ARTIGO

ARCHITECTURE, HUMANIZATION, AND PUBLIC HEALTH IN BRAZIL: A DEBATE ON STANDARD PROJECTS FOR PRIMARY CARE UNITS

ARQUITETURA, HUMANIZAÇÃO E SAÚDE PÚBLICA NO BRASIL: UM DEBATE SOBRE PROJETOS-PADRÃO PARA UNIDADES BÁSICAS DE SAÚDE

ARQUITECTURA, HUMANIZACIÓN Y SALUD PÚBLICA EN BRASIL: UN DEBATE SOBRE PROYECTOS TIPO PARA UNIDADES DE ATENCIÓN PRIMARIA

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ABSTRACT:

The humanization policies implemented by Brazil's Ministry of Health (MH) represent advances in facing challenges for improvements in public health equipment. However, many establishments still have an inadequate physical structure. To meet the demands and improve and expand the public attention network, the Federal Government and the State of Minas Gerais provided standard designs, enabling the construction of buildings capable of providing quality service to system users. Nevertheless, it is questionable whether these designs respond, in addition to normative and functional criteria, to the assumptions of humanization, aiming at an architecture that contributes positively to the health and well-being of the population. Thus, this article aims to analyze how architecture has been treated to achieve a humanized public health policy. To this end, we evaluate the quality of the Primary Care Unit (PCU) design proposal of the MH and Minas Gerais. Therefore, we verified the practical application of the humanization concept and the principles of ambiance in the standard projects of these PCUs through the qualitative analysis of the architectural plans and perspectives, considering technical-constructive, programmatic and functional, and environmental aspects, according to the authors' perception. The analysis of case studies showed the agility of construction, compliance with normative criteria, and cost reduction as advantages of standardization. As a disadvantage, we highlighted the distance between the project and the place. We conclude that the environments have improved in terms of quality. However, the focus remains on the construction and not on promoting the well-being and integral health of the subjects.

KEYWORDS: public policy; primary health care; healthcare architecture; ambiance.

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RESUMO:

As políticas de humanização implementadas pelo Ministério da Saúde (MS) representam avanços no enfrentamento dos desafios para melhorias nos equipamentos de saúde pública. Entretanto, muitos estabelecimentos ainda possuem estrutura física inadequada. Para suprir as demandas, aprimorar e ampliar a rede de atenção pública, o Governo Federal e do Estado de Minas Gerais disponibilizaram projetos-padrão, visando a construção de edificações capazes de atender com qualidade os usuários do sistema. Todavia, questiona-se se esses projetos respondem, além dos critérios normativos e de funcionalidade, às premissas de humanização, tencionando uma arquitetura que contribua positivamente para a saúde e o bem-estar da população. Diante disso, o objetivo deste artigo é analisar como a arquitetura tem sido tratada na implementação de uma política de saúde pública humanizada, tomando como objeto de estudo uma tipologia de UBS modelo do MS e outra de Minas Gerais, de modo a avaliar a qualidade da proposta projetual. Para tanto, verificou-se a aplicação prática do conceito de humanização e dos princípios de ambiência nos projetos-padrão dessas UBSs, por meio da análise qualitativa das peças gráficas dos projetos e perspectivas, considerando aspectos técnico-construtivos, programáticos, funcionais e ambientais, segundo a percepção das autoras. A análise dos estudos de caso mostrou como vantagens da padronização a agilidade da construção, o atendimento aos critérios normativos e a redução dos custos. Como desvantagem, ressalta-se a distância entre projeto e lugar. Conclui-se que houve uma melhoria qualitativa nos ambientes, porém, o foco permanece na construção e não na promoção do bem-estar e saúde integral dos sujeitos.

PALAVRAS-CHAVE: políticas públicas; atenção primária de saúde; arquitetura de edifícios de saúde; ambiência.

RESUMEN:

Las políticas de humanización implementadas por el Ministerio de Salud de Brasil (MS) representan avances en el enfrentamiento de desafíos para la mejora en edificios de salud pública, pero muchos establecimientos todavía tienen estructura física inadecuada. Para atender las demandas, mejorar y ampliar la red de atención pública, el Gobierno Federal y el Estado de Minas Gerais han presentado proyectos tipo que posibilitan la construcción de edificios capaces de prestar un servicio de calidad a los usuarios. Sin embargo, cabe cuestionar si estos proyectos responden, además de criterios normativos y de funcionalidad, a premisas de humanización, fomentando una arquitectura que contribuya positivamente a la salud y bienestar de la población. El objetivo de este artículo es analizar cómo la arquitectura ha sido tratada en la implementación de una política de salud pública humanizada, centrándose en modelos de Unidad de Atención Primaria (UAP) del MS y de Minas Gerais. Para ello, se verificó la aplicación práctica del concepto de humanización y principios de ambientación en los proyectos tipo de estas UAP, mediante un análisis cualitativo de las piezas gráficas de los proyectos, considerando aspectos técnico-constructivos, programáticos, funcionales y ambientales. El análisis mostró como ventajas de la estandarización, facilidad y agilidad en la construcción, cumplimiento de criterios normativos y reducción de costos. Como desventaja se destaca la distancia entre proyecto y lugar. Se concluye que hubo una mejora cualitativa en los ambientes, pero el foco permaneció en la construcción y no en la promoción del bienestar y salud integral de los sujetos.

PALABRAS CLAVE: políticas públicas; atención primaria de salud; arquitectura de edificios de salud; ambientación.

INTRODUCTION

Despite the advances proposed with the creation of the National Program for the Humanization of Hospital Care (*Programa Nacional de Humanização da Assistência Hospitalar* - PNHAH) by the Ministry of Health (MH) in 2001 - which aimed, among its actions, to change the culture of care in the hospital environment and restore physical facilities (BRASIL, 2001) - and the establishment of the National Humanization Policy (PNH) for Health Care and Management - HumanizaSUS, whose framework extends across the entire Unified Health System (SUS) network, recognizing humanization as fundamental rather than merely another program to be applied (BRASIL, 2004a), a notable number of healthcare establishments still possess inadequate or improvised physical structures. This situation arises from both a scarcity of resources and the suboptimal utilization of these resources, given issues related to the design of architectural projects by technical teams frequently lacking adequate qualifications, neglect of local constraints, failure to adhere to standards for health project development, disregard for criteria related to environmental comfort, insufficient understanding of work processes and the technologies integrated into them, and a lack of involvement by health professionals and system users in the spatial design process.

