

Universal Design Analysis at Emergency Room (Adam Building) Roemani Hospital, Semarang

Mifta Nila Munana^{1*}, Kurnia Widiastuti^{2*}.

¹ Faculty of Engineering and Informatics, Universitas PGRI Semarang, Jl. Sidodadi-Timur No.24 Semarang, Central Java 50232, Indonesia

² Faculty of Engineering and Informatics, Universitas PGRI Semarang, Jl. Sidodadi-Timur No.24 Semarang, Central Java 50232, Indonesia

*nilamanana@gmail.com

Abstract. Hospitals are always developing their services in every sector, including support facilities for patients and hospital users. One of hospital in Semarang that is undergoing development is Roemani Hospital. Many visitors come to this hospital because of its good service and adequate facilities. The research was conducted by observing the emergency unit in the Adam Building. The results of the identification will be analyzed based on regulations and principles of universal design. The results of the analysis of the implementation of universal design in the Adam Building will serve as a reference for the hospital to become one of the hospitals that implements universal design well and also for improvements if the analysis results are not satisfactory. The application of universal design aims to be accessible to all users regardless of age, physical limitations, and other factors.

Keywords: Universal Desain, Disability, Public Area, Hospital

1. Introduction

Providing equal accessibility opportunities to all people with any conditions is the goal of the implementation of universal design. Not only does it provide equal accessibility to everyone, but it also plays a role in facilitating people to return to social life, with a safer environment and free from any barriers and integrating them back into society [1]. To create a barrier-free environment, the implementation of universal design can be a more effective and efficient way when compared to conventional and inclusive designs that only focus on users with disabilities. All users are the scope of a broader design universe [2]. One of the regions that has a fairly good development of improving health services is Semarang City. Based on data from the Central Statistics Agency until 2022, there are 21 public hospitals, 11 special hospitals, 10 inpatient health centers, 27 inpatient non-inpatient centers, 264 primary clinics and 1,626 posyandu. Roemani Hospital is one of the hospitals in Semarang City. Romani Hospital has always made significant improvements. Located at Jalan Wonodri Sendang Raya No.22, South Semarang District by providing health services including emergency room, inpatient services, outpatient services, and supporting services such as Radiology, Laboratory, Physiotherapy, Medical Rehabilitation and Hemodialysis. Other services available are Superior Services, Homecare and Complementary. Until now, Roemani Hospital is still in the service evaluation stage, many new building constructions and renovations have been carried out. From 2025, the hospital is developing the construction of a new building that aims to improve service facilities. The building consists of 13 floors, the function of this building is emergency room, inpatient and hemodialysis, and other services. However, so far it has not been evaluated about the universal application of design to this hospital. Roemani Hospital consists of seven building masses, each with a different function. From a simple observation, many patients visit, especially in the emergency room area. This research will focus on the emergency room area located in the Adam Building of Roemani Hospital. The researcher will analyze the universal application of design to the waiting room and facilities in the emergency room area of the Adam Building. Universal design has been discussed a lot in previous researches, especially on public buildings, because the purpose of the universal design is to facilitate all groups, easily accessible to all users regardless of age, physical limitations and other factors. With this research, it is hoped that it will be able to get to know more deeply what is included in the universal design and what its implementation is like at Roemani Hospital.

2. Methods

The researchers used a descriptive approach that aimed to describe and explain the conditions at the research site at the time the research was conducted. This method provides accurate information, which is useful for the advancement of science and can be applied to various problems. The method used in the preparation of this final project was a quantitative method. Primary data and secondary data were used for data collection. Data was obtained through field surveys and collaboration with Roemani Hospital in Semarang City. The steps in the survey plan included conducting observations covering the conditions of visitors while carrying out activities in the Adam Building.

