THE WAYS OF ADJUSTING HOSPITALS FOR CHILDREN TO THE NEEDS OF THE CHILD – THE EXAMPLE OF MAYER CHILDREN HOSPITAL IN FLORENCE, ITALY

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Abstract
Designing child hospitals is a complex, multi-layered process. Research shows, the patients' environment has influence on the process of treatment. The feelings of isolation, powerlessness, discomfort and stress can be exacerbated by an inadequate design. Currently, many hospitals are built around the world, in which the design should help process of treatment. One of them is the Meyer Hospital in Florence, Italy, which is an excellent example of an interesting, functional and surprising hospital. The authors of the paper describe the urbanistic and architectural features as well as some elements of interior design, which have been adjusted to the perceptual and physical abilities of children. Some features of good design have also been distinguished, which can be applied also in the low-cost redecoration of the already existing hospitals. The aim of the article is to show a variety of possibilities in child hospital design. The article also shows that a hospital can be place which is attractive for patients, visitors, staff and even – owing to an interesting project – tourists.

Keywords: Children's hospital; Impact of users; Functional and spatial layout; Architecture; Interior design; Urban scale.

1. INTRODUCTION

People of different ages experience illness and suffering. This experience is particularly difficult for the little ones. Therefore, it is very important to design hospitals for children with care and attention. There is much evidence coming from longitudinal studies [1] which shows that the healing process is successful when medical treatment is linked with properly designed physical environment of the hospital. The hospital environment influences the behaviour, the well-being and the positive motivation of patients. The
space in which the patient lives during the treatment plays an important role in the healing process. There are many ways in which the hospital environment can be changed. The financial situation of the hospital is usually the main factor determining which measures can be taken. However, we can distinguish a few relatively low-cost solutions.

In our earlier studies, we discussed a few projects in Poland, in which the existing hospitals have been rebuilt and redecorated. Such projects, however, are rare and do not always cover all the areas which should be attended to. The present study shows one of the excellent examples of child health service centres, that is the Meyer Children’s Hospital in Florence, Italy. This hospital is unique and specialized unit in Tuscany. It is renowned for its diagnosis, care and rehabilitation of young patients, who may be admitted until the age of 18. The range is very comprehensive treatment in various fields such as immunology, infectious diseases, genetics, gastroenterology, nephrology, cardiology, rheumatology, ophthalmology, pediatric allergology, pediatric diabetes and cystic fibrosis. It seems that the architects influenced all the areas which could be affected. A vast array of aspects relating to space, colour and light have been attended to. In this way, the architects manipulated all factors which are responsible for creating the healing environment, ranging from the macro-factors (contact with nature) to the micro-factors (entertainment). The design significantly diminished the negative perception of the hospital, which is normally associated with pain and isolation.

2. THE STATE OF RESEARCH AND METHODOLOGY

Insufficient literature on this topic, prompted the authors to perform the following analysis, aimed at obtaining information on good examples of hospitals operating the world. Investigations were conducted of literature in order to recognize the object and its history. Then, on the basis of “in situ” obtained materials the following were carried out:

– architectural and urban analysis of the object,
– interviews with employees (healthcare professionals, the management),
– literature review,
– photographic analysis.

Successively there was a correlation between the results and conclusions of research in Meyer Children Hospital.

3. RESULTS OF RESEARCH

The Meyer Hospital is in the north of the city, 6 km from the historic centre. The hospital is built on the south slope of a hill, and is surrounded by rich vegetation and beautiful, Mediterranean architecture. The complex included a watchman’s house, the villa and the park, all fitted nicely in the landscape and natural environment. The building area is 37 000 m².

The main entry is in the historic building (A), in the south; it is square in plan, with a hipped roof. In the front of the four-floor front building there is only a spacious, ground car park, cut with greenbelts and ponds. The ground floor has been raised high above the level of the surrounding terrain. There is the reception and some of administration rooms. From the front building one can get to the lower rehabilitative zone (B) either through a glass corridor or through a path outside. The vast main Villa Ognissanti building (E) is to the north. There is a lot of communication tacks linking all the buildings. The fist track is on the level of the ground, through the park. The other is through glass corridors (C), designed symmetrically. From above, the corridors are U-shaped. All corridors lead to the main, glass hall (D), which looks like a forest because of the specifically shaped wooden pillars. In this zone, there is a waiting room, main information point and spaces for playing. This semi-circular (in cross-section), glassed hall covered with photovoltaic panels is adjacent to the middle part of the historic villa. The villa (E) has three parts: the middle one and two side protruding wings. Each of these elements is composed of three buildings, linked with one another through lower corridors. The three-storey historic building has the following functions: one-day treatment clinic, out-patients’ clinics, university part, management rooms, patients’ rooms, kitchen, bookshop. The part furthest to the north (F) has been built in the 21st century. It is patio-like, multi-part building, in which there is the reception room, laboratories, operating rooms, patients’ rooms as well as spaces for playing and recreation. Behind the buildings, the uppermost part of the hill belonging to the hospital there is an orchard and planting beds.

