

Modern Housing & Its Sustainability for the Elderly

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ملخص البحث:

تشير هذه الدراسة البحثية إلى العوامل المتعلقة ببناء بيئة مبنية مستدامة للمسنين، ويناقش الاهتمامات والقضايا المتعلقة بتنفيذ الحلول المستدامة داخل المباني السكنية التي توفر العيش المستدام لكبار السن. تهدف الدراسة إلى مناقشة التطبيقات المبتكرة المختارة للمباني الجديدة ومشاريع التحديث للتطورات القائمة التي تهدف فقط إلى الاعتماد على بيئة مستدامة لكبار السن ومتطلبات الإسكان المستدام. عند الحديث عن زيادة الطلب على إسكان المسنين والشيخوخة السريعة المرتبطة بارتفاع الطلب على إسكان المسنين، هناك حاجة إلى تخصيص تدابير وتوصيات محددة لهذا المفهوم، وهناك حاجة إلى خطوات على المستوى الحكومي لمثل هذه المباني والبيئات. يجب أن تكون المباني الخاصة بالمسنين من نوع معين لتلبية مفاهيم التصاميم المستدامة، ومن الضروري تقييم مدى ملاءمة التصاميم المستدامة للمباني للمعيشة. قامت هذه الدراسة البحثية بعصف ذهني لأدب كبار السن لاكتشاف الاختلافات بين هذا وبين التصميمات المعمارية العادية. بعد ذلك، اقترحت الدراسة آثارًا على مساكن كبار السن المصممة جيدًا، بما في ذلك تدابير السلامة للمنازل، وداخل مجتمعات التمريض المعقدة، وشقة معيشة كبيرة. مع هذه التصنيفات والآثار المترتبة على الدراسات السابقة، تقترح هذه الدراسة بعض التصميمات المستدامة الفعالة لكبار السن، بما في ذلك أشكال المباني، واستخدام المواد، والأنظمة الموفرة للطاقة، وتحسين المساحة للتشغيل الفعال، وحديقة الشفاء أو مناطق الجلوس، وأكثر من ذلك بكثير مما يثبت ذلك لتكون مناسبة.

Abstract:

This research study refers to the factors relating to the building of a sustainable built environment for the elderly. It discusses concerns and issues concerning the implementation of sustainable solutions within residential housing that provide sustainable living for senior citizens. The study is aimed at discussing selected innovative implementations for the new buildings and modernization projects of the existing developments that are purely aimed at relying on a sustainable environment for the elderly and to the requirements of sustainable housing. Talking about the increase in demand for elderly housing and rapid aging associating with the high demand for elderly housing, there is a need to allocate specific measures

and recommendations to this concept and governmental level steps are needed for such buildings and environments. Buildings for elderly citizens must be of a particular type. To satisfy the concepts of sustainable designs, it is mandatory to evaluate the suitability of sustainable designs of buildings for senior living. This research study has brainstormed the literature of senior living to discover the differences among this and normal architectural designs. Subsequently, the study has suggested implications on well-designed senior housing, including safety measures for homes, within complex nursing communities, and a senior living apartment. With such categorizations and implications of previous studies, this study suggests some effective sustainable designs for the elderly, including building shapes, material usage, energy-efficient systems, space optimization for efficient operation, healing garden or sitting areas, and much more that proves to be soothing and satiated.

Introduction

Building houses for senior citizens or elderly consists of an important series and amalgamation of architectural projects due to the demographic processes and materialistic demands we observe today. A considerable increase in the population of the elderly within different parts of the world across Asian and European Union states(Figure 1) over the two last decades has totally amended the senior citizen policy, economic policy, and requiring the need to figure out a new approach to the process of shaping spaces and amending houses for this social group (Enerdata, 2016).