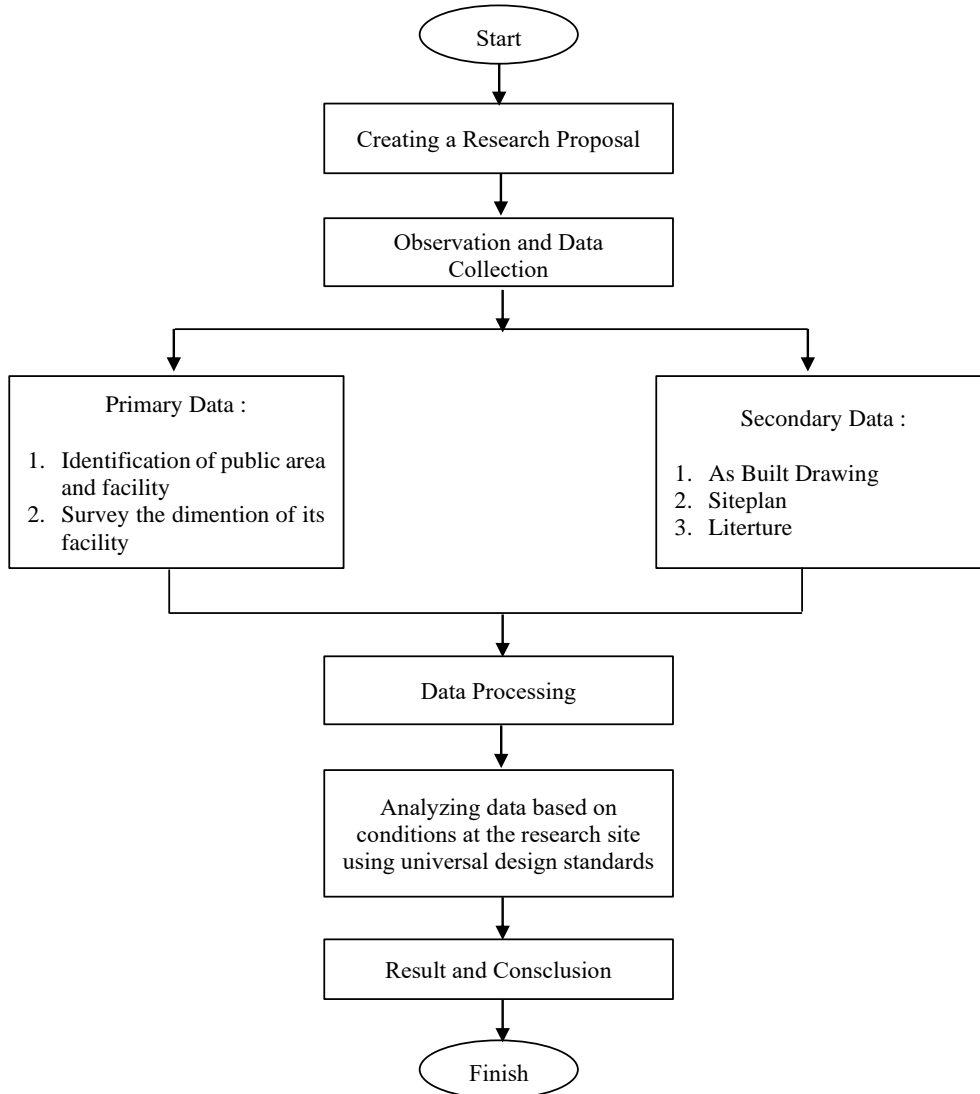


Figure 1. Flow Chart

3. Results and Discussion

1) Based on Survey Time

The survey was conducted on Saturday, January 24, 2026 using instruments such as a laser meter and measuring tape to measure the dimensions of the universal design elements applied in the Adam Building's emergency room.

a) Waiting Room Patient on Emergency Area

The emergency room area has been marked with large emergency room signs at the entrance. The reception area in the emergency room has implemented a zoning system with colorful lines according to the level of urgency. Green indicates areas with a low level of emergency, while red indicates the highest level of emergency. These measures are an implementation

of the universal design principle of Perceptible Information. Officers can understand these signs. The patient waiting area is quite spacious and allows wheelchair users to wait in this area. Wall handles are available on the walls to assist patients and family members who have difficulty walking, in line with the principle of Equitable Use. The receptionist is quite informative, but the registration method is still manual. The lighting in the room is relatively adequate, both natural and artificial. In areas where procedures and observations are required, lights have been installed at those specific points.



