego (PD) was chosen. Under her supervision, patient data was extracted from the "Junior Bit 7" software.

Abano and Albignasego settings were chosen according to the medical student program of the University of Padova which includes training of medical students at the pediatric or the general medical office.

3.2 Study design

This study is a prospective observational study with a comparative purpose, which was conducted in two types of settings: a low-resource setting and two high-resource settings.

3.3 Inclusion and exclusion criteria

For this study, each patient who presented for a medical visit during the period when the research was conducted in Kolkata and Abano was considered eligible. Similarly, every pediatric patient registered during the period of interest in Dr. Trevisan's Junior Bit 7 software in Albignasego was considered eligible.

In India, patients who came for consultation or medical visits were randomly assigned to one of the 4 or 5 available doctors. All patients who attended Dr. Subhas Mukherjee's clinic during the given period were recorded. In Italy, all patients who presented themselves during the given period for a consultation or medical visit were considered, following the same random order in which they arrived, as done in India.

There were no exclusion criteria for this study: male and female patients of all ages with any type of pathological condition or treatment were considered.

3.4 Data collection procedure

To collect data for this comparative study, a predefined format was used. In the brief questionnaire administered to the patient during each visit, several parameters were investigated with slight variations among the three settings: Kolkata, Abano, and Albignasego.

1. For each patient in Kolkata, the age, gender, diagnosis/purpose of medical visit, prescribed treatment/medical service provided, total number of certified medical visits, distance traveled to the medical practice, means of transport and medical appointment day were investigated.
2. For each patient visited in Abano, their age, gender, diagnosis/purpose of medical visit, prescribed treatment/medical service provided, distance traveled to reach the medical practice, mode of transportation, and medical appointment day were investigated.
3. Regarding the data collected in Albignasego, patients were registered using the Italian software Junior Bit 7. Therefore, patients who were visited both in person and through telephone consultation during the period of interest

were recorded in an Excel file and subsequently, the computer database provided by the software was studied. This did not allow for obtaining all the parameters relevant to the comparative study, but the majority of parameters were successfully collected. Specifically, age, gender, diagnosis/purpose of a medical visit, prescribed treatment/medical service provided, and medical appointment day were investigated.

Finally, three ad hoc databases were created that provided all useful information for the study.

3.5 Data management

The data were collected and organized according to specific classifications.

1. Regarding the patient's clinical condition, it was chosen to report the diseases according to the affected organ system and area of interest. For example, a patient with tinea corporis was categorized under DERMATOLOGICAL DISEASES.
2. The treatments have been classified based on the classification of the active substance, ensuring that it is clear which type of medication each patient was receiving. The focus was placed on specific types, including:
    - Antipyretic/Analgesic
    - Antifungal
    - Antidiabetic
    - Antibiotic
    - Bronchodilators
    - Antihistamine
    - Antinflammatory/Corticosteroids
    - Nutritional supplements
    - Antihypertensive
    - Medical examinations

There are some specific details to mention. The only active ingredient belonging to the "Antipyretic/Analgesic" class is paracetamol. The "Medical examinations" class includes both specialized visits (cardiology visits, pulmonology visits, urology visits, etc.) and diagnostic investigations (X-rays, CT scans, ultrasounds, color Doppler, etc.), as well as laboratory tests (blood tests, urine tests, urine culture, etc.) and diagnostic tests (such as the urea breath test, SCOTCH test, etc.). Furthermore, regarding the database of collected data in Kolkata, another class of drugs was considered that was not included in the other two databases: "Antiparasitic drugs".

3.6 Privacy

To respect the privacy of each patient, neither the name nor the surname was required in Kolkata or Abano. In Albignasego, where the data were collected electronically, only the informations indicated in the paragraph titled "Data collection procedure" were recorded. Therefore, no personal identification information was included, except for the gender and age of each individual patient. The absence of personal information and the resulting anonymity of each patient ensure privacy. The data was recorded in a specifically designed data sheet for this study and was kept to protect confidentiality before, during, and after the study.

3.7 Primary and secondary outcome measures

In order to translate the objectives of this study into a scientifically rigorous and statistically analyzable form, numerous data have been collected, including clinical, therapeutic, demographic, and pathway-related data for each patient, describing the healthcare condition in both low-resource and high-resource settings.

The outcome measures were directly and personally recorded in the aforementioned two settings.

The comparison involved various aspects of the healthcare experience. The number of patients seen per day, the type of prescribed/administered medications, and the analyzed pathologies were taken into consideration.

Other comparative outcomes between low-resource and high-resource settings focused on aspects related to patients rather than healthcare personnel. For example, the mode of transportation used and the distance traveled to obtain medical visits were examined.