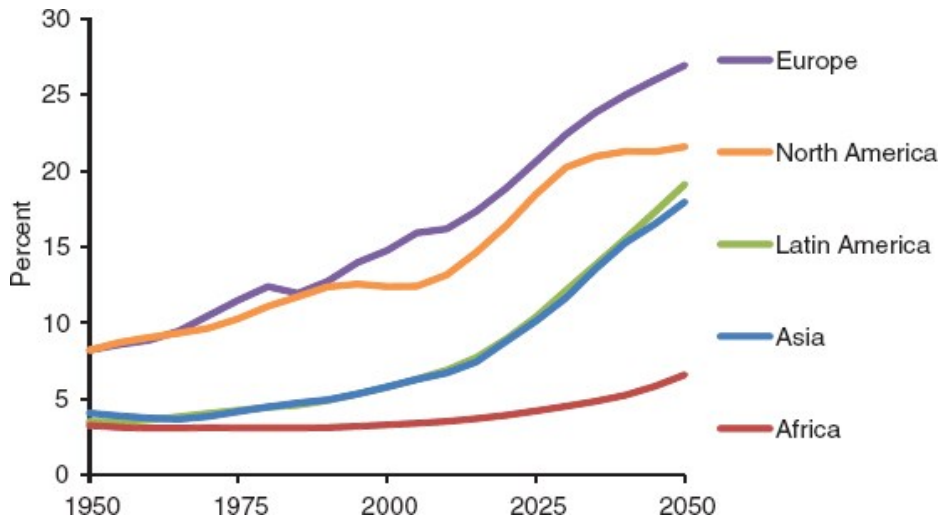


Figure 1. Demographic Trend of Aging: long-term implications of an older population. Source: The National Academies Press.

while undergoing the initiatives of designing housing environment for the elderly, special attention is paid to solutions fostering their activity, making their fielder spaces, safety precautions, and integration within the society, as well as to their expectations pertaining to their life comfort.

There are various and contrasting as well as comparing concepts of housing development being proposed for the elderly population, that implies with their degree of independence and their lifestyle. The senior citizen policy across different states within the premises of the European Union is geared towards promoting the model which is the most expected and anticipated by

the elderly, that is known as a model of living based in staying in their own environment. Moreover, there is a wide channel of diversified forms of accommodation, and could be categorized in various categories like supported, sheltered housing, community housing, nursing, and care homes.

But the comfort of building their own house and designing it with their expectation could never be matched with any of these. Here in this study, we are going to discuss this concern that how to manage and build a safer environment for the elderly meeting their expectations. The examples of housing for senior citizens presented in the following concepts and pages constitute an attempt on the part of designers while finding the answers to address the need of this social group. The projects discussed herewith this study not only comply with the requirements posed before the contemporary housing pertaining but also work through the implementation of ecological, energy-efficient, and sustainable solutions (Watson, 2013).

While undergoing the consideration of the progressive and every increasing aging of the population, providing the elderly with the possibility of living in appropriate and suitable conditions meeting their expectations is becoming an obligation of the society. Viciously, the significant majority of already made and proposed designed flats / houses is not elderly-friendly; their technical maladaptation and material choosing to make daily functioning difficult or even impossible for the elderly (Figure 2).

In some cases, elderly people, particularly those who are suffering from certain physical disabilities, are confined to their homes, bound to their activities, and become prisoners of the four walls. They have serious concerns about their movement and how they couldn't move around spaces due to inactivity and inability of their bodily disabilities; the designs don't allow them to freely.

