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VULNERABILITY OF THE SANITARY INFRASTRUCTURE IN RELATION TO COVID-19 IN THE DISTRICT OF CASTILLA-PIURA 2021-2022

VULNERABILIDAD DE LA INFRAESTRUCTURA SANITARIA EN RELACIÓN A LA COVID-19 EN EL DISTRITO DE CASTILLA-PIURA 2021- 2022

Luis Fernando Chero-Córdova [1,a], Guisela Yabar-Torres [2,b]

ORIGINAL PAPER

ABSTRACT

Objective: The relationship between the sanitary infrastructure, considering three aspects such as: equipment and supplies; built environments; humanization of care against COVID-19 in the district of Castilla - Piura in the year 2022. **Methods:** It adopts the Hermeneutic paradigm, with a cross-sectional, qualitative design, based on surveys applied to a statistical sample from the Castilla sector, unstructured interviews were conducted, aimed at health professional experts. **Results:** It is observed that 100% of the II and III level hospitals and health centers in Piura are in inadequate conditions to achieve efficiency and effectiveness in care, both in infrastructure-equipment, in built environment and humanized. **Conclusion:** The deficient state of health establishments has determined the increase in cases of COVID 19, during the pandemic, because they do not have adequate environments to treat different pathologies, as well as due to inadequate zoning of respiratory and vector isolation areas. , those that must respond to the reality of this Region; This situation raises the need to formulate a regional contingency plan, the same one that guarantees priority and quality care in emergency situations, as well as life during the pandemic.

Keywords: COVID-19, Facility design and construction, Health infrastructure, Equipment and supplies, Built environment, Humanization of assistance, Vulnerability. (Source: MESH-NLM)

RESUMEN

Objetivo: Analizar la relación entre la infraestructura sanitaria: equipos y suministros, ambientes construidos, humanización de la atención y la COVID-19 dentro del Desarrollo Urbano Sostenible en el distrito de Castilla - Piura en el año 2022. **Métodos:** Adopta el paradigma hermenéutico, con un diseño de tipo transversal, de tipo cualitativo, en base a encuestas aplicadas a una muestra estadística del sector de Castilla; a su vez, se realizaron entrevistas no estructuradas, dirigidas a expertos profesionales de la salud. Resultados: Se observa que el 100% de los hospitales de II y III nivel y centros de salud en Piura, se encuentran en condiciones inadecuadas para lograr la eficiencia y la efectividad en la atención, tanto en infraestructura sanitaria, equipos y suministros, como en los ambientes construidos y humanizados. **Conclusión:** El estado deficiente de los establecimientos de salud, ha determinado el incremento de casos de COVID-19, durante la pandemia, porque no cuentan con ambientes adecuados para atender diferentes patologías así como por la inadecuada zonificación de las áreas de aislamiento respiratorio y de vectores, las que deben responder a la realidad de esta región; esta situación plantea la necesidad de formular un plan de contingencia regional, la misma que garantice atención prioritaria y de calidad frente a situaciones de emergencia, así como la vivida durante la pandemia.

Palabras clave: COVID-19, Infraestructura sanitaria, Equipos y suministros, Ambientes construidos, Humanización de la atención, Vulnerabilidad. (Fuente: DeCS- BIREME)

[1] Universidad César Vallejo.
[2] Escuela de Posgrado Universidad Ricardo Palma, Lima-Perú.
[a] Magíster en Administración y Dirección de Proyectos.
[b] Doctora en Medio Ambiente y Desarrollo Sostenible.

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INTRODUCTION

Globally, an unprecedented health crisis has been experienced since January 20, 2020, when the WHO (World Health Organization) declared it had gone from epidemic to pandemic and was called COVID-1 No country was prepared to deal with such a situation except China, because of its background, a country that, since 2003, had already visualized a contingency plan[1]. The coronavirus family can cause from a common cold to pathologies of greater complexity, such as that observed in severe acute respiratory syndrome (SARS) or Middle Eastern respiratory syndrome (MERS). The new coronavirus (COVID-19) is a strain that is transmitted from person to person through small water-based droplets or particles that remain in the environment when sneezing or coughing. This means that infection can occur without maintaining physical contact with the infected person[2].

