

Analysis of the Impact of Furniture Forms and Interior Arrangements on the Quality of Life of Individuals with Visual Impairments

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Abstract: As part of the research, a number of diseases were characterized, such as glaucoma, Leber's disease, multiple sclerosis, diabetic retinopathy, macular degeneration, optic neuritis, neurodegenerative diseases, retinal artery aneurysm and retinal vascular diseases. The importance of adapting spaces to the needs of people with visual field disorders in the context of universal design was emphasized. The research conducted at the LIMBA Student House focused on analyzing the accessibility of common spaces for people with such problems. Some modifications were found to be necessary. Changes were suggested that could improve the quality of life of residents, especially those with visual field disorders.

Keywords: universal design, visual field disorders, interior design

INTRODUCTION

Modern society faces the challenge of creating more inclusive and accommodating environments for individuals with diverse abilities, particularly those with visual impairments. Diseases such as cataracts, glaucoma, or retinopathy can significantly impact visual perception, posing challenges in daily functioning. Consequently, the design of universal spaces becomes a crucial aspect of supporting individuals with such conditions.

Individuals with visual impairments often encounter difficulties in spatial orientation, object recognition, and maintaining independence in daily activities. In this context, the role of interior designers and architects becomes pivotal, as they determine whether public or private spaces are adapted to the varied sensory needs of individuals.

The analysis of the impact of furniture forms and interior arrangements on the quality of life of individuals with visual impairments thus becomes a research area aimed at raising awareness of the need for inclusivity in space design. By understanding the specifics of these impairments and identifying the barriers faced by individuals with visual problems, it becomes possible to develop more effective and tailored solutions. In this study, we will focus on the role of furniture forms and interior arrangements as key elements influencing the quality of life of individuals with visual impairments, with a particular emphasis on the needs of this social group in universal spaces.

RESEARCH OBJECTIVE

The aim of the study was to comprehend how individuals with visual impairments experience space and how furniture forms and interior arrangements impact their quality of life. The research conducted at the LIMBA Student House of the Warsaw University of Life Sciences focuses on analyzing the accessibility of common areas in five key areas: kitchen, corridors, rooms, bathrooms, and toilets. The objective of these studies was a comprehensive

assessment of the accessibility and functionality of spatial arrangements, with an emphasis on understanding the diverse needs of users, including those with mobility and sensory limitations.

Through a series of conducted observations, the research yielded specific conclusions and suggestions regarding spatial arrangements. An important goal was to identify areas requiring modifications or enhancements to increase accessibility and comfort in using common spaces. The primary aim of the research is to understand how appropriately designed and adapted living spaces, including furniture, can influence the quality of life of individuals with visual impairments. The study focuses on providing knowledge about specific ergonomic and design factors that significantly impact the daily functioning of individuals with visual impairments.

MATERIALS AND METHODS

A focus group study was conducted at the "Limba" Student House of the Warsaw University of Life Sciences, involving a group of individuals who wore simulation glasses mimicking visual impairments during the study.



Figure 1. Glasses posing a reduced field of vision

At the beginning of the study, participants were informed about the research objectives and the nature of the simulated glasses. Each participant was explained the specific visual impairments that would be simulated. Subsequently, participants donned the simulation glasses and were asked to describe their initial impressions and experiences associated with wearing them. Participants were then tasked with performing a series of activities in various scenarios, simulating everyday situations such as moving around the house, cooking, reading, etc. Throughout these tasks, participants were prompted to articulate their experiences and the difficulties they encountered.

Upon completing all scenarios, participants engaged in a group discussion. They were encouraged to share their observations and experiences, focusing on how different furniture forms and interior arrangements influenced their experiences. At the end of the study,

participants were invited to provide overall insights and suggestions regarding how interior arrangements and furniture forms could be improved for individuals with visual impairments.