Figure 2. Waiting Room Picture



Figure 3. Waiting Room Picture

b) Toilet

The toilet in the emergency room has fairly good facilities, including a 90 cm wide door with an outward opening. Inside the toilet, there is a handle bar for people with disabilities to stand up in accordance with the application of the Size and Space for Approach and Use principle, in accordance with PUPR Regulation No. 14 of 2017, which stipulates that the height of the handle bar for disabled toilets is 70 cm and the height of the monoblock toilet is 46 cm. The difference in elevation between the bathroom and the corridor floor is addressed with a ramp. The mirror is installed 1.90 meters from the floor, and the sink is 74 cm from the floor.



Figure 4. Toilet's Door Picture



Figure 5. Interior Toilet Picture

c) Ramp

To connect the first floor and the floors above it, as well as to provide patient evacuation access, the emergency room area uses a ramp as vertical access. The ramp is designed using reinforced concrete and anti-slip textured carpet to prevent slipping. The ramp has a slope of less than 7° so that users can comfortably cross it. In accordance with the principles of Low Physical Effort universal design, users do not feel fatigued when using this facility.



Figure 6. Ramp Picture

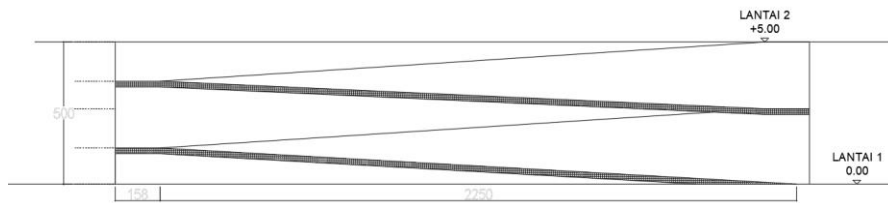


Figure 7. Ramp Section

d) Stairs

As a vertical connector, the stairs in the emergency room area are used as an evacuation route and also as a means of access for patients' families and staff. The standard requirements for stairs are a minimum width of 120 cm, a maximum distance between stairs of 40 m, an optrade of 15-18 cm, an antrade of at least 30 cm, equipped with handrails, and adequate lighting. Based on observations in the field, the staircase width is 158 cm with a rise of 30 cm and a run of 17 cm. This analysis is in accordance with the principles of Low Physical Effort Universal Design.



Figure 8. Stairs Picture

e) Lift

In addition to stairs for specific situations as a vertical connection, patients, their families, and staff can use the elevator in the emergency room area to access the first floor and the floors above. The elevator requirements based on standards are a minimum effective size of 120 cm x 240 cm with a minimum door opening width of 120 cm. The elevator doors are equipped with automatic sensors. Two elevator units are located in the center of the east side of the building, adjacent to the stairs. The passenger elevator is used for vertical circulation between floors, from the first floor to the fourth floor. The elevator size meets the requirements. The elevator wall finish uses maroon-colored granite material.



Figure 9. Hospital Lift Picture

f) Corridor

The horizontal access in the emergency room area is a hallway. The use of wall guards installed 131 cm from the floor on this wall is an application of the universal design principle of Equitable Use, whereby all users in the corridor can pass through this room without difficulty, whether they are healthy or disabled. The corridor in the emergency

department area is 340 cm wide, allowing patient beds to pass through. This is in accordance with PMK No. 40 of 2022, which stipulates that the width of corridors and hallways for two patient beds passing each other must be at least 240 cm. The following are the results of observations in the room.