According to a Minsa report, as of May 27, 2020, globally 5 848 536 cases have been detected; 359,661, deceased; 2,537,939, recovered patients and 2,950,936, active cases; the lethality is 6.15%. In Peru,1 345 905 total cases, deaths are 3983; the lethality is 2.93%. In Piura, of 6039 cases detected, 481 have died with a lethality rate of 7.96%:[3] for December 31, 2022, Peru, reported 4 479 771 positive cases, within its twenty-four departments. One of them, Piura, had 160,836 positive cases and the district of Castilla was one of the most affected[4].

This situation, in turn, brought into evidence deficiencies in the health system, especially in the infrastructure and equipment of health facilities. In the proper design of their physical spaces and in the humanization of users or patients; likewise, there is the lack of attention of the competent authorities to provide timely responses in the face of the pandemic, as is the case of the district of Castilla, which is the context of this research. The study site is the Cayetano Heredia Hospital (HCH), located in the department of Piura, whose construction began in 1972 in the district of Castilla, between the avenues Guillermo Irazola and Independencia, was inaugurated on October 2, 1974 in the government of General Velasco Alvarado. Consequently, the old Hospital de Belen, also located in Castilla, which was created in the early years of the colony, was closed. During the first stage of Alan Garcia's government, the hospitals of the Ministry of Health were integrated with those of the Social Security, and since then, it has been under the administration of the IPSS (Peruvian Institute of Social Security), which later changed its name to EsSalud by law 27056 of January 28, 1999 [5].

The Hospital III Cayetano Heredia is the institution of the highest complexity of the Health Network of the Piura departmental Management and the Grau Region, a level III hospital, of regional reference; offers basic and specialized care services, in the areas of outpatient consultation, hospitalization, ICU, surgical center and emergency[6]. In a 2020 study on quality of work life, 60% of their healthcare providers rate QWL as fair, as institutional support is rated very poor (70%). 81.7% refer to a lack of job stability. It was concluded that the QWL found is regular and deficient. The lowest levels of satisfaction were in institutional support and job security [6].

It has been observed, especially in Peru, that in hospitals the infrastructure and its equipment do not meet the minimum normative standard, they are not flexible to adapt to change; nor do they have sufficient human and material resources or contingency plans to deal with a health disaster such as COVID 19[7]. Therefore, they had serious constraints to cope with the demand of COVID-19 and any other similar; it is thus that this pandemic was tasked to bare the current care in the health services and show all the restrictions that exist in the establishments to provide adequate health care to the people and much more in a pandemic context.

The major existing problem is the antiquity and physical and functional obsolescence of hospitals, mainly of MINSA [8]. Peru nationally has 181 hospitals, only 16% of the Ministry of Health hospitals are less than 25 years old, 37% have an age of 25 to 50 years, 36% are more than 50 years old[9]. This means that the hospitals are very old with obsolete infrastructure, inadequate medical oxygen system, lack of oxygen generation plants, insufficient and deficient oxygen supply, and inadequate air control system in ICU environment [7], this situation determined the increase in COVID cases and deaths, both in Peru and in Piura and Castilla. It is necessary to unveil the idea of quality, associated with words such as: good, excellent, brilliant and expensive, qualifiers that do not guarantee quality.

ORIGINAL PAPER

A very expensive hospital building does not necessarily mean it is of good quality; it may have many undesirable characteristics, such as the inadequate functioning of proximity relations between departments[10]. And it is that today there is much discussion about the supremacy of the aspects of design, humanization, and spatial perception of hospital environments over technological aspects, specifically medical, and many investigations have been carried out that confirm the therapeutic effects that the physical environment has in the recovery process of patients [11,12,13,14]. Likewise, health risks to hospital personnel resulting from inadequate designs of the physical infrastructure have been studied [15,16].