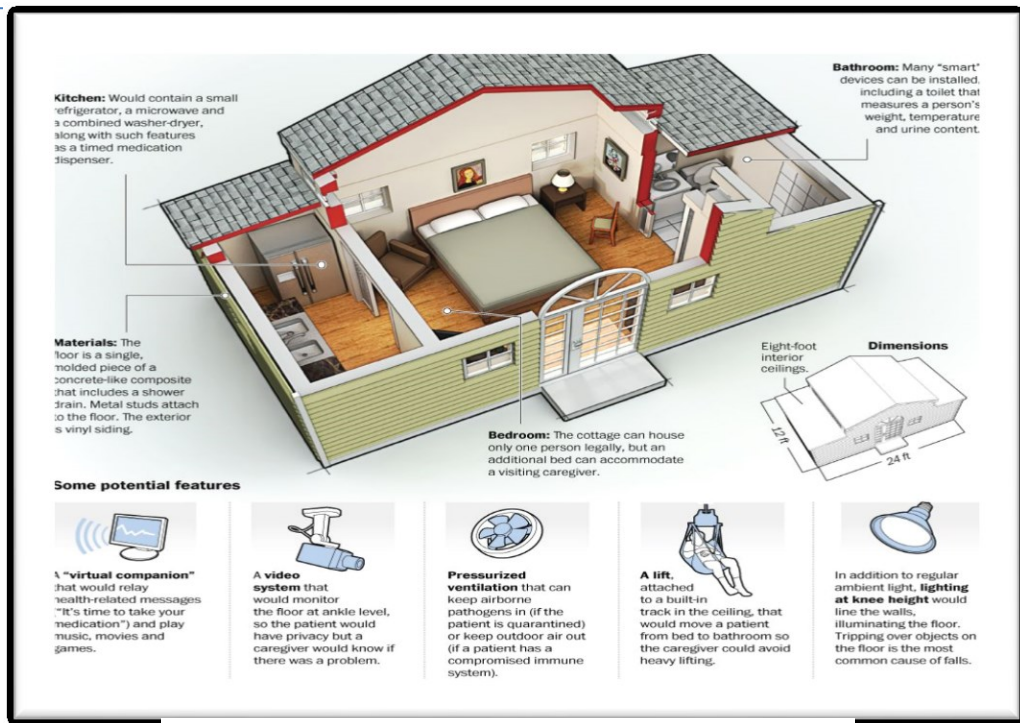


Figure 2 Display of elderly life being made easier by the use

A current solution to this problem involves making and building the flats or house with the process of adaptation to satisfy the needs of the elderly, which, however, is often expensive or technically impossible. The design for all concept was introduced and could prove to be a key strategy for creating social inclusion. Some research in the recent past have undertaken the problem of universal design contribution to sustainable development from the point of the city space and/or urban design only (Aleksandra Stupar, 2019).

The universal design of senior housing (UDSH) is a relatively new concept, and uprising approach to primarily construct house that would meet the needs of the elderly and especially of the disabled ones. These are categorized as barrier-free flats. The necessary adaptations and measured efficacies are implemented at the architectural design stage and involve modifications of bathroom, kitchen, household equipment, furniture, doors, as well as passageways.

The relevance of this scenario and initiative undertaken is justified by the existing gap between less demand for universal design senior housing and less knowledge of such a concept, UDSH is not expensive in its grounding fact, and crucial socio-economic benefits from this kind of construction. The reason for such a huge gap is a market failure in assessing values in a different time. The cost of universal design senior housing in present circumstances cannot be compared to the older people benefits as these housing concepts provide many benefits. In inter-generations calculations, the traditional discounting is no longer adequate or necessary and could be tackled with care (Wirl, 2004).

The rapid decrease in demand for the new houses for the elderly has been seen in recent past, which are typically and especially designed to house older population (relatively cheap) and on the other side, the demand for age-friendly house renovations that proves to be expensive concerning the supply of such renovation. While taking the view of the society as a whole depicting both young and old generations, is it okay and appropriate to investigate the social and economic benefits of fixing the market failure recognized as an important driver of development.

Supporting senior housing being one of the most influential fit in for the society concerning its concept and policy of sustainable development and promoting its implementation into the economy could be highly beneficial. The purpose of this research study was to demonstrate that the primary design of senior citizens' living space in the form of barrier-free flats could be justified by economic and social benefits as compared to secondary reconstructions and adaptations of existing apartments.

Aim of the research

There are various concepts of housing development for the elderly being proposed before the society abiding by the societal norms and values, adjusted to the degree of their independence and their lifestyle. The senior citizen policies in different parts of the world like in that of the European Union is geared towards promoting the model which is the most expected and anticipated by the elderly, namely a model of living based on staying in their own environment. There might be a broad offer of diversified forms of accommodation, including supported, sheltered housing, community housing

50+, or their own elder-friendly housing. This latter option is discussed and diversified in this research study.