Lastly, the comparison also involved purely statistical data, such as the types of patients recorded based on demographic information like gender and age.

3.8 Statistics

Numeric variables were expressed as median, mean, and interquartile range (IQR), while categorical variables were presented as absolute and relative frequency (percentage). Continuous numeric variables were analyzed using the Mann-Whitney test, and categorical variables were compared using the Chi-square test. All tests were two-tailed, and a p-value of less than 0.05 was considered statistically significant. Statistical analysis was performed using R 4.3 software (R Foundation for Statistical Computing, Vienna, Austria).

Following the statistical analysis, significant differences were observed between the low-resource and high-resource settings regarding age group, number of daily visits, the distance travelled by patients to the medical center where the visit took place, total number of certified medical visits per patient, certain diagnoses / purpose of medical visit, prescribed treatment / medical service provided.

4. RESULTS

Between August 30, 2022, and October 4, 2022, 18 days of medical volunteering were conducted, during which 1208 visits were carried out at the medical facilities of the non-profit organization IIMC (Institute for Indian Mother and Child) in Kolkata, India, with the collaboration of Dr. Subash Mukherjee.

From May 1, 2023, to May 30, 2023, 10 days of medical internship were conducted, during which data were collected from 117 medical visits and 106 phone contacts at Dr. Ceron's general medicine clinic in Abano, Italy.

From June 1, 2022, to June 30, 2022, data from 417 medical visits and 230 phone contacts were recorded using the Junior Bit 7 software at Dr. Trevisan's basic pediatric clinic in Albignasego, Italy.

The number of days on which medical visits were conducted varied depending on the location. Specifically:

- The 1.208 patients in Kolkata and surrounding areas were visited over 18 days, with 0 phone contacts.
- The 117 patients in Abano were visited, and 106 phone contacts were recorded over 10 days.
- The 417 patients in Albignasego were visited, and 230 phone contacts were made over 25 days.

Please note: Out of the 106 phone contacts registered in Abano, it was not possible to obtain further data.

4.1 Age per day and sex

The first notable data pertains to demographics. When focusing on age, a significant age difference between the Indian and Italian populations becomes apparent. The proportion of pediatric patients among the total number of patients differs significantly between the two populations. To facilitate this comparison, everything was normalized on a daily basis.

Therefore, the average number of adult and pediatric patients visited each day was studied in the two settings under consideration:

- In the high-resource setting, an average of 11.70 adult patients and 16.68 pediatric patients were seen per day.
- In the low-resource setting, an average of 43.78 adult patients and 23.33 pediatric patients were seen per day.

Variable	Categories	India (n=1.208)	Italy (n=764)	p-value
Age group	Adults patients	788	115	**<0.0001**
	Pediatric patients	420	649	
Sex	Female	687	427	0.70
	Male	521	337	
Patient per day	Adults patients	43.8	11.7	**<0.0001**
	Pediatric patients	23.3	16.7	
Tot. patient per day		67.1		

If we also consider patients who requested phone consultations with their primary care physician or pediatrician, the Italian data would undergo significant variation, unlike the Indian data, which would remain unchanged, as the proportion of phone contacts with physicians in the low-resource setting is zero.

- In the high-resource setting: an average of 22.3 adult patients and 25.88 pediatric patients were visited or contacted per day.
- In the low-resource setting the data remain the same: an average of 43.78 adult patients and 23.33 pediatric patients were visited or contacted per day.

The sex of the patients did not show a statistically significant difference in the two populations studied (p-value > 0.05).

4.2 Total number of certified medical visits

The previous certified medical visits of 1.166 out of 1.208 patients in the low-resource setting were investigated (data for 42 patients could not be obtained). Additionally, this data could not be retrieved for the patients visited in Abano as the software did not allow it. In particular, in Kolkata, in 773 out of 1.166 cases, the patient did not have any documentation from a previous medical visit, and in 196 cases, they had only one paper record from a previous visit. The difference was found to be statistically significant.

Variable	Categories	India	Italy	p-value
Total number of certified medical visits	Median (IQR)	1 (1-2)	34 (15-58)	**<0.0001**
	Mean	1.86	47.43	

4.3 Distance travelled to the medical center

The distances traveled by patients to reach the location of their medical visits were investigated. This analysis could not be conducted for 163 out of 1.208 patients in the low-resource setting and for the patients registered in Albignasego, as the latter registration, unlike the other two, was done remotely and it was not possible to ask individual patients for this information. Once again, the difference was found to be statistically significant.