In this context, ambiance emerges as a concept endorsed by the principles of humanization, centering on the built environment and the methodologies employed to integrate it into the experience of pleasure and appreciation for individuals, both collectively and individually. The concept is guided by three axes: the spatial element that seeks comfort, the space designed to encourage interpersonal interactions, and the spatial component as a tool that facilitates the work process (BRASIL, 2004b).

The construction of public health buildings must be considered carefully, given the constraints of resources, national and regional socio-economic diversity, and the challenges that municipal administrations have confronted in managing the public care network. According to data from the Brazilian Institute of Geography and Statistics (IBGE) (BRASIL, 2022a), spending on the final consumption of health goods and services in the country corresponded to 3.8% of GDP in 2019. This figure is notably modest in comparison to the extensive user base of the system, as the MH reports that approximately 80% of the population relies exclusively on the SUS for their healthcare needs (BRASIL, 2022b). Thus, it highlights the significance of judiciously allocating investments and incorporating plans for the renovation, expansion, and construction of buildings to distribute and utilize resources in a manner that effectively addresses the demand for health services, adhering to the criteria of equity, effectiveness, and efficiency.

With that in mind, two fundamental considerations necessitate attention: adherence to health requirements and the humanization of spaces. The former pertains to conformity with regulations designed to enhance the quality of health services, reduce costs, and facilitate the interpretation and communication of uses, processes, and working methods within the units (PESSATTI, 2008). Conversely, the latter is grounded in the understanding that healthcare buildings should not be confined to serving merely as supportive spaces for medical care but should serve as an active instrument in promoting the well-being of all those who visit them. This perspective arises from the acknowledgment that hospital architecture plays as important a role in the patient's healing process as the medical gesture (FOUCAULT, 1979).

The MH, with State and Municipal Health Departments, has allocated resources and initiated programs for healthcare building construction to address demands, just like improving and expanding the public healthcare network. It is facilitated through the construction of standard projects, which include the minimum environments required for each architectural typology, ensuring compatible sizing and adherence to regulatory criteria. This approach facilitates the construction of buildings designed to deliver quality care to people who use the system. Such

an alternative has been recurrently employed in public projects of social significance, including schools, nurseries, and hospitals, to achieve economic objectives, constructive rationality, and functionality. It is argued that the product resulting from standardization (both in design and construction) can attain higher quality when compared to non-standardized works (KOWALTOWSKI, 2011). This consideration proves to be advantageous for healthcare buildings, given the intricate array of regulations to comply with and the budgetary constraints encountered.

In this context, the development of standard projects for Primary Care Units (PCUs) has gained prominence, given that approximately 85% of the population's health issues are of low complexity and should be addressed at this level of care (BRASIL, 2011a) efficiently and cost-effectively. PCUs constitute essential infrastructure within the SUS framework and are strategically positioned throughout the country, serving as the entry point for citizens into the healthcare system. The services offered aim to promote and safeguard health, prevent illness, and provide diagnosis, treatment, rehabilitation, harm reduction, and health maintenance, with individual and collective impacts (BRASIL, 2011a).

Ordinance No. 2.048/2002 (BRASIL, 2002a) previously outlined guidelines for adapting the internal spaces of PCUs, focusing on evident issues such as patient screening, conducting examinations, managing professional ingress and egress, and the layout of accesses. However, there was a lack of emphasis on creating humanized environments that could function as tools to enhance patients' healing and rehabilitation processes. It was only in 2011 that PCUs were again on the Government's agenda, with the creation of the Basic Health Unit Requalification Program (*Requalifica UBS*). The program's objectives were to fortify primary care and provide financial incentives for the construction, expansion, and renovation of PCUs, thereby enhancing access and the quality of primary care, in addition to improving working conditions (BRASIL, 2016).

In 2013, Ordinance No. 340 introduced four categories of PCU (from I to IV) as part of the *Requalifica UBS* program, along with the corresponding financial incentives allocated to each category (BRASIL, 2013). By these classifications, the MH formulated standardized projects to ensure quality and inviting structures, aiming for greater agility and efficiency in the construction process. The dimensions and layout of the PCUs align with the number of Family Health teams (FHt)[i].

Aligned with the MH's proposal, the Government of Minas Gerais devised a program to expand primary healthcare structures (SES/MG, 2013). The objective was to augment the number of PCUs across the state while ensuring an architectural concept that, besides promoting user well-being, would establish an identity for the state. Employing an innovative construction approach, the Government of Minas Gerais opened a tender in 2013 for building the Minas Standard units, utilizing prefabricated self-supporting modules in the Light Steel Framing system. Despite the higher cost associated with this construction system compared to conventional methods, the intention was to build approximately 500 units within 12 months (SEACOM, 2013). The program garnered praise from the former Governor of Minas Gerais, Antônio Anastasia, at the launch event:

> *Estamos lançando um programa que é pioneiro na área da saúde pública. Ressalto a relevância deste projeto, primeiro pela sua concepção arquitetônica inovadora, segundo pelo material que utiliza, o nosso aço mineiro, e terceiro pelo seu fundamental conteúdo no apoio à atenção básica à saúde, abrigando as equipes do Programa de Saúde da Família. Teremos essas construções realizadas em poucos meses, melhorando muito o atendimento à saúde. (SEACOM, 2013).*

In contrast to the MH's proposal, the Minas Gerais project outlined 12 types of PCUs, categorized into I, II, and III sizes, corresponding to the FHt, as per SES/MG Resolution No. 2821, dated June 3, 2011 (SES/MG, 2011). Each size was further divided based on the overall size and mode of implementation, including one-story units, two-story units (for sloped terrain), and expandable units.