DISEASE CHARACTERISTICS

Glaucoma is a group of eye diseases that pose a serious threat to visual health. It is characterized by damage to the optic nerve, typically caused by elevated intraocular pressure (M. Rękas, 2018). This condition, often initially asymptomatic, can progress gradually, subtly affecting the visual field. Glaucoma symptoms can vary and may include a gradual narrowing of the visual field, which can be challenging to notice initially. Additionally, patients may experience eye pain, headaches, and a gradual loss of visual acuity (A. Misiurewicz-Gabi, 2020). These symptoms are often observed in advanced stages of glaucoma when significant damage to the optic nerve has already occurred. The risk of developing glaucoma may be associated with age, genetics, and high blood pressure. Advanced age often increases susceptibility to the development of this disease, as does a family history of glaucoma. Furthermore, high blood pressure can be a risk factor for glaucoma development. Diagnosing glaucoma requires regular ophthalmic examinations as early detection is crucial to minimize its negative impact on vision. Various treatment methods are employed, including medications and surgical procedures aimed at controlling eye pressure and preventing further damage to the optic nerve (J.J. Kański, 2018; M. Mulak, 2020). Long-term monitoring, regular visits to specialists, and adherence to medical recommendations are crucial for maintaining visual quality and limiting the progression of the condition. In case of any suspicions or symptoms related to glaucoma, prompt consultation with an ophthalmologist for proper diagnosis and initiation of appropriate treatment is essential.

Leber's Disease, also known as Leber's hereditary optic neuropathy (LHON), is a rare genetic disorder leading to a gradual loss of vision, typically in young adults. It is caused by mutations in mitochondrial DNA, affecting the function of optic nerve cells and resulting in slow vision degeneration (A. Kodroń, 2015). The main symptom of this disease is a gradual narrowing of the visual field, usually starting suddenly, often unilaterally, and then potentially affecting both eyes (I. Rościszewska-Żukowska and H. Bartosik-Psujek, 2020). Loss of visual acuity is characteristic, and patients may experience difficulties adjusting to changing lighting conditions, especially at night. The risk of Leber's Disease is associated with genetic inheritance. Most cases of this disease are maternally inherited, meaning that genetic mutations are passed from mother to offspring. While males are more susceptible to severe forms of the disease, symptoms can still occur in females, who can also carry the mutations. Currently, there is no effective treatment for Leber's Disease; however, research is underway on therapies aimed at improving the function of optic nerve cells (J. Roskal-Wałek et al., 2018). Some therapeutic approaches focus on reducing oxidative stress in cells or introducing substances with the potential to improve mitochondrial function. Like with other genetic diseases, the diagnosis of Leber's Disease is crucial for appropriate management and patient support. Therefore, a thorough genetic assessment and regular eye health monitoring by an ophthalmologist are essential. For individuals with family histories burdened by this disease, genetic testing can be helpful in identifying the risk of occurrence and implementing preventive or monitoring measures (M. Mulak et al., 2013).

Multiple sclerosis (MS) is a chronic autoimmune disease that affects the central nervous system, including the optic nerve (Ł. Rzepiński, Z. Maciejek, 2018). It is a condition in which the immune system attacks the myelin sheath surrounding nerves, leading to damage in communication between the brain and the rest of the body. Symptoms can be diverse and depend on the location of the damage in the brain or spinal cord. Primary symptoms of multiple sclerosis related to the optic nerve include visual field disturbances, which may manifest as

blurred vision, blind spots, or even complete loss of vision in one or both eyes (K. Selmaj, 2005). Additionally, patients often report issues with double vision and a gradual loss of visual acuity.

Risk factors associated with multiple sclerosis include genetic heritability, where individuals with relatives diagnosed with MS may have an increased risk of developing the disease. Furthermore, environmental factors such as exposure to viruses, vitamin deficiencies, or smoking may also impact the risk of developing this disease, although the exact mechanism of the environment's influence on the development of MS is not fully understood.

Currently, there are no definitive diagnostic tests for multiple sclerosis, but the application of McDonald's criteria aims to facilitate accurate diagnosis (M. Andrzejewska, 2021). The treatment of multiple sclerosis focuses on alleviating symptoms, delaying disease progression, and improving the quality of life for patients (B. Zakrzewska-Pniewska et al., 2019). Therapies may include immunomodulatory drugs, rehabilitation, interventions supporting psychological and physical functions, as well as symptomatic therapies aimed at controlling specific symptoms such as vision problems. Regular medical care and monitoring of disease progression are crucial for managing multiple sclerosis.