Variable	Categories	India	Italy	p-value
Distance (km)	Median (IQR)	20 (10-40)687	0 (0-2)427	**<0.0001**
	Mean	27.28	1.53	

4.4 Diagnosis / purposes of medical visit

After investigating the diagnoses of the patients included in the study, they were classified into categories. It emerged that in the low-resource setting, dermatological and infectious diseases are significantly more prevalent in terms of incidence compared to the high-resource setting. The result is that the difference in incidences is statistically significant for all categories considered, except for gastrointestinal diseases and metabolic diseases (p-value > 0.05).

Variable	Categories	India	Italy	p-value
Diagnosis / purposes of medical visit	Health evaluation (Bilancio di salute)	0 (0%)	30 (4%)	**<0.0001**
	Counselling	2 (0%)	145 (19%)	**<0.0001**
	Fever	34 (3%)	42 (5%)	**<0.0001**
	Musculoskeletal disorders	89 (7%)	31 (4%)	**0.0004**
	Ocular diseases	0 (0%)	20 (3%)	**<0.0001**
	Cardiovascular diseases	38 (3%)	12 (2%)	**0.04**
	Dermatological diseases	766 (63%)	30 (4%)	**<0.0001**
	Gastrointestinal diseases	73 (6%)	36 (5%)	0.24
	Infectious diseases	659 (55%)	28 (4%)	**<0.0001**
	Metabolic diseases	40 (3%)	17 (2%)	0.20
	Respiratory diseases	225 (19%)	187 (24%)	**0.002**
	Others	44 (4%)	85 (11%)	**<0.0001**

The medical conditions that show the most differences between the two populations under study are:

- Dermatological diseases, present in 766 out of 1.208 patients in the low-resource setting and in 30 out of 764 patients in the high-resource setting.
- Infectious diseases, affecting 659 patients in the low-resource setting and 28 patients in the high-resource setting.

In the case of respiratory, cardiovascular, and musculoskeletal diseases, the difference is statistically significant, but not as pronounced as in the previous two cases. For example, musculoskeletal diseases affect 7% of patients in the low-resource setting and 4% of patients in the high-resource setting.

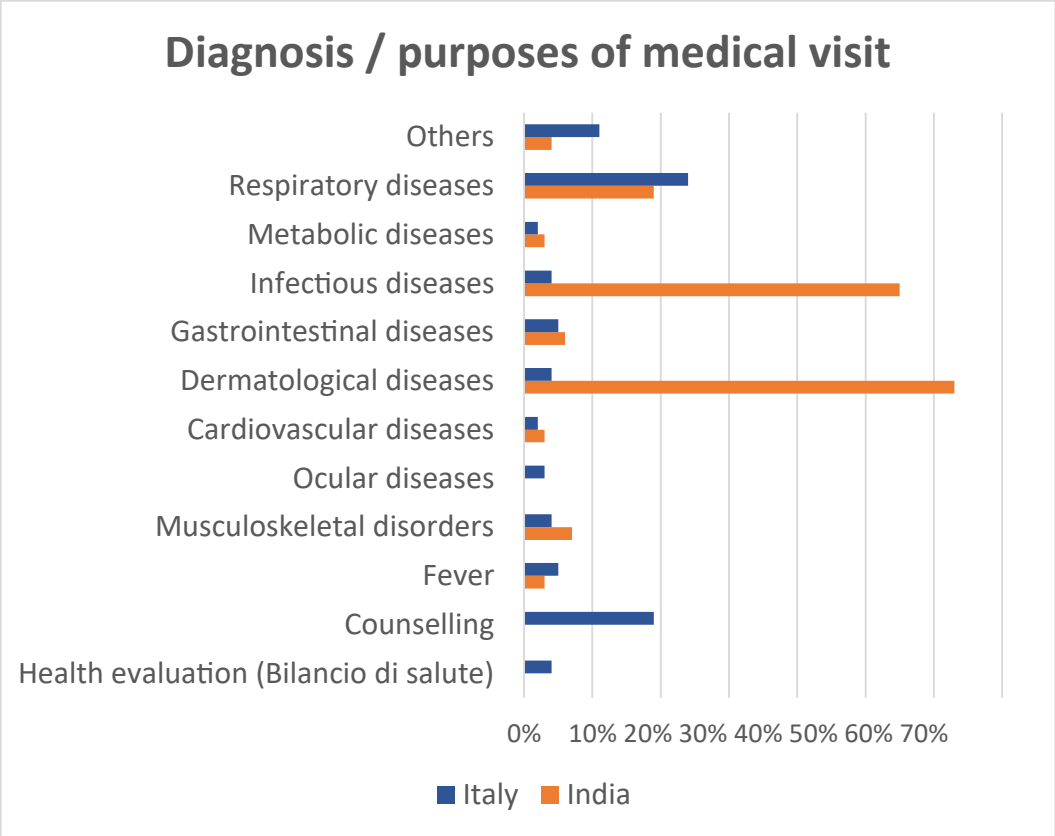
Fever was observed in 3% of medical visits in the low-resource setting and 5% of medical visits in the high-resource setting.