Meyer Children Hospital is an example of measures that have been taken to avoid associations with pain, illness and monotony. The analysis of all the steps taken allows to divide them into three categories: urbanistic, architectural and interior design. Each of the categories can be characterized by different scale of the measures taken and by a different effect it has on the recipient.
The first category includes all elements of the urban architecture. The designers fitted the whole complex of buildings in the south slope of a hill (Tab. 1.1), which produces a visual effect of diminishing the scale of the sizes of all objects. Some parts of stores are underground, which positively influences the child’s perception of the hospital. The hospital has three building lines from east to west. All parts of the buildings are separated from other object with trees and plants (Tab. 1.2). There are two small, square-plan objects in the first line, then the U-shaped corridors leading to the historic villa, and then the recently designed part of the complex, which is shaped differently on different floors. The whole of the complex goes back to the hill to finally link with it. The diversity of the urban design causes the diversity among the facades and shapes. The green zones (Tab. 1.3) create many interesting urban interiors. In front of the hospital, there is a vast parking zone, which is designed such away that its size does not overwhelm. The paths are slanted and the belts between each of the two rows of car park spaces are crossed with lawns with single, formed trees. In the middle part, which is in the north-south axis of the complex, there is a square with trees, fountains and ponds. In this area the colour of the ground is different and the number of parking places limited. Owing to these solutions the car park is not monotonous, one cannot see the whole of it at once. The ponds are interesting for children and, additionally, they change the microclimate by humidifying the air. The use of greenbelts allows to relax and increases the feeling of safety. It is worth stressing at this point that plants are present everywhere around the hospital buildings. The presence of plants has also historic reasons: it reminds of the original park surrounding Villa in the past. There are different species of trees, including pines, cedars, chestnuts as well as some exotic species. In the north there is a huge orchard.

The macro urban scale is supplemented with sculptures (Tab. 1.5). Little, colourful sculptures of jumping frogs surround the fountains, which additionally attracts children’s attention. Another sculpture of a natural-size man in a hat holding a bird invites the arriving patients: it is pleasant, evokes associations with fairy tales. Spaces for playing outside the hospital (Tab. 1.6) create a child-friendly atmosphere. Additionally, the placement of such spaces i.a. on the roof the north building, allows to avoid “empty”, industrial zones.

The analysis of the hospital’s architecture, just like the urban design, allows to distinguish elements which have been devised and built in a way adequate for child’s perception. The fundamental factor which influences the perception of the hospital is the combination the modern with the historic architecture (Tab. 1.7). The historic buildings are at the front of the premises. One of the first buildings at the entrance is a small house of the old door-keeper’s lodge. From this point, one cannot see the much bigger building of the villa. The facades seems like the old buildings; the roofs are covered with traditional, brick-coloured tiling. At these two building lines, the modern architecture is only a supplement facilitating communication and giving insight into the natural environment.

Modern architecture appears in the third building line. The gradual appearance of modern architecture results in the “softening” of its reception. The architecture of the 30s. reminds more a fairy tale or palace rather than a hospital. Another element which affects the perception of the hospital as smaller than it really is the terrace placement of the buildings in the north part of the hospital (Tab. 1.8). Drawing the floors back towards the hill “hides” them away from the sight of a young patient. In this part of the building the roofs have been prolonged in order to throw shadow on the terrace; the shape in the building is irregular, the facades inhomogeneous. The effect is enhanced with relatively low height of the buildings (two to four floors), and “immersing” some parts of the buildings in the hill. Another elements which positively influence the perception of the hospital are the green shutters, which additionally allow for individual control of light in the rooms. Also the Pinoccio-hat-shaped skylights have two functions: they ensure more light inside the buildings as well as decorate the surroundings. It is worth emphasizing at this point, that motifs from Carl Collodie’s fairy tales are used
also inside the buildings (pictures, sculptures). It seems that the main criterion for the interior designers of the hospital in Florence was to avoid monotony. Each room is different (Tab. 1.16) in size and light amount, e.g. next to a spacious hall there is a low, dark corridor and then a few-floor, open space of the waiting room. The designers also often use the motifs of the nature (Tab. 1.13). The most spectacular place is the main hall, with the glass sharp-bow-shaped southern facade. Also the construction pillars are of the same shape, which gives an effect of a forest with branches above. The glass is covered with little photovoltaic panels (Tab. 1.12), which, apart from producing solar energy, create an interesting pattern and give shade. Another natural element of the interior design is the aquarium (also colourful cows or steel fish).