With increasing scientific knowledge and advancements in therapies, there is a chance to improve the quality of life for individuals affected by this disease, although there is currently no cure for multiple sclerosis. Early diagnosis, appropriate treatment, and psychological support are key for patients suffering from multiple sclerosis.

Diabetic retinopathy is a complication arising from diabetes that affects the blood vessels in the retina of the eye. This condition develops gradually due to microvascular damage caused by prolonged high levels of blood sugar, characteristic of diabetes (M. Mulak, 2020). Initially, diabetic retinopathy may be asymptomatic or present with mild symptoms, but as the disease progresses, patients may notice a deterioration in their vision. Symptoms may include vision disturbances such as spots in the field of vision, blurred vision, and changes in visual acuity. In advanced cases of diabetic retinopathy, significant vision loss may even occur.

Risk factors associated with the development of diabetic retinopathy include long-standing diabetes and high blood glucose levels (D.S. Fong et al., 2003). The longer diabetes persists, especially in the absence of proper treatment or blood sugar control, the higher the risk of developing this complication (I. Kazimierska, 2022). Additionally, arterial hypertension and high cholesterol levels may increase the risk of worsening diabetic retinopathy. The diagnosis and monitoring of diabetic retinopathy require regular eye examinations for patients with diabetes. Early detection and intervention can help control the progression of the disease and reduce the risk of serious visual complications.

Treatment may include laser procedures, medications, and surgical interventions, depending on the stage of the disease and its individual course (D.S. Fong et al., 2003). It is also important to control blood sugar levels, arterial blood pressure, and regularly monitor the eye health of patients with diabetes to minimize the risk of diabetic retinopathy development and prevent serious consequences for vision (M. Jewusiak-Rogulska, J Kocięcki, 2013). In case of any concerns or changes in vision, it is crucial to promptly consult with an ophthalmologist.

Age-Related Macular Degeneration (AMD) is a condition affecting the central part of the retina, commonly occurring in elderly individuals. It is one of the leading causes of vision loss in the elderly (M. Mulak, 2020). A characteristic feature of AMD is the gradual damage to the macula, responsible for central vision and detail perception. In AMD, there is a progressive loss of retinal cells, leading to a gradual decline in visual acuity and the development of distortions in the central field of vision (B. Kostrzewa et al., 2015). Patients may experience

distortions in straight lines, straight points, and even empty areas in the central field of vision, significantly impacting the performance of daily activities that require precise vision.

Risk factors associated with AMD include age, genetics, smoking, and arterial hypertension. Advanced age is the primary risk factor for the development of this disease (I. Jankowska-Lech et al., 2013). Genetic heritability also plays a significant role, as individuals with a family history of AMD may be more susceptible to developing the disease. Smoking increases the risk of AMD, as does high blood pressure, which affects the health of blood vessels in the eye. The treatment of AMD focuses on delaying disease progression and preventing further deterioration of vision. It includes regular eye examinations, the use of vitamin supplements, photodynamic therapies, and, in advanced cases, treatment with injections of drugs into the eye. For dry AMD, there is no effective treatment to reverse damage, but early detection can help manage the disease. Individuals at risk of developing AMD are advised to undergo regular eye examinations, maintain a healthy lifestyle (including quitting smoking), and control arterial blood pressure, which can help reduce the risk or delay the progression of this eye disease (A. Stankiewicz and M. Figurska, 2010). In case of any observed changes in vision, it is important to promptly consult with an ophthalmologist for proper diagnosis and treatment.

Optic neuritis is an inflammatory condition affecting the optic nerve that can lead to severe vision loss. The optic nerve is responsible for transmitting visual signals from the retina of the eye to the brain, and inflammation of the nerve can cause damage, negatively impacting visual perception. Characteristic symptoms of optic neuritis include eye pain, which can be felt as a dull, radiating pain around the eye or head (D. Clark et al., 2010). Additionally, patients often report a gradual loss of visual acuity, which can be sudden or progressive, along with visual field disturbances. Other symptoms may include color vision disturbances, double vision, or changes in depth perception (K. Kaźmierczak et al., 2006).

Risk factors associated with optic neuritis include autoimmune diseases such as systemic lupus erythematosus, multiple sclerosis, or vasculitis, which can lead to autoimmune reactions and damage to the optic nerve. Additionally, viral, bacterial, or fungal infections, especially around the eye or related to the nervous system, can also lead to optic neuritis.