The aim of this study is to provide ample examples of housing for senior citizens providing an attempt and effort on the part of designers at finding answers to the needs of this social group. The examples presented here not only complete with the requirements posed before but also work through the contemporary housing pertaining to the implementation of ecological, energy-efficient, and sustainable solutions. These are to provide solutions that make their life easy, that make their living easy, and that can bring joys and smiles on their faces. They might spend the last parts of their life happily in that house and be more supportive and happier.

Materials and methods

The methods discussed here are consisting of a barrier-free housing for the elderly. The barrier-free housing concept is a relatively new concept for newly built houses adapted for the elderly and/or disabled persons, where all architectural barriers have been removed at the initial design phase. To ensure comfortable daily functioning and adaptive reaching facility of this social group, the barrier-free designs must be adapted while designing new houses in multi-family housing scheme or for the targeted elderly housing schemes.

There are some constraints and principles of barrier-free designs that include:

- ❖ Equitable use of the space to fulfill sustainability measures. Solutions should be useful and attractive for those who are characterized by varied physical ability; designs should be inclusive for all types of residents as some temporary disabilities are independent of age.
- ❖ Flexibility in use for the housing and its interiors. Each solution should take into consideration the needs and possibilities of various users without restrictions. So, that every design and feature is elderly-friendly and provides them with the comfort and coziness they deserve.
- ❖ The designs should be simple and intuitive. Everything within the design solutions should be easy to understand.

- ❖ The designs and parts should be easy to perceive and should be perceptible information. This doesn't need to be more specific for the age group or for rational understanding. This doesn't regard a user's sensory abilities, to make it easily understandable and adaptable.
- ❖ The design should be tolerant of error. There might be room for the minimization of the misuse of a given product. require low physical effort (Figure 3). The design and its pre-requisites would not account for physical efforts and their use should not be tiring; tiredness should be minimized at every level to address the concerns of the elderly population.

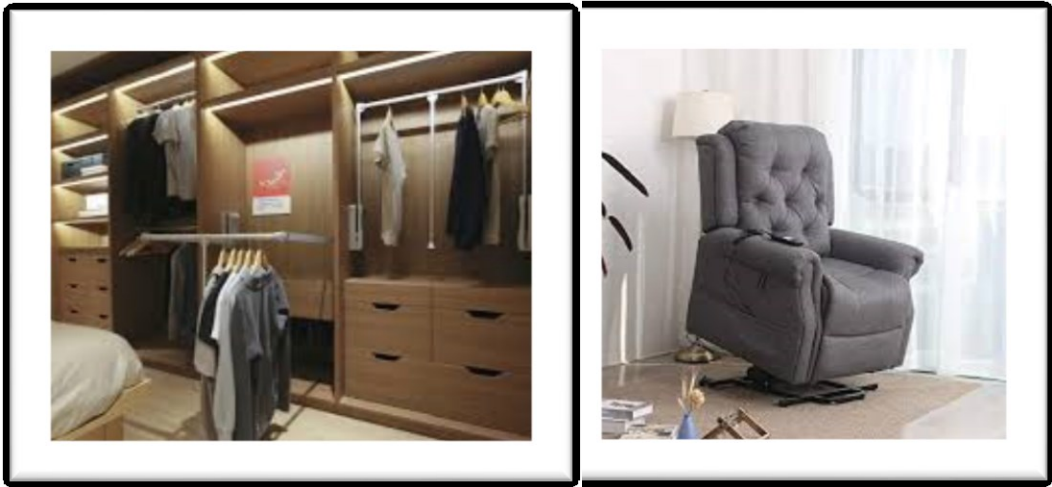


Figure 3 furniture that would make elderly

- ❖ The design should be sustainable concerning its size and space for approach and use. The idea is to address the concerns and provide solutions to everybody, regardless of their body build and size.