The designers used also some elements of the infrastructure to provide more light to the central part of the object through a system of mirrors (Tab. 1.14). The mirror frames on the floor are interesting for the young patients of the hospital. At the same time, these elements allow children to play safely. Also some empty spaces have been filled with interesting elements, such as the space in between the staircases, which is filled with zodiac shapes made from thin pipes, or the steps of the stairs, which function as galleries. The spaces in between the elements of the construction are used as mini-galleries, showing sculptures made by artists or patients themselves. The waiting rooms are adjusted to the needs both of adults and children (Tab. 1.17). There is no single waiting room, but a number of them, which makes them less crowded. In order to ensure more comfort during waiting, special screens have been put in different places (especially playgrounds) in order to inform about the current patient number in the queue.

The hospital design provides also for a well-developed catering services and shops (Tab. 1.18). This gives patients a chance to choose food and other goods, as well as creates spaces for meeting and relaxing and ensures variety in the ways of spending free time. There are also lots of spaces for playing, studying and entertainment (Tab. 1.19). These places cater completely for children’s needs. There is also a library with spaces for playing and studying. In front of the building there is a special garden, where children can grow plants themselves.

Another category of the elements of the interior design which influence the perception of the hospital is the medical equipment. In the Meyer’s hospital, a great deal of effort has been put into making the children’s rooms look like their bedrooms at home (Tab. 1.21). The rooms are double, painted in pastel colours, with delicate, warm light. The beds are separated with a wooden window-looking construction with a roof and curtains. Also the beds are wooden. Comfort is also enhanced by adjusting the size of equipment to children. For example, the bathroom are equipped with two adult – and child size toilets (Tab. 1.20). The medical and technical equipment (e.g. electricity boards) have been hidden or made looking interesting, such as mobile X-ray reminding a giraffe (Tab. 1.23).