The treatment of optic neuritis depends on its cause. If inflammation is caused by an infection, antibiotic therapy or antiviral treatment may be used to combat the infection. In the case of autoimmune reactions, immunosuppressive drugs or corticosteroids may be employed to reduce inflammation. It is crucial to quickly diagnose and treat optic neuritis, as delayed therapy can sometimes result in permanent damage to the optic nerve and permanent vision loss. In the presence of symptoms suggesting optic neuritis, it is essential to consult with an ophthalmologist or a neurology specialist for proper diagnosis and treatment.

Neurodegenerative diseases constitute a group of disorders that gradually lead to the loss of neuronal functions, often affecting vision. These diseases are characterized by progressive damage to neurons, resulting in impaired communication between nerve cells and typically leading to a deterioration in the body's functioning. Symptoms of neurodegenerative diseases that can impact vision include decreased visual acuity, worsening visual capabilities, and visual field disturbances (M. Gawel, A. Potulska-Chromik, 2015). Depending on the specific type of neurodegenerative disease, symptoms may vary. For instance, in Alzheimer's disease, which can also affect the brain region responsible for processing visual information, patients may experience difficulties recognizing images or individuals. Risk factors associated with neurodegenerative diseases include genetic factors, where the presence of certain genes may increase the risk of developing these disorders. Aging is also a key risk factor, as advancing age enhances susceptibility to many of these diseases (M. Bartoszevska, 2008). The treatment of neurodegenerative diseases typically focuses on symptom relief, delaying disease

progression, and improving patients' quality of life. Therapies may include medications targeting specific symptoms, interventions supporting brain and physical functions, as well as psychological support for both patients and their families. In the case of neurodegenerative diseases, including those affecting vision, early diagnosis and proper patient management can help slow the progression of the disorder and ensure the best possible quality of life for the patient (M. Oarowski et al., 2006). Scientific research and therapeutic development are concentrated on finding treatment methods that could effectively halt or slow down the progression of these diseases.

Retinal artery aneurysm is a condition in which there is a widening of the artery that supplies blood to the retina of the eye. This vascular disease can lead to varying degrees of visual disturbances depending on the location and size of the aneurysm. Characteristic symptoms of retinal artery aneurysm include changes in the visual field and a gradual loss of visual acuity. Patients may experience various symptoms such as spots in the visual field, flashing lights, shadowing, or distortion of images (K. Świergosz et al., 2020). The severity of symptoms may depend on the size, location, and progression of the aneurysm. Risk factors associated with the occurrence of retinal artery aneurysm include high blood pressure and atherosclerosis. High blood pressure can cause damage to blood vessels, including retinal arteries, increasing the risk of their widening. Additionally, atherosclerosis, a condition where atherosclerotic plaques build up in vessels, can lead to structural changes in retinal arteries and increase the risk of developing an aneurysm (D. Knap et al., 2010). The treatment of retinal artery aneurysm depends on the degree of advancement of the disease and the risk of complications. In the case of small aneurysms that do not cause significant symptoms or threats to vision, the doctor may recommend monitoring and regular check-ups. In more advanced cases where the aneurysm poses a serious threat to vision, interventional treatment may be necessary, such as laser therapy or surgical procedures to remove the aneurysm or restore normal blood flow in the retinal vessels (K. Wołkowski et al., 2014). Early detection and appropriate treatment are crucial for minimizing the risk of complications and preserving visual function in patients with retinal artery aneurysm. Regular eye examinations, especially in individuals with risk factors such as high blood pressure or atherosclerosis, can help in the early detection of the problem and the implementation of suitable therapeutic measures.