There are certain criteria and important elements of universal design that include the following:

- ❖ Bathroom: safe bath that accounts for providing adequate space enabling necessary maneuverability, railings, holders/grips, the height of bathroom furniture, adjusted shower, special toilet seats, etc. for all age groups and especially for those who are addressed with the design, like we are taking about the concerns of the elderly population (Figure 4).



Figure 4 Non-slip floors and grips would make

- ❖ Comfortable kitchen environment, where particular attention should be paid to cooking and cleaning functionality and safety. This also accounts for the appropriately fixed cupboards and kitchen equipment; providing easy access to equipment and furniture as well as these must be ergonomic and comfortable.
- ❖ Comfy doors and doorsteps. These require the designer to provide appropriate widths of doorways, heights at which handles are fixed, automatic door opening assistance, etc. Everything that accounts for easy access and a safer environment for the elderly.
- ❖ Safer windows, balconies, terraces. These must be situated at appropriate heights, might use automatic opening mechanisms, doorstep-free balconies/terraces, adjusted railing, and adequate space enabling necessary maneuverability, providing easy access, and resulting comfort for every step.
- ❖ Easy and approachable access to buildings. The managing of floors, ramps and navigation systems should address the needs of any potential user, regardless of their physical form.

The universal designs for senior housing include the ergonomic characteristics of the internal living space to enable older individuals to stay free and active within their life course (Figure 5). They need to be more

attractive and easier to understand, easy to use designs so that users will not face difficulties.

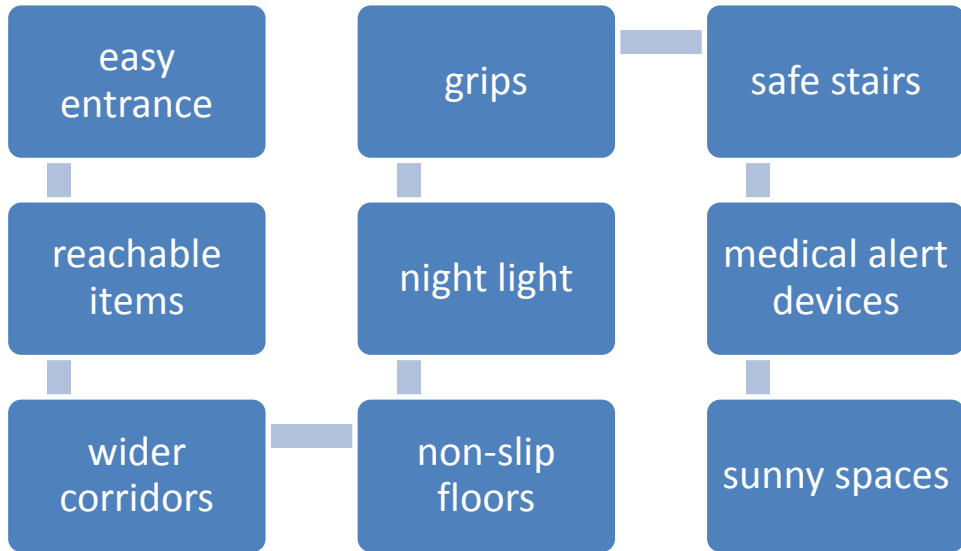


Figure 5 Things to consider in elderly flat / house

Previous research

Creating a prosperous living environment for the development of humans is imperative, especially for the elderly. Because of their age, physiological functions decline, adaptability of the environment decreases, and the need for more public love increases. Therefore, senior housing should not only meet the basic elderly necessities but also meet the cultural needs for the elderly to provide appropriate leisure and entertainment (Erin G. Roth, 2016). However, there are still the places where there is room for improvement for the elderly apartments, such as unsuitable site planning, single function, backward facilities. Those buildings may not meet the standards for high-quality apartments and meeting their diverse needs. Therefore, we should focus on the architectural design and sustainable technology applications for the senior housing limits and requirements (Matthew Desmond, 2016).

With the rapid development and growing needs of the world economy and society, people's energy needs have drastic effects on climate change. Building energy is one of the largest forms of energy consumption. Energy efficiency and sustainable development of buildings have become one of the most discussed construction industry topics around the world. Therefore, this must be tackled and discussed before going for the construction of elderly-oriented buildings as well.