4. CONCLUSIONS

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<th>Description</th>
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<th>Advantages</th>
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<tr>
<td>1</td>
<td>Placement on a hill</td>
<td>-</td>
<td>-</td>
<td>- hospital fitted in the natural landscape, - perception of the hospital as smaller, - adjusting the hospital to child’s perception</td>
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<tr>
<td>2</td>
<td>Diving the hospital into a number of smaller buildings</td>
<td>The whole complex of buildings</td>
<td>- making monotonous open spaces smaller, - dividing the interiors, - diversity</td>
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<td>Elements of architecture</td>
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| 3 | The use of plants        | Parking area | – the softening of perception of monotonous open spaces of the parking area  
                                          – creating shade  
                                          – regulating the amount of light  
                                          – thermal insulation of the roofs and filtering of rain water (green roofs) |
| 4 | The use of water         | Cascades in the parking area | – diversity in the parking area  
                                          – improving the microclimate |
| 5 | The use of sculptures    | The sculpture of a man in a hat at the entrance | – pleasant, inviting atmosphere,  
                                          – arousing child’s interest  
                                          – diverting child’s attention from the main function of the hospital  
                                          – diversity |
| 6 | The use of places for playing, studying and relaxing | In an isolated place on the roof of the north building | – the possibility to stay outside in the shaded and peaceful area of the hill  
                                          – creating places for waiting, talking, etc. |
| 7 | A blend of historic and modern architecture | Historic villa with modern corridors and newly-built buildings at the north | – associations with fairy tales  
                                          – avoiding monotony |
| 8 | Terrace placement | New buildings at the back of the complex | – decreasing the scale of the building  
– giving lightness to the shape of the buildings  
– possibility of going outside |
| 9 | Not high architecture, two to four floors | All buildings | – linking the building to the shape of the hill  
– adjusting the building to child’s perception |
| 10 | Shutters | Historic part | – fairy-tale atmosphere  
– controlling light in the rooms |
| 11 | Adjusting the architecture to the world of fairy tales. | Pinocchio-hat looking skylights | – additional light  
– using a motif from “Pinocchio”  
– arousing interest |
| 12 | Using photovoltaic panels and other renewable sources of energy | Fitted in the roof of the hall | – getting renewable energy  
– giving shadow to the glassed part of the hall  
– creating a visual effect of twinkling squares |
| 13 | Drawing on the nature | Tree-looking pillars in the hall | – adding variety to the interiors  
– arousing interest  
– diverting attention from illness and treatment  
– avoiding monotony and boredom |
| 14 | Adjusting lighting to child’s perception | Mirrors reflecting light | – arousing interest  
– giving more light  
– introducing new elements |
| 15 | Using art | Sculptures of colourful, metal fish, installations in staircases, | – adding variety  
– diverting attention  
– arousing interest,  
– education |
| 16 | Variety in sizes of room | Small spaces next to high, open spaces | – adding variety  
– ensuring more light and air  
– creating one spacious interior with discreetly emphasized elements of the floors |
<table>
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<tr>
<th></th>
<th>Waiting rooms adjusted to the needs of children and adults</th>
<th>Waiting room in the main hall, -- patients can choose the place of waiting because they can monitor the queue on computer screens</th>
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<tr>
<td>17</td>
<td>Spaces for catering and shops</td>
<td>In public spaces -- possibility to do shopping -- spaces for meetings and relax -- offering an alternative way of spending free time</td>
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<tr>
<td>18</td>
<td>Playing and education zones</td>
<td>In many places, such as waiting rooms, on the last floor of the back building -- offering ways of spending free time -- opportunity to study (library, botanical garden grown by children) -- ensuring contact with other children</td>
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<td>19</td>
<td>Adjusting the sizes of furniture to the height of children</td>
<td>Toilets -- facilitating use</td>
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<td>20</td>
<td>Patients’ rooms equipped in a way not reminding a hospital</td>
<td>Pastel colours, wooden, house-looking and crayon-looking partitions between beds -- drawing of the world of fairy tales -- friendly, homely atmosphere -- double room with a partition (intimacy and opportunity to meet others at the same time) -- space for the parent</td>
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<tr>
<td>21</td>
<td>Elements of interior design</td>
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All in all, Meyer hospital in Florence is an example of the modern health architecture of health service centres, which is consistently adjusted to the needs of its users, e.g. children. It needs to be emphasized that the features described in the present paper can be possibly adapted for implementation in most new projects of hospitals. However, in Poland, we rather modernize the already existing hospitals rather than build new ones.

Therefore, out of the list of all features influencing the perception of the hospital, we have chosen only a few, which can be implemented in the already-existing hospitals. The modernization of such objects is often possible at relatively low costs, but still can bring good results. The adjustment of the equipment to child's needs and physical possibilities is probably the most important aspect. It seems that the discomfort felt in this area is responsible for treating the hospital as unfriendly. Using art, such as paintings and sculptures, is another way in which the perceptions of a hospital can be changed. It is worth reminding, however, that according to some research, art should inspire, fascinate and allow for interaction. Abstract drawing forms of the nature seem to work best (cf. a quote “Give us something else than these butterflies on the walls” [2]). Another way of changing the perception of the hospital is the use of plants. This allows for: dividing the views, creating urbanistic interiors, stressing and hiding some elements of the landscape. Plants also have influence on the microclimate are regulate the amount of light.

Another feature which can be changed at relatively low costs is the homely atmosphere in patients' rooms. Sadly, as our previous research shows [3], many patients have to stay in hospitals repeatedly. Therefore, it seems vital to ensure comfort and intimacy both for patients themselves as well as for their parents. Also, as is often the case in hospitals outside Poland, it would be good to allow pets in a hospital. In Meyer Hospital, for instance, some specially trained dogs are walked daily by their guardians. There are some hospitals in Poland, for example The Rehabilitative Hospital in Radziszów near Cracow, which try to meet the requirements enumerated in the present article.
adjusting the elements to child’s perception
designing places for playing, studying and relaxation
placement on a hill
terrace placement
low buildings (2-4- floors)
using shutters
using renewable energy sources
different sizes of rooms
different shapes and sizes of buildings
adjusting the waiting rooms to the needs of children and adults
modern architecture
using specially designed medical equipment
covering technical infrastructure

adjusting the sizes of equipment to child’s possibilities
using plants
using sculptures, painting, photograph
and other art blending historic and
drawing on nature and fairy tale world

Figure 2.
Low-cost elements of design which can be taken into consideration during hospitals’ redecoration

REFERENCES