Vascular diseases of the retina encompass a variety of conditions that affect the blood vessels within the retina of the eye. These vascular diseases can lead to visual disturbances and a gradual loss of visual acuity, depending on the type and stage of the condition (F. Raciborski et al., 2016). Symptoms associated with retinal vascular diseases include changes in vision, which may manifest as spots in the visual field, distortion of images, difficulty in distinguishing shapes, or even loss of visual acuity. The severity of symptoms can vary depending on the specific type of retinal vascular disease and its progression. Risk factors associated with the development of retinal vascular diseases include high blood pressure, diabetes, and atherosclerosis. High blood pressure can cause damage to the blood vessels in the retina, increasing the risk of various vascular disorders. Diabetes can also lead to significant vascular changes in the retina, resulting in diabetic retinopathy (U. Bojakowska, 2016). Atherosclerosis, characterized by the deposition of atherosclerotic plaques in blood vessels, can also affect the condition of the vessels in the retina, causing various vascular diseases. The treatment of retinal vascular diseases depends on the type and stage of the condition. Therapies may include the control of risk factors, such as hypertension management, improved diabetes control, pharmacological treatments, or interventional procedures, depending on the nature of the disease. Early diagnosis and treatment of retinal vascular diseases are crucial for minimizing the risk of complications and preserving visual function. Regular eye examinations, especially

in individuals with risk factors like high blood pressure, diabetes, or atherosclerosis, are essential for the early detection and proper management of these conditions. In case of any changes in vision or suspicion of retinal vascular diseases, prompt consultation with an ophthalmologist is recommended.

UNIVERSAL DESIGN IN INTERIOR DESIGN

The societal shift towards inclusion and accessibility for all has made interior design a particularly crucial area in ensuring comfort and functionality for individuals with various disabilities. In the context of blind and visually impaired individuals, there is a need for a special approach to designing interior spaces inside buildings, aiming to facilitate movement, orientation, and the use of the environment (A. Leszczyńska, 2016).

Internal space signage plays a crucial role in ensuring safety and orientation for individuals with visual impairments (J. Poliński, 2012). Elements such as Braille signage, contrasting markers, or sound-reflecting materials are significant components that facilitate navigation within buildings (Y. Yamanaka, 2014).

Proper interior lighting, with its even distribution, should be the foundation when designing lighting installations. This contributes to more efficient perception of the surroundings by the visually impaired, consequently enhancing the sense of security (I. Benek, A. Labus, 2016). The use of contrasting colors contributes to easier differentiation of various architectural elements, aiding orientation and mobility for individuals with visual field impairments (J. Budny, 2009).

Interior space design should consider the appropriate arrangement of furniture to avoid hazardous obstacles or narrow corridors, which could hinder the movement of blind or visually impaired individuals (J. Budny, 2009 and M. Wysocki, 2010).

Communicative accessibility in buildings, as well as in public spaces, is crucial for all users (J. Poliński, 2013). Raised floor markings, tactile maps, or navigation systems can significantly facilitate the use of different spaces (J. Poliński, 2013; J. Poliński et al., 2015).

The concept of universal design, which considers the needs of individuals with various disabilities, is extremely important in creating more accessible and user-friendly spaces for everyone (E. Kuryłowicz, 1996; J. Budny, 2009).

In the context of interior spaces, designing with the needs of individuals with visual impairments in mind is crucial to ensuring full accessibility and comfort for all users. Several key aspects should be considered in the interior design for blind and visually impaired individuals.

The first essential element is the signage within internal spaces. Braille markings, contrasting indicators, and sound-reflecting materials play a significant role in facilitating navigation and orientation for individuals with visual impairments (A. Leszczyńska, A. Fabisiak, 2016). Poliński (2012) and Guzik-Makaruk et al. (2014) emphasize their importance in ensuring safety and orientation within buildings.

Another crucial aspect is adequate lighting and the use of contrasting colors in interior spaces. Kuryłowicz (1996) and Budny (2009) point out that proper lighting and color differences between architectural elements make orientation and movement easier for individuals with visual field impairments.

Interior design should also consider the proper placement of furniture and the elimination of potential obstacles, such as narrow corridors or hazardous barriers. Budny (2006) and Wysocki (2010) emphasize the need to create safe and easily navigable spaces for blind and visually impaired individuals.

Additionally, to ensure communicative accessibility in buildings, the use of raised floor markings, tactile maps, and navigation systems is proposed. Poliński (2013) and the White

Paper of the RAILWAY FORUM (J. Poliński et al., 2015) underline that such solutions can significantly facilitate the use of different spaces for individuals with various disabilities.

In conclusion, an approach based on the concept of universal design, considering the needs of individuals with various disabilities, is crucial for creating more accessible and user-friendly spaces for all (E. Kuryłowicz, 1996; J. Budny, 2009). Integrating these solutions can significantly improve the quality of life for individuals with visual impairments, providing them with greater independence and comfort in their daily lives.