Analyzing the proposals mentioned, it is evident that there have been advancements in public policies concerning the adaptation and construction of PCUs. Recognizing that the physical structure plays an essential role in the population's health care, substantial investments have been directed towards creating high-quality spaces to comply with normative criteria and functionality, besides promoting a welcoming environment and contributing to the well-being of users and staff. However, is it possible to say that these premises have been taken into account in the standard PCU projects of the MH and Minas Gerais, aiming to promote an architecture that goes beyond being a mere substrate for health actions and possesses the capacity to contribute positively to the health of the population? A more in-depth investigation of the two proposals is warranted to answer this and other questions.

Therefore, the objective of this article is to analyze the treatment of architecture in the execution of a humanized public health policy, with a focus on the MH model PCU and the Minas Standard PCU as the subjects of study. The intention is to identify how the concept of ambiance is incorporated as an instrument for constructing these spaces by analyzing the quality of the design proposal in terms of its insertion in the urban space, the organization of the environments, regulatory parameters, the construction techniques adopted, and environmental comfort.

Humanization policies in the context of architecture

According to Sá (2009), the proposal of a transversal policy by the PNH represents a practical and conceptual advancement compared to previous initiatives. By transversalizing vertical communication (characterized by a distinct separation between those responsible for formulation and those involved in implementation) and horizontal communication (which takes place among peers), the PNH facilitates the expansion of communication among individuals. This approach transcends barriers between knowledge and health practices, intending to construct a shared plan (BRASIL, 2004a; PEDROSO; VIEIRA, 2009).

Population involvement is also pivotal in advancing humanization criteria and in the formulation, control, evaluation, and execution of health policies. This involvement, combined with the other principles governing the organization and management of the SUS - namely, regionalization, hierarchization, decentralization, and a unified command - must be considered in determining health facilities. In this way, based on their size and function within the system, they should align with this structure, addressing the needs of the entire territory and delivering quality care to the population in a universal, comprehensive, and equitable manner (BRASIL, ©2023; SANTOS; GABRIEL; MELLO, 2020).

However, there is a more comprehensive theoretical understanding of the humanization concept than its practical implementation. This discrepancy arises from the use of the term in different contexts and the challenge faced by actors involved in accurately articulating its intended meaning (SÁ, 2009; SOUZA; MENDES, 2009). A considerable portion of healthcare facilities do not foster a more intimate professional-patient relationship due to inadequate investment and a rigid architecture that lacks user appeal. In light of these challenges, the MH (BRASIL, 2009) conceptualizes humanization as a means of appreciating the various individuals involved in the healthcare process. The guiding principles of this policy encompass

autonomy and protagonism of the individuals, co-responsibility among them, solidarity, and collective participation.

In this context, it is evident that the term refers to comprehending each person in their uniqueness, emphasizing the role of the human being in formulating behaviors and expressions. Besides that, it aims to create environments tailored to their physical and psychological well-being. That entails delivering quality healthcare supported by a physical, human, technological, and administrative infrastructure that fosters a welcoming atmosphere for patients, their families, and the professionals who work there (BRASIL, 2004a; TODRES; GALVIN; HOLLOWAY, 2009).

Indeed, the physical environment exerts a profound influence on the physical and mental health of users, consequently shaping their attitudes and behaviors (VILLAROUCO et al., 2021; DING, 2022; KARLEN; ROBERTS; TUCKER, 2023). In 1984, Roger Ulrich conducted a study demonstrating the restorative effects of windows offering views of the natural environment in hospital rooms in Pennsylvania, comparing them to rooms with windows facing a brick wall. The research revealed that patients in rooms with views of natural scenery experienced shorter post-operative recovery times and required fewer painkillers, among other benefits (ULRICH, 1984). Years later, Beauchemin and Hays (1998) highlighted that patients in a cardiac Intensive Care Unit (ICU) with sunny rooms exhibited improved recovery and a lower mortality rate than those in rooms lacking access to sunlight. Despite these scientific findings, a large part of the country's healthcare environments did not receive adequate attention in terms of spatial quality (TODRES; GALVIN; HOLLOWAY, 2009). It is crucial to bear in mind that these spaces are designed to facilitate relationships and practices while creating a welcoming atmosphere (BARROS; PESSATTI; MASSARO, 2006; TODRES; GALVIN; HOLLOWAY, 2009; DING, 2022).

In this context, João Filgueiras Lima (Lelé), an architect recognized as a reference in hospital architecture, argued that the healing process for patients should extend beyond the physical realm and encompass the spiritual sphere. According to Lelé, providing more humane and aesthetically pleasing healthcare environments without compromising functionality would facilitate psychological healing, as beauty revitalizes the spirit (LIMA, 2004). Todres, Galvin, and Holloway (2009) emphasize that spaces are shaped not only by the physical environment but also by the activities and interactions that occur within them. Continuously, the environment provides stimuli perceived by the body as sensations, and once processed by the mind, these stimuli generate perception and awareness, potentially triggering a behavioral response. Therefore, the design and presentation of the environment are crucial for its users, as their perception of the environment significantly impacts and influences their behavior (VILLAROUCO et al., 2021). Singha (2019) notes that art and architecture possess the potential to evoke natural forms that soothe and contribute to the natural healing process. However, such resources should not be intrusive but naturally attract individuals, offering delight, distraction, and development elements. Reynolds and Prior (2006) discovered that environments facilitating leisure activities and visual arts creation can contribute to the recovery and maintenance of the identity of cancer patients. In a study conducted on the experience of patients undergoing cancer treatment in Israel, Kliger et al. (2011) identified that environments designed to resemble homes can help alleviate the pain and stress experienced by patients.

In this way, Barros, Pessatti, and Massaro (2006) underscore the necessity for a novel operational approach and an appropriate spatial layout in response to the evolving principles of healthcare environments, which considers the significance of ambiance. Architectural projects must adhere to prevailing regulations without allowing their technical aspects to impede flexibility, thereby aiming for the desired enhancement of the care and management of

these spaces. The authors emphasize that in primary care, the architectural project should strive to integrate work teams operating within the same unit, establishing multifunctional areas that can be shared and designated spaces for meetings among staff and between staff and patients. By effectively organizing spaces used collaboratively, it is possible to save time and energy. This organization should inform the overall configuration of the healthcare facility, shaped by the actual behavior exhibited when the building is in use. By anticipating collaborative work and studying current movements and workflows, it becomes possible to reduce the distances traveled (KARLEN; ROBERTS; TUCKER, 2023).