Humanization, on the other hand, synthesizes all the actions, measures and behaviors that must be generated to guarantee the safeguard and dignity of every human being as a user of a health facility. This means that the user is at the center of every design decision, not only as a producer of functional requirements, but as an expression of the human values to be considered[17]. For the design of the physical environment, organizational system and behavioral models of a health facility, it is necessary to begin by establishing the cultural and physical context of the user. In order to favor a humanized perception of the facility and promote a process of identification of the user with the symbols, messages and meanings that the appearance of the building can communicate[17].

This research aims to analyze the relationship between health infrastructure, for which three aspects have been considered: equipment and supplies, built environments, humanization of care in the face of COVID-19 in the district of Castilla - Piura in the year 2022; therefore, their results may contribute to a better knowledge of other realities and thus contribute to subsequent research

METHODOLOGY

The research design is non-experimental, explanatory-level, with a mixed approach; therefore, quantitative methods such as survey and qualitative such as in-depth expert interview are applied, within the hermeneutic paradigm, for which several sources of information such as the Pan American Health Organization (PAHO), World Health Organization (WHO), Ministry of Health (MINSA). vulnerability, health infrastructure, COVID-19, equipment and supplies, built environments, humanization.

According to the 2017 Census of INEI, the population of the district of Castilla is 160, 201 inhabitants: because of a large population, the statistical selection criterion, of proportional attachment, was considered to determine the sample. The questionnaire, as well as the guide of the in-depth interviews were validated by expert judgment, for which referred instruments were sent to two doctors in architecture and a methodologist; once validated, he proceeded to apply them in different areas of the district of Castilla.

The results of the survey, with 21 questions, were processed with the IBM Statistic SPSS 27.

RESULTS

After having applied, reviewed and analyzed the results of the surveys to the local inhabitants of the district of Castilla and the interviews to the health experts, the following is observed in terms of the aspects: health infrastructure, equipment and supplies, controlled environments and humanization of care:

A.Health infrastructure, equipment and supplies

For this aspect, sanitary infrastructure, equipment and supplies are defined as the set of elements and services that are considered necessary for the optimal functioning of a building and organization; and thus, provide a quality service that meets the needs of its users.

According to PAHO[18], in the technical working document of April 2020, it is recommended to "reconvert and expand the existing infrastructure many times, making it more flexible and adaptable for the use of its spaces and thus organize in the best way the patients admitted and who require care with different degrees of complexity. It is necessary for hospitals to have sufficient medical equipment, drugs, and clinical supplies to respond effectively to the needs of patients."

Cambra [19] states that design decisions should be based on credible and sustained research on the needs of users. In order to obtain the best possible results; thus, an infectologist physician from Minsa pointed out in an interview, whose opinion is that: "Many of the health facilities in Piura have been designed and built without taking into consideration aspects that have occurred during the pandemic and this because it was recent. For example, the air flow should be taken into consideration for hospitalization or observation of patients in health facilities where respiratory diseases are treated; therefore, what has been done is to set the environment for the hospitalization or observation of patients in health facilities where respiratory diseases are treated. Air flow must be taken into consideration for the hospitalization or observation of patients in health facilities, where diseases that are transmitted by respiratory tract are treated; therefore, what has been done is to set some places inside these existing facilities, but, if we talk about a correct sanitary infrastructure, these would not be so adequate" [20].

Nevertheless, in the interview with an attending physician of the Intensive Care Unit (ICU) of Cayetano Heredia Hospital in Piura, he said: "Initially there was no infrastructure and proper equipment to deal with the pandemic. Currently, there is already a contingency plan, from 2020 to date, there is a fairly acceptable containment capacity; but, in a centralized manner, only the hospitals of highest capacity in the Piura Region as they are: the José Cayetano Heredia Hospital, the Hospital de la Amistad Peru – Corea Santa Rosa and the Sullana Hospital [21].