RESULTS

The study focused on a detailed analysis of the accessibility of common spaces in five key areas: the kitchen, corridors, rooms, bathrooms, and toilets. Conclusions from the observation of these areas indicate the need to adjust many elements to create a more accessible and ergonomic space for diverse users, especially those with mobility and sensory impairments.

In the context of the common kitchen, observations emphasize the need to adjust the height and layout of furniture. The main issue identified is inadequate lighting. Participants complained about poor lighting at the sink and countertop. There is an urgent need to eliminate potential hazards associated with protruding elements below the eye level, as well as problems determining distances between objects. Proposals include modifications to the furniture layout and the elimination of potential hazards related to their height. The need to lower hanging cabinets depends largely on the height of the participants. However, a slight lowering would significantly facilitate comfortable use for shorter individuals. In the lower parts of kitchen cabinets, participants found drawers more convenient to use. They argued that by using drawers, they could see the entire contents.

In the area of corridors, staircases, and elevators, the analysis indicates the need to improve lighting, especially where it is often turned off. Additional lamps in staircases can significantly increase safety. Space signage proves to be a fundamental aspect, emphasized in both the literature (A. Leszczyńska, A. Fabisiak, 2016) and research findings. In this context, Braille markings, contrasting indicators, and sound-reflecting materials are crucial to facilitate navigation and orientation (J. Poliński, 2012; E. Guzik-Makaruk et al., 2014). It is worth noting that auditory information about the floor number in the elevator and the presence of Braille markings are positive elements facilitating navigation, but their expansion could further increase accessibility.

According to the literature, lighting is a key element influencing environmental perception (I. Benek, A. Labus, 2016). In the case of rooms, bathrooms, and toilets, observations indicate the need to improve lighting, especially in deep cabinets. The study highlights the need to improve lighting, especially in areas where insufficient light may be a problem, such as deep cabinets (I. Benek, A. Labus, 2016). Users emphasize the need for contrast to facilitate distance determination and the distinction of handles against the backdrop of furniture fronts. Therefore, it is proposed to adjust the lighting and introduce contrasting elements to increase clarity and comfort in using these spaces.

Overall, the space of the LIMBA Student House requires adjustment, particularly in terms of furniture ergonomics, lighting, and general accessibility. Conclusions from the observations suggest specific steps, such as adjusting furniture height, installing auditory and tactile markings, and improving lighting. Furthermore, the analysis of areas such as ease of passage, furniture ergonomics, and user reactions to existing solutions indicates specific areas for improvement, such as replacing high shower trays with flat bottoms in shower cabins, removing protruding chair and table legs, and adjusting furniture height to the needs of different users. Implementation of the suggested changes can significantly contribute to creating a more accessible and user-friendly space for all residents of the LIMBA Student House.

SUGGESTED MODIFICATIONS

The research conducted at the LIMBA Student House has provided a range of conclusions and suggestions for modifications and improvements aimed at increasing the accessibility and functionality of common spaces. Specifically, the lack of auditory and tactile markings poses a challenge, and additional lighting and adapting the social space are suggested areas for improvement.

Considering modifications in the common kitchen area to enhance its functionality and safety, attention should be given to several key aspects. Firstly, adjusting the height and layout of furniture is crucial. Changing the height of furniture, such as kitchen countertops, can facilitate their use, especially for individuals of varying heights or those using wheelchairs. The arrangement of furniture is also significant—ergonomic placement can improve efficiency in the kitchen. Another aspect is the elimination of potential hazards associated with protruding elements below eye level. Protruding elements, such as cabinet corners or handles, can pose a threat, particularly to small children or individuals with limited mobility. Removing or securing these elements can significantly improve kitchen safety.

Introducing contrasting handles for better visibility is an important element. Handles in contrasting colors can assist individuals with visual impairments in locating and operating cabinets or drawers more easily. The last but equally important aspect is the installation of additional lighting in areas requiring precise tasks. A well-lit workspace is crucial for safety and efficiency. Additional light sources, such as under-cabinet lighting or spotlights, can significantly improve visibility in areas where precise tasks are performed, such as cutting or cooking.