In the Brazilian context, we can observe that the ambiance concept application as a tool for humanizing environments has prompted a shift in how healthcare spaces are conceptualized and designed. There is now an imperative to prioritize the human being as the central focus of architectural projects, and the spaces must be qualified to provide physical and psychological comfort for users through environmental attributes that promote well-being (MENDES, 2021). Barros, Pessatti, and Massaro (2006) state that the isolated consideration of ambiance alone does not induce changes in the work process. Instead, it functions as a facilitating tool, enabling the creation of spaces tailored to the diverse users of the environment. Furthermore, embracing the concept of ambiance in the architecture of healing spaces signifies a qualitative progression in the discourse on the humanization of SUS territories. It extends beyond the technical and formal composition of environments, incorporating the interaction between users and their appropriation of space.

METHODOLOGY

The MH and the Minas Gerais Government have undertaken similar initiatives to address the challenges associated with improving public health facilities, aiming to bolster primary care. However, it is imperative to modernize the system to transform the standard of care within healthcare facilities, providing higher quality and more efficient services while valuing both users and professional staff. That includes ensuring that the physical structure of these spaces aligns with the principles of ambiance.

With this objective, the initial phase of the study entailed gathering data on the architectural projects of PCUs of sizes I to IV proposed by the MH and the 12 typologies, spanning from I to III size, put forth by the Minas Gerais Government. We consulted the *Requalifica UBS* websites of the Primary Health Care Secretariat (SAPS) (BRASIL, 2011b) and the Minas Gerais State Health Secretariat (SES/MG, 2013) to access the digital files of the PCU projects from both the MH and the Minas Gerais Government. The consulted files included the Descriptive Memorial, floor plan, layout plan, site/roof plan, sections/elevations, and external/internal perspectives.

Once we obtained the architectural projects for various sizes of PCUs, we specifically selected the typologies analyzed in this study. Thus, we chose the MH's size II PCU and the Minas Gerais Government's ground-level size II PCU. The selection of these two typologies was driven by the shared emphasis of both the Federal Government and the Minas Gerais Government on prioritizing the implementation of units of this size. This fact is attributed to their effectiveness in catering to the local level, once the size II PCU serves up to 8,000 users. We highlighted that this is a particularly pertinent consideration given that most Brazilian municipalities have a relatively small population. This configuration enables health teams to operate in closer proximity to the population. Additionally, the equitable nature of these models and their respective needs programs facilitated a comparative analysis of the case studies.

The second phase involved examining the graphic elements, plans, and perspectives of the chosen PCUs. This analysis aimed to assess the practical implementation of the concept of humanization and the principles of ambiance by interpreting the environments from the

authors' point of view. This qualitative analysis considered the parameters outlined in Resolution-RDC No. 50 (BRASIL, 2002b), Ordinance No. 340 (BRASIL, 2013), SES/MG Resolution No. 2,821 (SES/MG, 2011), and its subsequent updates, along with the most recent version of the HumanizaSUS Ambience Booklet (BRASIL, 2010). The following aspects we did take into consideration:

- **Technical-constructive:** urban insertion; implementation on the ground; shapes, dimensions, and volumes; accessibility; materials and finishes (coatings, colors, and textures); sealing elements;
- **Programmatic and functional:** adequacy of the program of needs; access, circulation, and spatial organization; treatment and use of open areas; provision for living areas and social support[ii]; quality of furniture;
- **Environmental:** integration between internal and external environments; views to the outside; use of vegetation; ventilation; acoustic, thermal, and visual comfort.

In the final stage, we compared the results derived from the analyses of each case study in the context of the study question. This comparison facilitated a comprehensive understanding of the integration of humanization and ambiance principles in the architectural projects of PCUs proposed by the MH and the Minas Gerais Government.

CASE STUDIES

CASE STUDY 01 - PCU OF MINISTRY OF HEALTH

As mentioned above, the standard project proposed by the MH has emerged as a financial incentive for the exponential growth in the implementation of PCUs across the country in a rapid and standardized manner. The program of needs proposed for the size II PCU, established in Ordinance No. 340 (BRASIL, 2013), includes the following areas: 1 reception for at least 30 people; 2 toilets, including for People with Disabilities (PwD); 1 immunization room; 1 pharmacy; 3 undifferentiated medical offices; 2 medical offices with an attached toilet that must cater for PwD; 2 dental offices; 1 collective inhalation room for four patients; 1 healing room; 1 procedure room; 1 simplified Sterilized Material Center (SMC); 1 administrative room; 1 room for collective activities; 1 storeroom; 1 pantry; 2 toilets for employees; 1 Cleaning Material Deposit (CMD); 3 deposits for waste, including recyclable, contaminated, and common waste.

Aiming for simple construction and easy logistics, the team responsible for the project chose to distribute these environments in a floor plan in the shape of a Roman cross and played with volumes on the outside to add more movement to the main façade. This project was analyzed based on the plans and perspectives made publicly available by MH, incorporating the authors' observations on the technical-constructive, programmatic functional, and environmental aspects.

Suggested implementation

The project recommends a total built area of 415.47 m^2 distributed over a single floor. From the site plan (Figure 1), we can observe that the proposal only includes construction on flat land or land with a maximum slope of 3%, which is a drawback since most Brazilian cities have predominantly sloping land. Consequently, if the municipality lacks flat terrain during the design process, it falls on the technical manager to adapt the building to the existing ground, opening the possibility of errors, especially concerning accessibility. Another aspect observed is the distance between the parking space for PwD and the main entrance to the building,

resulting in a longer walk to the main entrance or forcing people to pass through the area restricted to employees (Figure 1 - yellow path).

As for the proposed landscaping, although the green areas are a positive aspect, the architectural project could better utilize the relationship between internal and external environments. Contact with nature is fundamental for promoting well-being. In this sense, therapeutic gardens stand out. When integrated into healthcare environments, they contribute to reducing stress, anxiety, and blood pressure, as well as improving sleep quality, among other benefits (ULRICH, 2001).