Figure 10. Hospital Corridors Picture



Figure 11. Hospital Wall Guard Picture

2) Based on analysis of observation results and standard data

Table 1. Universal Design Analysis

Variables	Standart	Realtime Condition	Analysis Result
Waiting Room on Emergency Room Facilities	Lighting in the room is sufficient.	The lighting of the room is in good condition.	meet the standards
	Name signs should be clear and contrasting	The name sign of the emergency room is placed in front of the entrance and is quite clear.	meet the standards
	Access Information should be easy to understand.	Access to Information There are 4 officers in the triage area.	meet the standards
	The waiting area must be able to be occupied by people with disabilities.	The waiting area is wide enough for safe and wheelchair access.	meet the standards
	Bathroom door is at least 90 cm, opening side is out.	Bathroom door is 90 cm and opening side is out	meet the standards
Toilet	There is a handle bar for users with disabilities installed 65 cm – 80 cm from the floor.	There is a handle bar installed 70 cm from the floor.	meet the standards
	The position of the wastafel is at least 70 cm – 85 cm.	Wastafel placement position 74 cm from the floor	meet the standards
	Installation of mirrors 90 cm from the floor.	The mirror is installed 90 cm	meet the standards
Ramp	The minimum slope of the ram in the building is 6°. The minimum slope of the ram outside the building is 5°.	The ramp in the building in the 7° slops.	does not meet the standards

Stairs	The minimum width of the stairs is 120 cm. Optrade minimum 15 cm and maximum 18 cm Antrade is at least 30 cm.	Staircase width 158 cm. Optrade 17 cm. Antrade is at least 30 cm.	meet the standards
Lift	The minimum door opening is 110 cm. Elevator Size 120 cm x 230.	Elevator door opening 120 cm. Elevator Size 120 cm x 240.	meet the standards
Corridors	Standard corridor width 152 cm. The minimum handrail installed is 65 cm – 80 cm from the floor.	Corridor width 340 cm. The installed handrail 131 cm from the floor.	meet the standards

4. Conclusion

From the analysis and discussion, the researchers can draw the following conclusions :

- a.) The emergency room reception area is quite easy for everyone to know because it has a fairly clear sign and is strategically located. The application of Perceptible Information has been implemented quite well. The staff in the reception area is quite informative. The method used is still manual, because officers have to sort patients based on categories to their respective emergencies.
- b.) The toilets in the emergency room have quite good facilities and facilities that support disabilities are available, including the provision of handle bars, door widths that can be passed by wheelchairs, ramps for connecting different elevations. In addition, mirrors and sinks are also installed for all users to use. The principles applied in the toilet area of the emergency room are Size and Space for Approach and Use.
- c.) Vertical connection facilities available in the emergency room area are stairs, elevators and ramps. Each facility for vertical relationships in the emergency room area has been sized according to the standards in PMK regulation and has also implemented the principle of Low Physical Effort. However, the ramp has a slope that has not met the standard.
- d.) For horizontal connections, the corridor has been built to good standards, the size is quite wide and there are wall guards or hand railings installed on the wall.

From this research, the author has several recommendations, including :

- a.) Creating innovations to make information more accessible by utilizing digital technology.
- b.) Improving the slope of ramps and safety facilities in ramp areas.
- c.) Conducting periodic inspections of facilities in disabled toilets.

References

- [1] Goldsmith.S, "Universal Design. Oxford : Architectural Press," 2000.
- [2] Korydon. H.S., and Preiser. W.F.E., "Universal Design Handbook," 2011.
- [3] Peraturan Menteri PUPR, "Permen PUPR No. 14/PRT/M/2017 mengenai Persyaratan Kemudahan Bangunan Gedung." 2017.
- [4] Menteri Kesehatan Permenkes, "PMK No. 40 Tahun 2022 mengenai Persyaratan Teknis Bangunan, Prasarana, dan Peralatan Kesehatan Rumah Sakit." 2022.
- [5] Wibawa. B.A. and Widiastuti. W., "Standar dan Implementasi Desain Universal Pada Bangunan Gedung Dan Lingkungan." 2020.