Additionally, there were no recorded cases of ocular diseases in the low-resource setting, while there were 20 cases in the high-resource setting.

In Italy, in the high-resource setting, a health evaluation of children called "Bilancio di salute" is commonly performed. It was conducted 30 times during the period under examination, according to the data recorded through the Junior Bit 7 software. In the low-resource setting examined for this study, no comparable

activity to this health evaluation was carried out.

Another possible reason for medical visits or contact with the doctor is counselling. This was found to be frequent in the high-resource setting (145 patients, approximately 19% of the total population) and very infrequent in the low-resource setting (only 2 patients, approximately 0%).



4.5 Prescribed treatment / medical service provided

Just like the diagnoses, the prescribed therapies / medical services provided were recorded in the database and organized into categories. It has been observed that all categories of drugs considered, except for bronchodilators (p-value > 0.05), show a statistically significant difference between prescriptions in the population of the low-resource setting and prescriptions in the population of the high-resource setting.

The case of antiparasitic drugs is particularly striking, as they were prescribed to 243 patients (out of 1.208) in the low-resource setting population, compared to 0 patients (out of 764) in the high-resource setting population.

Another noteworthy category is that of antifungals: these drugs are among the most prescribed in the population of the low-resource setting (425 prescriptions), while they are among the least prescribed in the population of the high-resource setting (only 2 prescriptions).

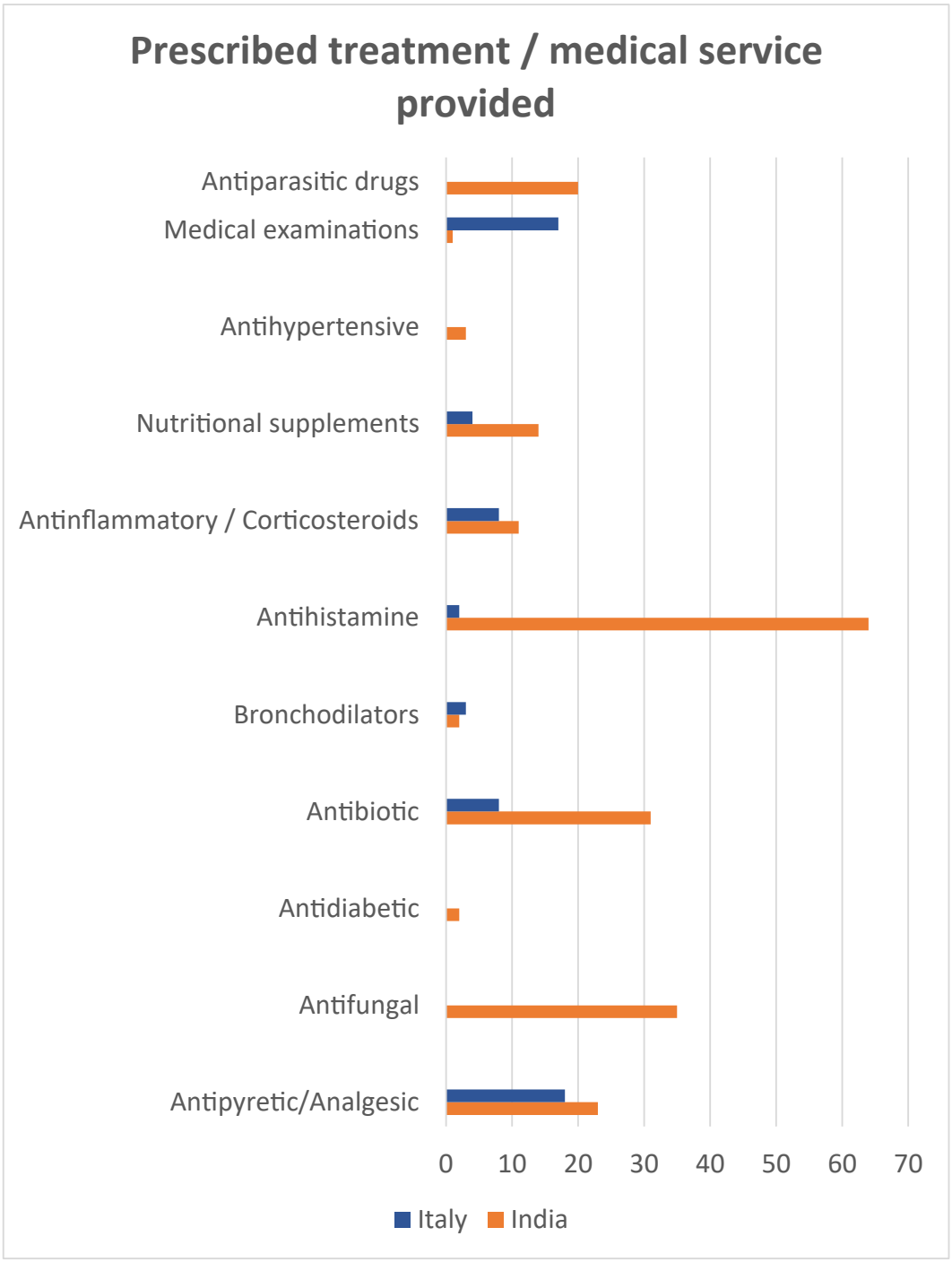
The most prescribed category of drugs in the low-resource setting is that of antihistamines, which were prescribed to 64% (771 individuals) of the patients examined. In contrast, in the high-resource setting, the prescription of antihistamines plays a more marginal role (2%).