In corridors, staircases, and elevators, well-lit spaces can greatly facilitate orientation and movement, especially for individuals with visual impairments. The use of high-contrast lighting can also help identify doors, stairs, and other key elements. Handrails can provide additional support and safety when navigating stairs, especially for older individuals, those with mobility impairments, or individuals with balance disorders. Markings can help identify step edges, which can be particularly helpful for individuals with visual impairments. These could include contrasting strips on the edges of steps. Introducing auditory or tactile markings in key locations is another suggestion that can significantly improve accessibility. These markings can assist individuals who are blind or visually impaired in navigating through spaces.

In the context of common rooms, bathrooms, and toilets, it is essential to consider the diverse needs of users. Improving lighting is a key element that can significantly enhance the comfort and safety of these spaces. This may include the use of LED lighting, which is energy-efficient and provides bright, even light. Adjusting the height of furniture to different user needs is another important aspect. This may involve adjustable shelves, cabinets, and countertops that can be adapted to various heights and needs. The use of contrasting handles can also help improve accessibility. Handles in distinct colors may be easier to notice for individuals with limited visual abilities and can aid in spatial orientation. Introducing auditory or tactile markings in key locations can facilitate navigation. All these modifications, though seemingly minor, can have a significant impact on improving the accessibility and usability of common areas, bathrooms, and toilets.

In a broader perspective, the suggested modifications aim to create a more user-friendly space, especially for individuals with various needs, including visual or mobility impairments. Continuous monitoring and adjustment of space arrangements to meet changing needs and community feedback are also necessary.

Detailed suggestions include installing mirrors on the upper rims of tall and hanging cabinets, using light-reflecting materials on cabinet bodies, attaching handles to cabinets in

contrasting colors to the fronts, and installing strips indicating stairs. In the kitchen, it is also suggested to adjust the height of furniture and use contrasting handles to facilitate the use of cabinets, especially for individuals with visual impairments.

Implementing the suggested modifications, such as additional light sources, adjusting the height of furniture, and introducing auditory or tactile markings, can significantly make the space more accessible and inclusive for different user groups. Continuous monitoring and adjustment of space arrangements to meet the diverse needs of the LIMBA Student House residents are also crucial.

CONCLUSIONS

Individuals with visual impairments may encounter a range of challenges when navigating the spaces within the LIMBA Student House. The analysis of the conducted research points to existing issues, such as inadequate lighting in the kitchen, corridors, rooms, and bathrooms. Additionally, the absence of auditory and tactile markings, as well as the non-adjustment of furniture height, can pose difficulties for independent movement and use of various amenities.

However, overall, the LIMBA Student House is adapted to some extent, and minor modifications proposed in the findings and suggestions can significantly enhance its accessibility for individuals with visual impairments. Proposals such as additional light sources, contrasting handles, auditory and tactile markings, and other suggested modifications have the potential to improve the daily functioning of individuals with visual limitations.

The LIMBA Student House has the potential to become a more welcoming and accessible place for all residents, including those with visual impairments. Implementing the suggested changes will help minimize obstacles, providing greater comfort and safety. However, it is crucial to monitor and adjust the space effectively to respond to the changing needs of the user community.

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Streszczenie: W ramach przeprowadzonych badań, dokonano charakterystyki szeregu chorób, takich jak jaskra, choroba Lebera, stwardnienie rozsiane, retinopatia cukrzycowa, zwyrodnienie plamki żółtej, zapalenie nerwu wzrokowego, choroby neurodegeneracyjne, tętniak tętnicy siatkówkowej oraz choroby naczyniowe siatkówki. Podkreślono znaczenie dostosowania przestrzeni do potrzeb osób z zaburzeniami pola widzenia w kontekście uniwersalnego projektowania. Przeprowadzone badania w Domu Studenckim LIMBA skupiły się na analizie dostępności przestrzeni wspólnych dla osób z takimi problemami. Stwierdzono, że konieczne są pewne modyfikacje. Zasygnalizowano zmiany, które mogą poprawić jakość życia mieszkańców, zwłaszcza osób z zaburzeniami pola widzenia.

Słowa kluczowe: projektowanie uniwersalne, zaburzenia pola widzenia, aranżacja wnętrz

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