ORIGINAL PAPER

Table 1. Health infrastructure, equipment and supplies that failed to cope, with patient restoration and satisfaction.

Item	Sanitary infrastructure, equipment and supplies	Very low	Low	Regular	High	Very high	250 respondents
3	The health centers that have made it possible to deal with the COVID 19 pandemic.	25.20%	31.60%	35.60%	4.80%	2.80%	100%
8	Contributed to the recovery of COVID 19 patients.	10.80%	44.00%	39.60%	5.60%	0.00%	100%
9	Patients were satisfied.	24.80%	41.60%	30.40%	2.80%	0.40%	100%
10	Lack of adequate infrastructure and equipment in health facilities	12.00%	24.00%	35.60%	20.80%	7.60%	100%

Source: Own elaboration. Results of the questionnaire applied to the population of the district of Castilla - Piura.

These appreciations of the health experts relate to the results of the questionnaire applied to the residents of the district of Castilla - Piura, such as shown in table 1. Which evidences the results of items 3, 8, 9 and 10 of the questionnaire to the residents: it is noted that of the 250 people surveyed, more than a third of the population surveyed considers that health facilities have a deficient health infrastructure, equipment and supplies, with which they had to deal with the pandemic due to COVID-1. Similarly, about half of the respondents precise that this situation did not allow proper care or rehabilitation of patients, which plunged into grief to patients and family members around them.

Table 2. Sanitary infrastructure, equipment and supplies in the laboratories and oxygen plants.

Item	Sanitary infrastructure, equipment and supplies	Nothing Adequate	Poorly Adequate	Regularly Adequate	Adequate	Very Adequate
6	Health facility laboratories are adequately equipped to perform COVID19 tests.	13.20%	42.80%	29.20%	12.00%	2.80%
7	Health facilities were equipped with oxygen equipment to care for COVID19 patients.	39.20%	39.60%	19.60%	1.20%	0.40%

Source: Own elaboration. Results of the questionnaire applied to the population of the district of Castilla - Piura.

Furthermore, Table 2 corroborates what the medical experts in items 6 and 7 stated, which also shows the lack of equipment in the laboratories as well as the lack of oxygen plants in the hospitals and health centers.

B. Built environments

For this analysis, built environments are defined as physical spaces with large diaphanous rooms that allow for a more welcoming and comfortable environment, in addition to being adaptable and flexible to the needs of users. Cedrés[17] considers that spaces should have a humanizing design and quality that elevates the dignity of each person; therefore, thought should be given to their requalification and the functions they develop.

Of course, at the beginning of the pandemic it was not possible to think about the comfort of a space. It was only sought to provide solution to the high demand for ICU beds; however, the importance and strong influence that spaces and their zoning have to mitigate and enhance the mental and physical health of users should not be lost sight of. Soler proposes among the aspects and needs of COVID-19, the importance of zoning "emphasizing the segregation of spaces within the same hospital center, such as: dirty area, clean area and transfer. Understanding as dirty zone to the controlled spaces where sanitary workers to treat them, the use of personal protective material being necessary, access infected patients. In contrast, from the clean zone corresponding to the center area, which is clean of all disease, therefore no protective material, is necessary. And the transfer, whose space is intended for the decontamination of the sanitary and the material after having treated a patient" [8] . For the expert doctor interviewed, the criteria that should have been considered for the design of the physical spaces, adequate infrastructure-equipment in hospitals and health centers: "Firstly, it is from the design itself, where environments for different types of pathologies should be considered. When pathologies are evaluated, basically infectious, the transmission mechanisms have to be seen, and that is where the contact routes are, which is basically where a patient's isolation in such an environment has to be individualized.