Antibiotics were prescribed 379 times (31% of patient) in the low-resource setting population and 58 times (8% of patient) in the high-resource setting population.

Paracetamol, the only component considered in the category "Antipyretic/Analgesic," was prescribed in 23% of visits in the low-resource setting and in 18% of visits in the high-resource setting.

Regarding the category of “Medical examinations”, which includes the prescription of laboratory tests, specialized visits or consultation, follow-up tests, diagnostic tests and imaging tests, there were only 11 (1%) prescriptions in the low-resource setting and 131 (17%) in the high-resource setting.

Variable	Categories	India	Italy	p-value
Prescribed treatment / medical service provided	Antipyretic/Analgesic	276 (23%)	140 (18%)	**0.016**
	Antifungal	425 (35%)	2 (0%)	**<0.0001**
	Antidiabetic	29 (2%)	1 (0%)	**<0.0001**
	Antibiotic	379 (31%)	58 (8%)	**<0.0001**
	Bronchodilators	25 (2%)	21 (3%)	0.1089
	Antihistamine	771 (64%)	15 (2%)	**<0.0001**
	Antinflammatory / Corticosteroids	131 (11%)	58 (8%)	**0.017**
	Nutritional supplements	164 (14%)	31 (4%)	**<0.0001**
	Antihypertensive	37 (3%)	3 (0%)	**<0.0001**
	Medical examinations	11 (1%)	131 (17%)	**<0.0001**
	Antiparasitic drugs	243 (20%)	0 (0%)	**<0.0001**


Prescribed treatment / medical service provided
Antiparasitic drugs
Medical examinations
Antihypertensive
Nutritional supplements
Antinflammatory / Corticosteroids
Antihistamine
Bronchodilators
Antibiotic
Antidiabetic
Antifungal
Antipyretic/Analgesic
0
10
20
30
40
50
60
70
Italy
India

5. DISCUSSION

This study sought to provide an overview of the management of outpatient patients in both low-resource and high-resource settings and to capture the differences between the two settings.

The results of the present study demonstrate statistically significant differences for almost all variables that were investigated throughout the course of this study.

A) Among the most striking results, the difference in the average number of daily visits calculated in the two settings stands out. In the low-resource setting, where there was no distinction based on age group, adult and pediatric patients were seen by the same doctor who conducted an average of 67.11 medical visits per day, with 43.78 visits for adults and 23.33 visits for pediatric patients.

In the case of the high-resource setting, as mentioned earlier, two different facilities were visited to obtain data on adult and pediatric patients. These two patient types were seen by different doctors in separate clinics: the pediatric clinic in Albignasego (with an average of 16.68 patients per day) and the primary care clinic in Abano (with an average of 11.70 patients

per day). However, it should be noted that in a high-resource setting, there is an additional tool available: phone consultations with the doctor. These phone consultations were not carried out in the low-resource setting, while in Italy, they represent almost 50% of patient-doctor interactions. Even if phone consultations were to be considered equal to in-person visits, the workload (measured as the number of patients seen per day during working hours) of an Indian doctor would still be more than double compared to an Italian doctor, according to the study's data.