Access and flows

Regarding the accesses (Figure 1), the main façade accommodates both the ambulance entrance and exit (blue arrows) and the pedestrian entrance and exit (orange arrows), positioning both at the main door. This situation demands increased attention during movement to prevent accidents. The entrance to the uncovered parking lot, which has three spaces, one of which is for the PwD, is on the right-hand side of the building (brown arrow). Access to the recyclable and contaminated waste bins is on the left-hand side of the building, and access to the regular waste bins is on the rear façade (both with magenta arrows). Once again, the issue stems from the varied ground types, as not all of them will permit front and rear access, posing challenges for the responsible company in waste collection.

Figure 1. Floor plan and spatial zoning of the Ministry of Health's size II PCU.

Font: Adapted from Brasil, 2011b.

Concerning the internal flows (Figure 1), the emphasis on creating a simple and easy-to-understand circulation is apparent. This consideration is crucial in healthcare buildings to prevent cross-contamination in environments and ensure the comfort and safety of patients, especially those in a state of mental confusion. Designing a floor plan with good orientation facilitates easy movement, enables people to memorize the space, and reduces the need for assistance from the healthcare team in the process of navigating between environments.

Patients circulate in corridors with the "T" shape (dark green arrow). After accessing the building, they pass the reception at the main entrance and enter the central corridor, which houses the consulting rooms. The staff-restricted circulation (red arrow) follows a straight line, with a door at the beginning of the corridor preventing patient access and another door at the end allowing staff access to the outside part of the PCU, covered with a green area.

Spatial zoning and layout of rooms

The standard project successfully accommodates all the mandatory areas mentioned in Ordinance No. 340 (BRASIL, 2013), and the spatial zoning allows easy circulation for the patients and the staff (Figure 1). However, due to their placement on opposite sides of the building, the medical offices may encounter issues with daylighting and ventilation, depending on the ground, with a high risk of only one of the façades receiving the necessary sunlight. The gardens at the end of each corridor, although little explored, offer contact with the outside environment and were used as a strategy in the location of the compressors used. The equipment's contact with the grass reduces vibrations, helping to minimize the noise they could generate.

The spatial zoning of private environments is valuable as it prevents the undesired circulation of patients in specific areas of the building. Moreover, providing access to the outside and the contaminated waste deposit facilitates the generated material transportation. That prevents the crossing of flows and, consequently, cross-contamination. This strategy aligns with RDC No. 50, which establishes functionality as a design premise for the building (BRASIL, 2002b). One observed point regarding accessibility is that the toilets for employees are not adapted and do not meet the criterion of universal access to all spaces, as stipulated in the regulations.

Building materials and volumetry

We noted that the most pronounced conflicts concerning the ambiance concept advocated by the MH were in the suggested finishes for the PCUs. However, it is worth noting that the municipality can decide about the standards for coatings while adhering to the minimum quality specifications outlined in the project.

Windows that are only 80 cm high and have a sill of 1.80 m are detrimental to the view of the external environment and the access to daylight. We should note that lighting requirements in healthcare environments must respect the essentiality of natural conditions. Therefore, openings facing the external landscape require integration with the design solutions. However, privacy is a relevant aspect when it comes to openings in healthcare environments. In this sense, protective devices, such as blinds and curtains made of suitable materials, can be a viable alternative to meet both requirements (BITENCOURT, 2007). The choice of colors for painting the interior walls is also questioned, given the recurrence of the color Ice White in all environments. As pointed out by Farina, Perez, and Bastos (2011), the World Health Organization recommends that hospital walls, outpatient clinics, and inpatient rooms should not be completely white. It is due to the potential of this color to evoke feelings of emptiness and affective deprivation.

While adopting a light tones standard for healthcare environments due to sanitary prerogatives, making it easier to detect dirt, it is necessary to balance its use to avoid monotony. Monotony can make the environment uninteresting and may also hinder the performance of work tasks for the professionals working there (GÓES, 2011). The use of colors is a critical aspect in the implementation of humanization in environments and is not merely an aesthetic concern. When used strategically, colors can evoke sensations in the human brain that transmit feelings such as tranquility, well-being, and a sense of welcome (HELLER, 2013; KARLEN; ROBERTS; TUCKER, 2023). Even in the furniture used, tones that differ from the hospital standard can be employed. In the standard project, the choice of black chairs is visible (Figure 2), but several options can make the environment more cheerful and welcoming.

Concerning volumetry, the difference in the volumetric composition of the PCU is noticeable, particularly on the façades (Figure 3). The architects demonstrated care in selecting exterior

colors, seeking to highlight the different volumes and contribute to increasing the visual appeal of the whole. An attractive aspect of this model project is the variation in façade colors based on the unit type, with straw, rust, and gray tones used for the size II PCU. However, the emphasis on volumetric composition and the use of colors in finishes appears more pronounced on the exterior of the building. Neutral colors predominate inside, with less variation in the spatial configuration of different environments, potentially giving a sense of monotony (Figure 2).

Figure 2. Internal perspective of the Ministry of Health's size II PCU.

Font: Brasil, 2011b.

Figure 3. External perspective of the Ministry of Health's size II PCU.

Font: Brasil, 2011b.

CASE STUDY 02 - PCU OF MINAS GERAIS GOVERNMENT

With the same objective as the MH - to increase the number of PCUs - the Government of Minas Gerais established its own standard project for implementation throughout the state. The program of needs also differs from that proposed by the MH and includes the following areas for PCUs of size II and ground level: 1 reception and waiting area with toilets for patients; 1 meeting and education room; 1 manager's room; 1 triage room; 1 collection room; 1 immunization room; 1 gynecological office with toilet; 3 multi-professional care offices; 1 healing room; 1 primary care room; 1 toothbrushing room; 4 dental offices; 1 room for health agents; 1 support room with storage for endemic disease agents; 1 pantry; male and female changing rooms for staff; 1 SMC; 1 medicine storage room; 1 CMD; 1 storeroom, and 2 waste storage units.

Unlike the cross pattern created in the MH project, the floor plan of the Minas Standard PCU has a rectangular shape with a central garden, which divides the outpatient department and the staff areas.