When we talk about infection by COVID-19, or even by tuberculosis or influenza A, we have to talk about the respiratory tract or airway as they are called, which are those particles that transmit infections and that can travel beyond three meters inclusive, so in these considerations it is necessary that, for example, there are negative pressure isolation environments. It means that the patient is in an individual environment, where the conditions mean that when opening a door, the airflow does not go out to the outside rather, that it is eliminated through filters. It eliminates all the infectious load that it may have, and once they go through a disinfection process, they are eliminated abroad, these systems do not normally have them in the north, but Lima does in two hospitals, one of them is Hospital 2 de Mayo "[20].

Therefore, as a result of what has happened with COVID-19, and as a lesson learned, it should be required that there be this type of space in the original design of the infrastructure and equipment of hospitals and health centers. Other option is to take this type of environment into consideration for these very specific cases, not only for patients with COVID-19, but also for patients with influenza and tuberculosis; however, today they are placed in environments that are not suitable [20].

Table 3. Adequate built environments such as SS.HH., situational rooms and adequate distribution.

Item	Built environments	Very low	low	Regular	High	Very High
3	Adequately implemented hygienic services to guarantee hand washing.	19.20%	35.60%	35.20%	8.40%	1.60%
8	The built environments of the hospitalization centers are adequate.	13.20%	40.40%	42.80%	3.20%	0.40%
9	They had situation rooms to keep the families of patients with COVID19 informed.	33.60%	38.80%	19.60%	4.00%	4.00%
10	Hospital environments facilitated the transmission of COVID19 to medical and administrative staff.	8.40%	23.20%	35.60%	26.80%	6.00%

Source: Own elaboration. Results of the questionnaire applied to the population of the district of Castilla - Piura.

In the year 2022, a large percentage of the population used the physical spaces of hospitals and health centers in the region, either for reasons of contagion or accompanying a friend or relative, which is evidenced in Table 3. When visiting health establishments, more than a third of the inhabitants indicated that the condition of the hygienic services was not adequate to guarantee hand washing. Regarding the distribution of spaces, approximately half of the population considers that it is regular with a tendency to very low. More than a third of those surveyed referred to the lack of situational rooms to keep the relatives of patients with COVID-19 informed; therefore, they classified the distribution of the rooms as regular, a situation that facilitated the spread of COVID-19.

Table 4. Ventilation and lighting system and rehabilitation built environments.

Item	Built environments	Not at all adequate	Poorly adequate	Regularly adequate	Adequate	Very adequate
12	Ventilation systems were adequate for the number of patients with COVID19 in the care centers.	20.80%	54.00%	18.40%	6.40%	0.40%
13	The lighting system in the hospital wards was adequate.	9.60%	34.40%	42.80%	13.20%	0.00%
15	The rooms and/or environments were adequate for the rehabilitation of post-covid19 patients in the hospital services.	28.40%	50.40%	14.80%	6.00%	0.40%

Source: Own elaboration. Results of the questionnaire applied to the population of the district of Castilla - Piura.

ORIGINAL PAPER

Table 4 shows that within the environments built to provide a good service to patients, health workers, service personnel, administrative staff, among others, approximately half of the respondents state that these spaces lack good ventilation, and are therefore regularly adequate. Although it is evident that a percentage slightly higher than half of those consulted describe the ventilation system of the same built environments of hospitals and health centers as inadequate. A percentage slightly higher than half of those surveyed consider that the spaces for patients with COVID-19 to rehabilitate were inadequate, since they did not have the necessary technical conditions and equipment.

For the medical experts consulted, the types of conditions of patients with COVID-19 were mild/moderate, severe and critical. They also ratified their concern for the safety of medical personnel, nurses and assistants, who are the most precious asset; therefore, there is an even greater clamor for the quality of the healthcare infrastructure, through the design of appropriate environments, capable of treating and protecting each one of them efficiently [8].