A genuinely sustainable project is a project that could be defined as such before site selection. Traffic and parking are major issues for most senior living projects. Every site has unique positive features, this might be the views, the heritage, a favorable solar orientation, an ecosystem of flowers and animals in a supportive habitat. These all should be considered for a healthy environment and safer supportive roles (Matthew Desmond, 2016).

One more thing is to reduce the use of fossil fuels for keeping the temperatures low, or for running hot water, building orientation and domestic hot water usage should be considered. Other factors, such as heating, ventilation, air - conditioning, lighting, daylighting, and smart usage of materials resources, should also be considered. These are some pre-requisites that must be followed for the building and its habitat.

Another research was conducted with the purpose of analyzing senior housing interiors, there might be circumstances that some senior citizens want to live alone while others need additional services such as meals, rest, or nursing care. Living rooms and bedrooms are important areas of concern for these seniors. Kitchens and bathrooms are areas that require specialized features for these seniors and a balcony offers a transition from the inside to outside (Zhi Wang, 2014). Public space and public interaction are an important contribution to those residents living in nursing homes. The function of public space might also include a game room, reading room, fitness room, painting room, and classrooms, etc.

Interior air quality is also an important factor for the elderly, who spend long periods of the day indoors. Avoiding toxic material and efficient ventilation is necessary for them and is required at their age.

Some factors that need to be followed for the elderly as they might be lacking physical abilities to perform tasks on their own. Specific requirements could be summarized as the following:

- ❖ Privacy: the elderly needs a space of their own. The design and its pre-requisites must respect resident living habits, preferences, and privacy.
- ❖ Social interaction: There might be arrangements for social interaction as a lonely life is very harmful to the physical and mental health of the elderly as they themselves have the need for social interaction. Therefore, while considering the space, there might be room for social interaction space and exchanges between residents.
- ❖ Security and comfort: all designs for the elderly need to provide a safe indoor environment that provides a sense of security and psychological comfort requirements.
- ❖ Disability design: indoor spaces for elderly activities require good accessibility to perform every task safely and easily.

Moving ahead of this, outdoor environments should also provide a sense of security so

that frail, aging adults can feel very comfortable. Vegetation, soft furnishings, and even sidewalls can be used to create a sense of enclosure or shade. Venues for public gatherings, terraces, and other related public spaces provide opportunities for networking and meaningful activities. Blocking the sun is a way to access nature without harmful sun rays. The use of the natural characteristics of trees, flower racks, green corridors can contribute to preventing sun exposure.

Survey results

An interview survey been made by the researcher on 887 people. This sample was chosen randomly from different areas in Kuwait (Figure 6) and from different ages (Figure 7). You can find the sample details below.

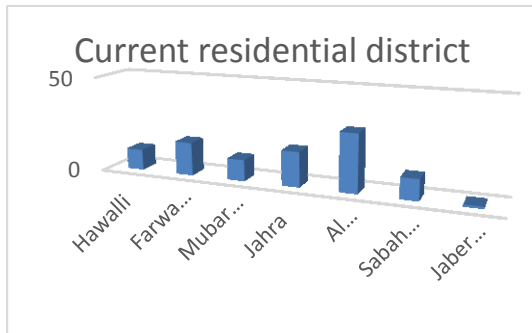


Figure 6 chart shows the chosen sample from different areas.

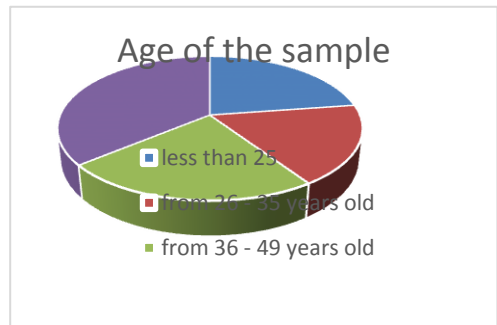


Figure 7 chart shows the age of the chosen sample from different areas.