Like case study 01, the analysis of the Minas Standard PCU was carried out according to the author's observations on the technical-constructive, programmatic, functional, and environmental aspects, consulting the architectural plans and perspectives made publicly available by the Minas Gerais State Health Department (SES-MG).

Suggested implementation

As previously mentioned, the standard projects took into account the ground patterns, considering factors such as flatness, high acclivity, and steep slopes. This thoughtful approach allows for better planning about environmental comfort (including aspects of insolation and ventilation) and accessibility (see Figure 4). However, one notable aspect is the lack of proposed interventions in the external environment, such as landscaping. While there are identified permeable areas, these could be further developed to create outdoor spaces for patients and staff, fostering stronger bonds and contributing to the well-being and humanization of the environment.

In contrast to the PCU of MH, the Minas Standard PCU does not have a parking space, which may inconvenience staff and disabled patients who need to come to the unit in their vehicles.

Figure 4. Floor plan and spatial zoning of Minas Standard PCU size II and ground level.

Font: Adapted from SES/MG, 2013.

Access and flow

The front façade features three main entrances (Figure 4): a pedestrian entrance on the left (orange arrow), a central entrance for the immunization room - highlighting a positive aspect of the project, as many people visit PCU daily for immunization, especially post-Covid, preventing overcrowding in the waiting room (magenta arrow) - and an ambulance entrance on the right (blue arrow). This distribution enhances safety, particularly for children and elderly people. On the right side, there's an entrance for staff, a loading and unloading point - facilitating the transport of medicines and other equipment used in the PCU without hindering patient circulation - and access to the waste bins.

Both free and restricted circulation follow an 'L' shape, promoting fluidity and a simplified floor plan. However, without proper design and access to daylight, corridors may create a sense of enclosure with extensive white walls on both sides.

Spatial zoning and layout of rooms

The proposed program effectively addresses the primary care demand, encompassing outpatient care and the diagnostic, logistical, technical, and administrative support spheres. Unlike the MH program, the Minas Standard PCU adheres to the state's specific legislation (SES/MG Resolution No. 2,821/2011). Its differentials include a triage room that facilitates care, a collection room separate from the observation room, a toothbrush room to support the dental offices, and rooms for health and endemic disease agents. However, it lacks a specific inhalation room (as the service occurs in the primary care room), and there is no pharmacy dispensing medicines to the population within the PCU. This service is provided in another state-standard building called Minas Pharmacy, necessitating patients to walk from the PCU to another location to collect prescribed medications.

The Minas Standard PCU project features a distinct division between the patient flow and the restricted staff flow, effectively preventing conflicts between the two (Figure 4). The unit has a large waiting room, complemented by large openings, allowing daylight in.

We highlighted that the project prioritized accessibility by implementing the principles of ABNT NBR 9050/2020 (ABNT, 2020) in the sanitary facilities, including those designed for staff, as well as the reception desk and the sink in the toothbrushing room. However, there are concerns regarding the accessibility of the gynecological office, which may pose challenges for women with disabilities during appointments. Another drawback is the placement of the primary care room at the rear of the unit, making it challenging to transfer patients requiring ambulance transportation to advanced care units. It occurs because first responders must cover a considerable distance with the stretcher to the room and then go to the ambulance area.

Lastly, the internal courtyard created in the project serves a limited function. We observed that, in practice, its use is restricted to authorized persons only in some units (Figure 5). This underutilization of the space is evident in the landscaping, as the courtyard has the potential to serve as a contemplative space or therapeutic garden, as initially proposed in the architectural project. Despite this, the place remains unused.

Figure 5. View of the internal courtyard of Suzana Cunha Pereira de Oliveira PCU, in Carandaí-MG, highlighting the notice of restricted access to users pasted on the door.

Font: The authors.

Building materials and volumetry

As observed in case study 01, the finishes represent a significant deficit in terms of ambiance. This issue is even more pronounced in this project due to the lack of flexibility in choosing materials, as specifications must be strictly adhered to.

The application of vibrant colors continues to be evident on the exterior of the building, creating an inviting entrance (Figure 6). However, inside, the color scheme remains cool, reminiscent of a hospital setting. Despite a range of options that could act on the human brain, stimulating beneficial sensations - according to color psychology (HELLER, 2013) - white predominates on all walls. One noteworthy difference in the design proposal is the use of green glass tiles on the walls of the handwashing basin (Figure 7). The application of different materials, such as tiles and paint, enhances the sensory perception of users through variations in texture and color. Moreover, the description of materials demonstrates a higher quality than those usually applied in typical healthcare environments, encompassing careful choices from the floor covering to the design of light fixtures.

The absence of green spaces also hampers the ambiance. As mentioned earlier, a simple act such as admiring a garden contributes to the mental health and, consequently, the physical well-being of users, particularly patients.

Regarding the volumetry (Figure 6), the module created with corten steel establishes an internal void, deviating from the typical rectangular box pattern often employed in primary healthcare environments. This deviation makes the building more visually engaging, aligning with the sought-after visual identity in the Minas Standard PCU project. Inside, the ceiling height is double in the reception/waiting room. This double-height ceiling, as well as creating a set of external volumes, makes it possible to install larger openings, allowing more daylight into the interior and contributing to the user's comfort.

Figure 6. External perspective of Minas Standard PCU size II and ground level.

Font: SES/MG, 2013.

Figure 7. Primary Care Room of Suzana Cunha Pereira de Oliveira PCU, in Carandaí-MG.

Font: The authors.

COMPARATIVE ANALYSIS OF THE CASE STUDIES

As outlined in this article, the investment in restructuring and constructing PCUs with the capacity to welcome and provide quality care to users represented a significant advancement in public health policies. However, upon analyzing the standard projects presented in the case studies, it became imperative to draw a parallel between them to identify both positive and negative aspects in the application of PCUs with a pre-defined physical structure, aiming to understand whether they fulfill their intended objectives and are capable of providing comfort as well as physical and psychological well-being to their intended users.