From the perspective of the workload of the doctor, it is therefore appropriate to compare the average data obtained in India (67.11 patients/day) with the averages obtained in Abano (11.70 patients/day or 22.30 including telephone consultations) and Albignasego (16.68 patients/day or 25.33 including telephone consultations) separately. This result reflects the objectives of the IIMC association, which provides healthcare services to approximately 100.000 patients every year(32) and enables access to healthcare in densely populated areas that would otherwise not have the opportunity to benefit from such services. Building on the concepts already discussed in the introduction, the patient load that had to be addressed in Kolkata is a result of insufficient investments in India’s public health(3) and poor quality of healthcare facilities(21) that does not allow for adequate capacity and provision of healthcare services in the face of significantly higher demand for healthcare.

B) The difference in age distribution of patients was statistically significant in the two settings, with a higher proportion of pediatric patients in India compared to Italy.

This result reflects the age distribution in the two countries where the study was conducted. In Italy, the percentage of minors in the total resident population is approximately 16% (ISTAT), while in India, it is estimated to be around 28% (United Nations).




C) In the preparation of this work, a difficulty was encountered, which was decided to be taken into account: while patients in Italy all had a known and recorded medical history thanks to the software used by general practitioners and pediatricians, in Kolkata, there was often the impossibility of obtaining detailed information about the patient undergoing the medical visit. However, there were some cases in the low-resource setting where patient information was available through paper records from previous visits, which included diagnosis and prescribed medications. The striking result was that in Kolkata, 66% of the visited patients did not have documentation of a previous visit, and only slightly over 1% had documents dating back to 10 or more previous visits. Additionally, the doctors' stations were not equipped with computers or any other computerized support capable of digitizing a medical report.

The significant difference highlighted by this finding can be attributed to the definition given to these two settings: the low-resource setting does not provide the opportunity for the doctor to electronically record individual patient information using dedicated software, as is the case in the high-resource setting. The large amount of information that is lost is certainly one of the reasons why the quality of healthcare in the frequented setting is poor(12,22,23).

D) Another finding with evidence of statistical difference between the two settings is the distance traveled by the patient to reach the location where the medical visit took place. It was found that in the low-resource setting, the patient had to travel an average of over 20 km more compared to the patient in the high-resource setting.

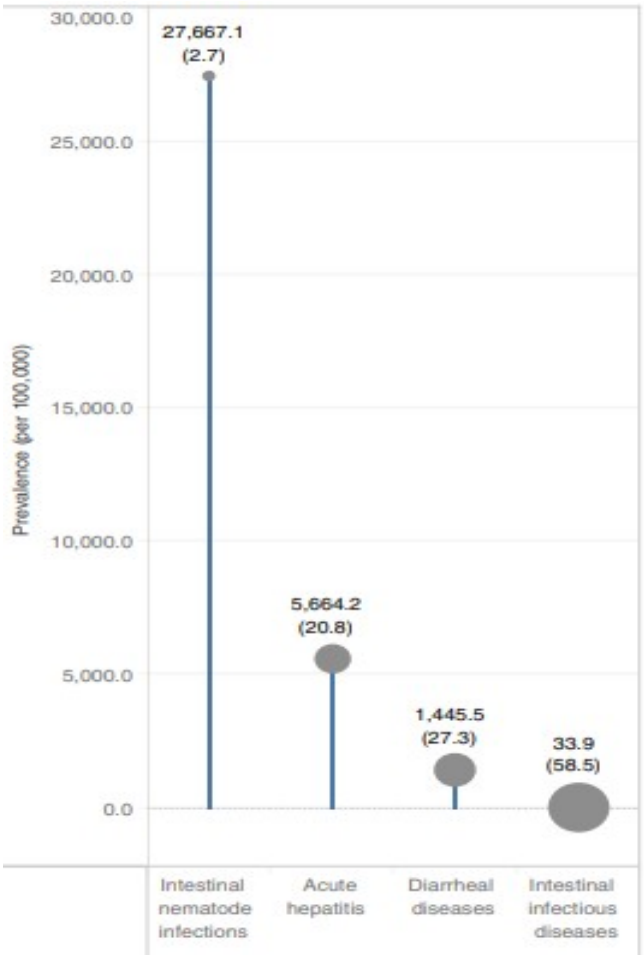
This data fully reflects the accessibility issues that exist in West Bengal and have prompted the government to implement reforms such as the Swasthya Sathi Programme(11). The problem of scarcity of healthcare facilities and the resulting excessive distance is widely felt throughout India, especially in rural areas. This problem is particularly pronounced in West Bengal, where the lack of nearby healthcare facilities is the primary reason why citizens avoid using public healthcare services. 49.6% of the interviewed citizens reported this type of difficulty, which in the eyes of the citizens is even more significant than excessive waiting times (46.5%) and low healthcare quality (35.0%)(12).