C. Humanization of care

To speak of humanization of care means to refer to every person who must assume behaviors, actions and measures that protect and defend the dignity of each person or human being. Being consistent with their values and principles formed from an early age, and as a user or patient of health facilities, has the right to be cared for and treated in the best way for their recovery, prompt improvement and psychological state of the person [17].

All sanitary architectural design must be based on the needs of the human being and the experiences that the place has, mainly as an expression of human values and not as a functional product of the space.

Likewise, the environments where patients and family members stay must be increasingly humanized, with comfort, lighting and natural ventilation, domesticity in the environments, where people feel comfortable and be treated with respect and kindness, given that medical stays will probably tend to increase in the future [1].

Cobolli makes a comparison between the means used in the United States and Italy to humanize hospital environments and mentions that North American hospitals have been designed paying particular attention to the psychological report between patient and environment, and have generated spaces similar to those of hotels and homes, in contrast to the far-fetched image of some European hospitals. [22].

Table 5. Appropriate treatment of patients and quality of care.

Item	Humanization of care	Very low	low	Regular	High	Very High
16	The treatment of health personnel was adequate to facilitate the recovery of patients infected with COVID19.	14.40%	28.80%	45.20%	10.00%	1.60%
17	Impact of quality of care and prevention actions on COVID19-infected patients.	13.60%	19.60%	36.40%	20.40%	10.00%
18	Patients infected with COVID19 will adapt to the situation in health facilities	16.80%	34.80%	40.80%	5.60%	2.00%

Source: Own elaboration. Results of the questionnaire applied to the population of the district of Castilla - Piura.

Table 5 shows that there is still much work to be done in terms of the treatment and quality of care provided by health personnel to patients, since 45.20% of those surveyed rated the treatment provided by the personnel as fair; likewise, 36.40% of the same population mentioned that the quality of care was fair.

DISCUSSION

The commendable work of health professionals and the mission they had in the context of the pandemic must be recognized. However, it cannot be denied that the situation was aggravated by the conditions in which they worked, with inadequate infrastructure, equipment, and physical sanitary spaces, not at all appropriate to attend to health emergencies, a situation that is beyond their control. However, it is noteworthy the criterion of the humanization of the space that implies the reception, the affable treatment of the patient, the empathy as important factors that were evident in all the health establishments of the North.

At the Cayetano Heredia Hospital in the Castilla-Piura district, 81.7% of health personnel report that there is no job security[18]. The WHO, in 2017, specifies that, in several countries of the world, more than 50% of collaborators work in an unorganized sector, which does not provide them with social protection, to access a health service and, many times, they do not have elements for the application of occupational health and safety regulations[5]. Despite the fact that health personnel have the necessary training and resources to avoid risks and comply with self-care practices in the biopsychosocial field of the human being; however, a number of problems have been found, such as the increase in pathologies: discs, anxiety and depression [6].

When the response from other health centers in the interior of the country is analysed, it does not differ much, but when compared with the responses from other countries, the difference is overwhelming. Many lives are lost due to deficient health equipment, due to the lack of flexible and adaptable physical capacity or

ORIGINAL PAPER

space that can house more ICU beds and due to the lack of political will of the competent authorities to have responded efficiently and effectively and avoid deaths and an increase in cases. Added to this is the dehumanization of spaces, which did little to help improve patients affected by COVID-19. Every hospital project or health center should have a space designated for possible expansion, cover the need to accommodate new patients and have a greater number of ICU beds. In addition, spaces or environments should be designed with the ability to adapt and be flexible to other uses during the time required by the pandemic.

Likewise, Estrada M[7] considers that not only in Peru, but in all countries of the world, hospitals are sized and designed on the basis of a portfolio of services to treat certain pathologies according to the epidemiological profile of the place that demands it. The situational state of hospital infrastructure in Peru presents certain criteria to consider such as: patient treatment and recovery, health and care of medical personnel, biosecurity and asepsis of intervened environments and constant operability and maintenance[23]. In rigorously asepsis environments, such as the ICU, operating room, laboratories, among others, it is necessary to install mechanical air extraction ventilation, where the extraction grille will be installed above 30 cm from floor level[23].