From the outset, it is noteworthy to acknowledge the advantages of ease and efficiency that the implementation of standardized projects has brought to building PCUs in Brazilian municipalities. Particularly beneficial for those lacking the resources and specialized technical personnel required for the design and execution of such expansive structures, the standardized projects adhere to a multitude of regulatory criteria. These include the design of spaces meeting the minimum necessary sizing, adhering to the prescribed program of needs for the given typology, and establishing a functional organization of spaces and flows. Standardized projects contribute significantly to enhancing efficiency and treatment outcomes. The uniformity in the design of rooms ensures that healthcare professionals operating in diverse units can precisely locate essential equipment and supplies during patient care, promoting a streamlined, patient-focused workflow. This proves advantageous, especially considering the challenges many municipal authorities face in generating appropriate architectural designs for healthcare spaces. Many establishments don't even have projects approved by the Health Surveillance Agency or have been drawn up inappropriately by professionals with limited experience in healthcare projects. Moreover, adopting standardized designs speeds up the construction process, which translates into a cost reduction associated with specialized design labor, such as architects and engineers. Thus, the allocated funds can be entirely dedicated to the infrastructure (KOWALTOWSKI, 2011).

Nevertheless, it is possible to debate whether the standardized approach sufficiently considers the intricate interplay between the project and its specific locale. The failure to incorporate

local characteristics, including epidemiological, environmental, cultural, and geographical criteria, raises concerns. Notably, the absence of active participation from staff and users in the decision-making process, coupled with the relegation of the architect to a seemingly dispensable role, emerges as a significant shortcoming. Beyond the generic and potentially unsuitable internal solutions for local demand, the embodiment of this vital health facility into the urban context appears to be an afterthought. The construction of the building is subject to the availability of public land within the designated service area. In other words, there are no more in-depth investigations into the socio-spatial, cultural, morphological, and urban environment characteristics. Such oversight neglects to examine the experiences, uses, and social practices inherent to each specific territoriality, thereby risking disruptions to established landscapes and community bonds.

Regarding environmental aspects, irrespective of architectural typology, a pivotal initial step in project design involves a detailed analysis and comprehension of the local climate. Such understanding proves indispensable for devising strategies that ensure user comfort within the premises and uphold the building's integrity over time. Climatic conditions wield influence over the building's configuration, the selection of construction materials, the size and positioning of openings, the incorporation of shading devices, and the decisions about landscaping, among other factors. Moreover, the topography of the chosen ground and existing barriers in the vicinity can impede wind access and solar incidence. Regrettably, in both PCU projects scrutinized, the accompanying documentation neglects to furnish insights into the significance of studying insolation. This study is crucial for determining solar incidence on the façades and sizing openings to facilitate access to daylight and ventilation. The absence of such considerations may result in an overabundance of light in specific spaces during certain periods, inducing visual fatigue, glare, and changes in mood and alertness. In determined locales, excessive heat gain might compromise users' thermal comfort. Once construction is complete, alterations to layout and orientation become immutable, and thermal comfort will have to be solved by changing the seals or implementing thermal insulation, for example. Disregarding these aspects, since they are standard projects, can lead to irreversible or costly problems (HEYWOOD, 2023) and excess effort on the part of staff to carry out their daily tasks and provide services to the community.

About the construction techniques, the Minas Gerais project introduces innovations by incorporating Light Steel Framing into a public health building. This material not only expedites execution time but also facilitates a project with reduced waste generation. However, it is imperative to acknowledge that adopting this system overlooks the traditional construction techniques prevalent in localities and the availability of skilled labor. As per reports from SES-MG technicians overseeing the works, in terms of technical-constructive aspects, it is crucial to recognize the diligent efforts of the project teams in selecting high-quality materials and crafting a harmonious volumetric composition. The public nature of these projects stands out, as such care is often lacking in other health units. In Minas Standard PCU, the distinctive aesthetic achieved on the façade through corten steel functions as a landmark in the landscape. This visual identity lends an easily recognizable feature to the PCUs, making them identifiable across diverse municipalities.

Notwithstanding, the documents cited do not explicitly promote the use of local materials. This practice could reduce construction costs and infuse design guidelines with regional influence, thus providing thermal comfort and emphasizing local culture. Despite the Minas Gerais Government's intention to establish a design proposal that imparts a distinct identity to the State, the project falls short in respecting existing regionalisms. The stipulated use of only materials outlined in the specifications restricts the inclusion of elements that could contribute to a more nuanced representation of local identity. Furthermore, the building materials choices tailored to the local reality and context can enhance acoustic comfort conditions. The absence

of adequate acoustic privacy in PCUs leads to distractions and impairs the ability to concentrate. In addition, many problems affected the execution of the project, including difficulties in hiring professionals possessing the requisite technical knowledge for this construction type, foundational errors resulting in work stoppages and financial losses, deviations from specified requirements, project abandonment, disruptions in management and public policies, and delays or insufficient fund transfers corresponding to each project stage. Consequently, in numerous municipalities, there was a substantial increase in the time required for project completion, with some remaining unfinished, thereby casting doubt on the cost-benefit ratio of the proposed initiative (based on verbal communication)[iii].

The improper execution of construction techniques and details, as specified in the project documents, poses a significant challenge. Examples include the failure to use cementitious board joint meshes, the use of ordinary boards in wet areas instead of waterproof ones, and errors in roof execution, which can cause short and long-term damages. These issues lead to delays, increased costs, and potential work outages and have enduring effects on the PCU's operational lifespan. Instances of these long-term effects are evident when the PCU is in operation, potentially compromising the durability of the construction. For instance, the SES-MG team reported instances of infiltration problems in Minas Standard PCUs in various municipalities, including São João Del Rei (addressed roof leakage even before project completion), Carandaí (experienced infiltration at an early stage), and Casa Grande and Senhora dos Remédios (encountered a plaster ceiling collapse, with subsequent renovation completed), located in the south-central region of Minas Gerais. A similar situation was noted in a PCU in the city of Timóteo, in the eastern region of the State. Despite being in operation for only 18 months, this PCU is already struggling with problems such as infiltration, structural issues, and plumbing damage (REIS, 2023).