E) One of the most important parameters that have been analyzed is that of diagnosis / purposes of medical visit. The most common categories observed in the low-resource setting are dermatological diseases (63% of cases), infectious diseases (55% of cases), and respiratory diseases (19% of cases). In the high-resource setting, the most common category is respiratory diseases (24% of cases). Additionally, in 145 cases (19% of the total), the reason for the visit falls under the category of "counselling," meaning medical consultation. In India, on the other hand, patients who requested medical counselling were only 2 out of 1.208 (approximately 0%).

According to scientific literature in Italy, cardiovascular diseases (CVD) account for 44% of deaths. Ischemic heart disease is the leading cause of death, accounting for 28% of cases(33). In India, cardiovascular diseases are the predominant cause of mortality, representing 25% of all deaths. Stroke and ischemic heart disease emerge as the primary contributors to these deaths, comprising over 80% of CVD cases. Despite variations in the prevalence of cardiovascular risk factors across different regions, cardiovascular diseases have become the leading cause of death throughout the country, including poorer states

and rural areas(34). This study observed a relatively small difference in the number of patients requiring outpatient medical visits between the two settings considered.

Scientific literature indicates that in India, over 90% of gastrointestinal and liver disorders are attributed to infectious causes. Among these, the most common is intestinal infection caused by nematodes(35). These findings fully support what has been observed in this study, where it was found that in the majority of cases examined in Kolkata, conditions falling under the category of "gastrointestinal diseases" are infections caused by pinworms (nematodes).



Some of the previous studies conducted in India and other developing countries have reported a high prevalence of chronic lung diseases (CRD), such as chronic bronchitis, in rural communities, especially among non-smoking women(36). According to a scientific article published in "Lung India," among the respiratory disorders observed in India, asthma has been identified as the most common respiratory disorder, followed by allergic rhinitis, COPD, and rhinosinusitis. The combination of symptoms reported by this patient population includes cough, sputum production, runny nose, sneezing, and itching(37). Similarly, in the present study, the combination of cough and cold symptoms was found in 196 cases out of 1.208 patients examined (over 16% of the cases). It can be stated that the data from this thesis confirm what has been observed in scientific literature regarding respiratory diseases in India.

In the scientific literature, there is a lack of studies on the prevalence, healthcare seeking, treatment compliance, and treatment outcomes of skin diseases in rural areas of India. Although they are not generally considered among the most common conditions, there are studies confirming the significant epidemiological importance of dermatological diseases. An article in the Indian Journal of Community Medicine observed a high prevalence of skin diseases in Indian villages. The most frequent conditions within the field of dermatology were infections and eczema(38). Similarly, the work conducted in this thesis reports results that demonstrate the epidemiological importance of dermatological diseases, often overlooked in other studies. Skin diseases were found in 63% of the visited patients (766 cases). In this study, among the 1.208 patients examined in a low-resource setting, 358 cases of tinea, 244 cases of scabies, 63 cases of contact dermatitis, and 35 cases of ecthyma were observed. The burden of dermatological diseases in the high-resource setting is significantly lower. In Italy, according to the data collected in this study, only 4% of patients received a diagnosis within this category. The reason for this difference is likely to be found in the significantly different environmental conditions encountered in the two settings. Due to the nature of dermatophytosis being primarily found in tropical regions, its high prevalence often goes unnoticed in scientific research, despite its significant impact(39) that has been proven by the present study. The situation of dermatophytosis management in India, which ranks first among the diagnosed

conditions in this study (358 cases of tinea), is chaotic due to the lack of local scientific evidence, and treatment decisions are often based on non-scientific grounds. There are also new concepts and therapeutic approaches being promoted without a solid scientific foundation, such as the combined use of oral antifungals, multidrug treatment, and regular medication usage(39).

Among the most common reasons that prompted patients to visit the doctor in the high-resource setting is the “Counseling” service. In 145 cases (19% of the total), patients sought the doctor's advice and clarification without requiring a formal diagnosis or treatment. This trend is largely absent in the low-resource setting, where counseling services were provided to only 2 out of 1.208 patients. The reason for this difference lies in the medical knowledge of the population. The average knowledge of Indian citizens is increasing, and as a result, the doctor-patient relationship is also changing. These behavioral changes are not yet observed in poor and rural areas of India, whereas in a high-resource setting like Italy, patients tend to be more informed about their condition and health risks(40).