A question that was asked was if they prefer a house design that don't include multiple levels due to its difficulty of use when aging.

There was a relation between the people of age 50 and above preferring a home to have one level for easy access, The younger people

preferred more floors as they are more interested in the aesthetics than worrying about the future (Figure 8).

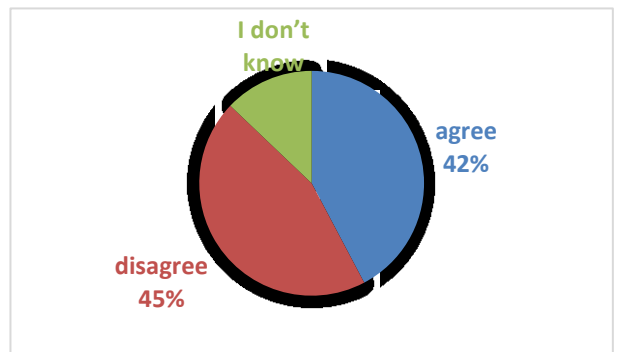


Figure 8 chart shows the responses of the chosen sample about if they prefer a house design that don't include multiple levels due to its difficulty of use when aging.

Another question was asked concerning the preference of choosing furniture to help your body was preferred from people of all range of age 637 said yes (72%), while 146 said no (16%) and 104 were not sure what they want. (12%) (Figure 9)

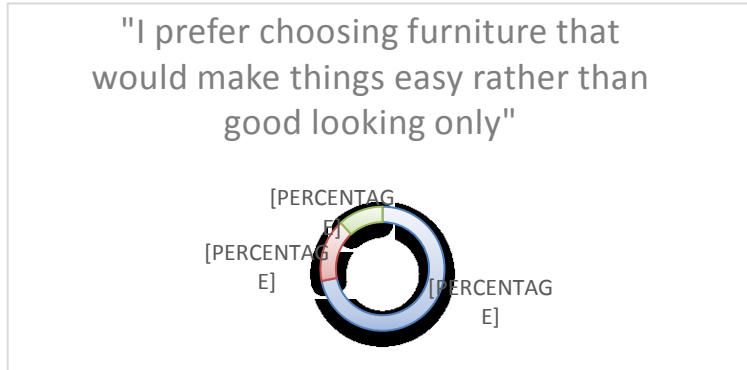


Figure 9 chart shows the responses of the chosen sample about if they prefer choosing furniture to help your body.

Conclusion

Designers need to assess everything at the very beginning so that building construction could follow guidelines. They especially need to focus on improving indoor environment quality with lower energy use. The main sustainable designs are high-performance HVAC systems, LED lighting, low-emitting materials, renewable materials, non-portable irrigation, dual-flush water closets, and water-saving faucets. The residents themselves must also care about their indoor environment, gardens, and public areas. Whereas in comparison to this, on-site renewable energy and building reuse were not concerns here they might be too high with cost and the overall effect is insufficient. In conclusion, the key sustainable features are the high-performance HVAC systems, IAQ management, low-emitting, and renewable materials, efficient materials for the floors, tops, and everything around.

The adaptation and suitability of an already existing flat to meet the needs of an elderly person require high costs. Here we have presented the main outcomes of analyses of everything that is needed and required resulting from the adjustment, adaptation, and reconstruction of existing buildings and flats based on the current market prices.

- ❖ Movement sensors need to be installed so they can protect the elderly.
- ❖ Adjustment of lighting illuminating the access to buildings to provide a clear view of the house and environment.

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- ❖ Rebuilding/ building a ramp providing access to the building. This provides easy access and the far-reaching ability for the elderly.
 - ❖ Widening of doorways, including doors to avoid any hacks and accidents.
 - ❖ Changes of switches to make these environments elderly friendly.
 - ❖ Adaptation of heights at which electric sockets are installed and the redesign/change of the wiring system to secure every socket and habitat as well.
 - ❖ New flooring that should never be slippery and provide a stable walking experience.

Often the elderly are neglected and are forgotten, if we incorporate these changes into our homes at the very start they will be available for use when we need them even for ourselves.

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