Concerning the definition of internal environments, despite compliance with health standards, there are potential concerns about the size of some areas in the two standards analyzed. While it is understood that the primary goal of a standard project is to facilitate the replication of modules on any plot of land, adhering to the minimum size specified in the regulations aids this goal, creating a compact space that adapts more easily to lot sizes. However, if there is a case for creating spaces that consider humanization and, consequently, the well-being of those who visit them, concern for the layout and adequate space should be a central point in the design process. The furniture layout should prioritize comfort for patients and staff, and circulation within the premises should be designed to be friendly and inclusive for PwD. For instance, the PCU of MH lacks a dedicated room for health and endemic disease agents to meet or rest, and there isn't even an adapted bathroom for them. In addition, the pantry barely accommodates a table for meals. On this point, the Minas Standard PCU is ahead as it includes these spaces. However, the arrangement of the community agents' room in Minas Standard PCU suggests only two large tables that occupy the entire room and hinder circulation.

Both proposals, although incorporating green spaces, have limitations in providing extensive contact with nature. The potential of permeable areas appears to be included in the projects more as an obligation than an opportunity to enhance socialization and interaction between people. According to the plans analyzed, in the PCU of MH, most of the permeable area is covered only with grass, and there are two arboreal bodies in the flowerbeds on the front façade. In the Minas Standard PCU, there is only grass. Internal gardens could provide more meaningful contact with nature, and the landscaping could be designed to release pleasant aromas into the environment, helping to reduce stress and mask the medicinal smells characteristic of hospital environments. Additionally, the landscaping attracts birds, and the sound they emit makes the environment more pleasant and promotes distraction from any context of discomfort and anxiety (ULRICH, 2001). Therefore, the application of humanization

and ambiance in this regard seems to fall short, often due to resource limitations that require municipalities to strictly adhere to what is outlined in architectural projects and specifications.

Concerning internal environments, both cases analyzed exhibit a dominance of the color white. While very light tones contribute to light reflection on inner walls and better light distribution, they may convey a sense of coldness, which is undesirable in healthcare settings. Monochromatic environments can create a feeling of monotony, leading to a loss of concentration and visual fatigue. Thus, it is crucial to introduce visual contrasts between planes and openings by incorporating different colors, materials, or textures. Colors play a significant role in evoking emotional responses, impacting people's feelings and moods. The application of colors in strategic areas can enhance productivity, promote relaxation, induce joy or sadness, and influence perceptions of temperature, for instance. In healthcare environments, violet color may help reduce stress, yellow can improve mood, and green can convey tranquility and hope. On the other hand, red may induce agitation and elevate blood pressure, while combinations of yellow with black or gray can negatively impact mood and should be avoided (FARINA; PEREZ; BASTOS, 2011; HELLER, 2013; VILLAROUCO et al., 2021). Additionally, it's essential to note that colors influence thermal comfort, as the hue used on surfaces determines the extent to which incident solar radiation is absorbed, subsequently affecting the heating of the material and its transmission to the internal environment.

Finally, considering the criteria analyzed, it is possible to identify both advantages and disadvantages related to adopting standard projects for primary health care. However, concerning humanization, there is a clear need to delve deeper into fundamental aspects of ambiance.

FINAL CONSIDERATIONS

Policies aimed at humanizing public health spaces in Brazil hold significant value for enhancing the human processes of care and the physical environment housing these services. Based on this principle, the MH and the Government of Minas Gerais have implemented standard projects to achieve better architectural performance and, consequently, to enhance and expand the public primary health care network in the country's municipalities.

Based on an analysis of the design plans and perspectives of the standard projects for MH's size II PCU and Minas Standard PCU size II and ground level, we observed that while this represents a step forward in public policy, addressing improvements in service quality and effectiveness, these projects still fall short of fulfilling the principles of humanization, particularly concerning the ambiance.

The main design flaws identified apply to both cases. They are related to the lack of urban insertion, disregard for local construction techniques, the distance between project and place (indifference to environmental, cultural, and geographical criteria), design decisions disconnected from users, disregard for environmental comfort, rigid organization of spaces, and the coldness of environments. Furthermore, it is worth noting that the basic premises of healthcare architecture were not taken into account when drawing up these projects, such as flexibility and expandability (GÓES, 2011), given that this type of facility is subject to continuous transformations, extensions, modifications, and adaptations.

A more specific analysis of the architectural projects studied reveals that the PCU of MH stands out from the Minas Gerais model by proposing implantation with more permeable areas and suggesting the insertion of trees in the front flowerbeds. Additionally, it allows the choice of coverings and colors in the internal environments. On the other hand, the Minas Standard PCU establishes a more demarcated visual identity in the urban landscape by presenting a bold

architectural language. It also stands out for having a more complete program of needs aligned with primary care policies, using better quality cladding materials, and employing an innovative construction system. However, it is crucial to acknowledge that this construction technique proved to be a barrier to the project's execution.

The analysis of the case studies allowed us to infer that adopting standardized projects has brought benefits, such as reduced project costs and preparation time, compliance with regulatory criteria, organization of environments, functionality, rationalization of construction, and higher construction quality. However, considering the inherent characteristics of standardized construction, in terms of humanization, they tend to replicate the focus on building support spaces and not on their contribution to promoting the well-being and integral health of the individuals. If the reproduction of standard projects is the main alternative adopted by the public authorities, Post-Occupancy Evaluations (POE) should be performed to implement corrections in the repetition process. POE can also provide higher-quality future implementations (KOWALTOWSKI, 2011). As an alternative to standardization, it is possible to think of design models that serve as horizons for use by the bodies responsible, enabling interventions to adapt equipment to local realities, taking into account social, cultural, and climatic aspects, among others. Another promising possibility is to hold architectural design competitions, like the one held in the Federal District, to build the Riacho Fundo PCU (UNIDADE, 2022).

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Notes

[i] Each FHt is responsible for serving a maximum of 4,000 inhabitants, with the team comprising at least a doctor, nurse, nursing assistant/technician, and community health worker, with the possibility of endemic disease control workers and dentists joining the team (BRASIL, 2017).
[ii] Social support is the emotional support and assistance received through contact with family and friends. It can be obtained through environments that promote socialization, among others (ULRICH, 2001).
[iii] Information provided by employees of the Works Monitoring Sector of the Barbacena Regional Health Superintendence of the Minas Gerais State Health Department, in 2023.