F) The study of medication usage has provided important details reflecting the differences observed in the study of diagnoses. The most commonly used class of drugs in the low-resource setting was antihistamines

(prescribed to 64% of patients), followed by antifungals (35%), antibiotics (31%), paracetamol (23%), and antiparasitic drugs (20%). In the high-resource setting, paracetamol ranked first (prescribed to 18% of patients), followed by the category "Medical examination" (17%), which includes all clinical examinations, diagnostic tests, and further investigations, as well as referrals to specialist visits.

The widespread use of antifungal and antiparasitic drugs in low-resource settings is primarily driven by the need to address the high number of cases of tinea and scabies. Comparing this to high-resource settings, it can be observed that only 2 prescriptions of antifungals (approximately 0%) and no prescriptions of antiparasitic drugs were observed, whereas in Kolkata there were 425 and 243 prescriptions, respectively. The use of antifungal drugs in low-resource settings is driven by the high prevalence of fungal infections and the lack of long-term patient follow-up, which often leads to poor treatment compliance and inadequate healing. As a result, there is a persistent demand for antifungal drugs (as well as other classes of drugs), and the epidemic of infections such as tinea continues to spread(39). The use of antibiotics recorded in India indicates a certain risk of antibiotic resistance due to sometimes improper utilization of this class of drugs(41). In contrast, in the high-resource setting, antibiotic guidelines have been followed. For this reason, and also because India has a higher burden of infectious diseases, the number of prescribed antibiotics in Italy has been found to be significantly lower.

5.1 Differences and remarks

The data collected in this study suggest that before engaging in a similar volunteering and scientific analysis experience in a low-resource setting like West Bengal, India, medical students or interested healthcare professionals should carefully consider their expectations regarding a reality that proves to be significantly different from that experienced in a high-resource setting. The expected differences will encompass both clinical data regarding diagnosis and treatment, as well as aspects of patient life and the role of healthcare professionals within the healthcare system. In the low-resource setting, it will often be necessary to face challenges arising from the disorganization and chaotic service encountered. The perception encountered in India is that of a setting where more emphasis is placed on the quantity of patients who can benefit from the healthcare service offered rather than on the quality of the service itself. Another profoundly different aspect between the two analyzed settings is the computerization of the medical profession: the use of software and telephones has become integral parts of any high-resource setting, while in low-resource settings, their utilization is limited or non-existent, especially in rural areas, making data collection challenging, such as those related to short and long-term patient follow-up.

5.2 Limitations of the study

During the course of the study, several challenges and limitations were encountered that should be taken in account.

- In both settings, data collection was based solely on medical visits and phone calls received during working hours. However, it is possible that the same doctors who assisted with the study (Dr. Mukherjee in Kolkata, Dr. Ceron in Abano, Dr. Trevisan in Albignasego) may have conducted additional visits outside of working hours. This is particularly relevant for the phone consultations received in the high-resource setting, which may not adhere to the doctor's working hours.
- Another limitation is related to the counting of previous visits. The limitation stems from the fact that the study was conducted within a specific setting in India, utilizing the healthcare facilities and personnel of the IIMC association, which primarily operates in Kolkata, Dhaki, and surrounding areas. It is possible that utilizing public healthcare facilities or the services of another nonprofit organization would have resulted in higher-quality follow-up.

6. CONCLUSIONS

Significant differences were observed between the Indian and Italian settings compared in the study. The choice of healthcare facilities affiliated with the Institute for Indian Mother and Child allowed for a full medical experience in one of the poorest areas of West Bengal, India. This provided the opportunity to fully engage with a healthcare system specifically designed to meet the healthcare needs of the local population and capable of providing assistance to a large number of people. However, a higher number of medical visits per day is not necessarily associated with better healthcare management. In India, daily challenges were faced due to the higher burden of infectious diseases compared to Italy, which had implications for medical prescriptions, which, however, should be subjected to a more accurate, careful and scientifically based choice. A more state-of-the-art system provides a range of prescriptions for specialized visits, diagnostic tests, and laboratory investigations, rather than relying solely on physical examination for diagnosis. Nonetheless, the efforts made by the Indian government and NGOs to optimize their limited resources should be recognized. The quality of healthcare services provided in the chaotic Indian setting appears to be lower, and the implementation of digitalization in the medical profession would improve this aspect, starting with the ability to ensure proper patient follow-up. The digital evolution of the healthcare profession would also promote greater healthcare accessibility, with potential implications for public health in rural areas of the country. The presence of non-profit organizations, such as IIMC, that facilitate healthcare accessibility for citizens who otherwise would have limited access in low-resource settings, is certainly important.

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