MINSA has 181 hospitals nationwide. Only 16% of MINSA hospitals are under 25 years of age. 37% are between 25 and 50 years old. 36% are over 50 years of age; the biggest problem is the age and physical and functional obsolescence of its hospitals. Regarding the supply restrictions in hospital infrastructure and equipment in the face of COVID-19, there is: the high percentage of very old hospitals with obsolete infrastructure (oversaturated, slums. In poor physical condition, with disjointed services due to inorganic growth), inadequate state of mechanical facilities (inadequate medical oxygen system, lack of oxygen generation plants, insufficient and deficient oxygen supply, inadequate air control system in ICU environments), insufficient and inadequate endowment of equipment (outdated equipment, lack of adequate and necessary equipment in intensive care units, lack of maintenance), insufficient maintenance of infrastructure, facilities and equipment (lack of maintenance personnel, lack of a maintenance system, insufficient budget)[7]. Likewise, facing the restrictions for management, there is: the inadequate information system- lack of timely, reliable and secure information on: availability and status of ICU beds, availability and status of equipment, availability of land areas in hospitals to implement temporary contingency infrastructure and availability of urban infrastructure that serves as temporary contingency infrastructure[7].

In the Diagnosis of Infrastructure and Equipment Gaps in the Health Sector, which serves as the basis for the Multiannual Investment Programming (MIP) for the period 2022-2024, of the three levels of government, it states that 97% of all health establishments at the first level of care have inadequate installed capacity, expressed in the precariousness of the infrastructure, obsolete, inoperative or insufficient equipment[9]. The health establishments of the first level of care, which have been identified as having inadequate installed capacity, are those that have not had any comprehensive intervention with infrastructure and equipment in the last five years. Piura has 97% of first level care establishments with inadequate installed capacity out of a total of 448 ES[9].

In the face of this reality, PAHAE proposes to address the health emergency with the immediate construction and manufacturing for different situations; the timely acquisition of finishing materials that allow achieving asepsis and biosafety in indoor environments. The inclusion of HVAC systems with filters and negative pressure control, as well as considerations for installations that contribute to hygiene and functionality[23], proposal is framed within the context and reality faced in the Castilla-Piura district and supports the need for a regional contingency plan. Furthermore, it takes into account hospital habitability as a crucial aspect that affects patients' sensitivity and addresses their basic physical and psychological requirements[7].

The main limitation of the research was the attitude and low availability of experts to answer in-depth interview questions, difficulties in accessing health facilities, as well as limited in-depth interviews.

CONCLUSIONS

Health experts point out that in the design of a health facility, different environments for different types of pathologies should be taken into account in order to offer a better service, as well as the zoning of areas for respiratory isolation and vector isolation, according to the reality of each region. Therefore, it is important to have a regional contingency plan, the same that allows to carry out the appropriate management of the necessary processes quickly and efficiently, since each department faces different realities and diseases; in the case of Piura: COVID-19, dengue, zika and chikungunya; the last three produced by transmission vectors such as the mosquito.

Among the main deficiencies found in this region is the lack of an effective hospital engineering and architecture, which allows guiding the adaptation, reconversion and expansion of different physical spaces that respond to the needs of patients.

The environments in which patients and healthcare workers stay must be increasingly humanized, to provide comfort, lighting and natural ventilation, i.e., domesticity in the environments, where people feel comfortable, and be treated with respect and kindness, given that medical stays will probably tend to increase in the future.

ORIGINAL PAPER

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Correspondence: *Luis Fernando Chero Córdova.*
Address: *Urb. San Ramón Mz C1 Lote 19 Jr. Las Amapolas. Piura. Lima, Perú.*
Telephone number: *965011844*
E-mail: *arqlufer@gmail.com*

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