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Optimization of Urban-Scale Sustainable Energy Strategies to Improve Citizens' Health

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Abstract: Sustainable energy strategies have been a critical subject for sustainable development, especially in cities. Citizens, as an integral part of the urban environment, play a significant role in urban spaces, as does their health. An accurate understanding of citizens' mental, social, and physical health in urban settings is required to design and plan better cities. This study aims to assess the level of alignment with health factors in Mahabad, a major medium-sized city in Iran. Previous studies indicate that the built environment can influence health dimensions. Health factors depend to a great extent on how well the environment is formed and how it is put together. This research is a descriptive, analytical, cross-sectional study that analyzes the environment's psychological elements and physical and mental health factors of Mahabad's citizens. According to the Cochran model, 384 questionnaires were distributed among households. For data analysis, SPSS 12 and Arc GIS software were used. The main results of this research show that five factors, "Environmental quality", "Identity and social relationships", and "Readability", have the most impact on the physical and mental health of citizens (respondents). These issues are much more pronounced in the downtown neighborhoods. This study showed that urban experts can understand different levels of public health by knowing the historical, social, cultural, and economic factors and characteristics. The result will help decision makers, city authorities, designers, and urban planners to be more informed about citizens' health and the ways to improve it.

Keywords: sustainable energy strategies; healthy urban design; public health; sustainable development

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1. Introduction

The global energy crisis, coupled with the threat of climate change [1–3], demands innovation in the energy sectors [4–6] and responsible consumption for both developed and developing countries. Therefore, the need for sustainable energy strategies seems very critical. Nevertheless, the impact of these strategies on human health should be noted while making decisions in this area. As defined by the World Health Organization (WHO), health encompasses not only physical factors, but also mental and social well-being [7]. Different health factors are under the mutual influence of environmental design quality and affect people's health [8]. This shows that planners and designers can transform the urban environment in this direction by examining the design factors affecting the health factors and their impact to improve public health. One of the fundamental challenges of urban planning is the high rate of urbanization and the large and problematic migrations

of villagers to major cities, leading to severe and complex problems for both cities and villages [9–11]. Due to unplanned immigration, many urban regions in Iran, including Mahabad, are demographically growing [12,13]. However, the existing urban facilities and infrastructure do not respond to such growth effectively, and as a result, people's health has been negatively influenced across several distinct factors. Mahabad is considered a medium-sized city [14,15]. Due to the population growth of 2.2% during the 1990s, its geographical and behavioral situation has changed [16]. Accordingly, more research is required to review different environmental, social, and cultural dimensions and the quality of its citizens' health [17].

Environment psychology studies the relationship between humans and the physical environment and their mutual effects to understand people's values, attitudes, and needs, which contribute to their behavior [18]. Recent research also confirms that "a high share of health promotion is being created through the improvement and promotion of urban environments" [19,20]. These relationships between environment, architecture, and health are also seen in theories of urban planners such as Hooseman and Baumyster [21,22]. The appearance of urban space should make people feel safe and create a balance between themselves and the rest of the world [23,24]. Even if the city has sophisticated visuals, it should be pleasant, and this happens when citizens feel the tranquility of mind from what they infer from the city's image [25,26]. The individual's goals, expectations, criteria, and desires have a profound effect on their physical, psychological, autonomous, social, and religious beliefs. In general, a desirable quality of life includes citizens' satisfaction with physical and mental health and also social satisfaction and environmental satisfaction [27].

Therefore, this research aims to investigate the impact of urban spaces on the two dimensions of citizens' physical and mental health to harmonize the city environment with citizens' well-being, as it has been a matter of debate in scientific society [28–30]. Even though people's lifestyles change, their needs for nature remain constant. As such, using nature as a design element opens the door to real approaches in various cultures. This strategy not only promotes healthy, safe, and healthful living areas, but it also makes cities more sustainable and resilient. Aside from creating green areas in cities during and after an epidemic, urban salutogenic design has the potential to improve multidimensional and multisensory experiences, both individually and collectively, by allowing users to perceive things from different angles and with different senses.

2. Literature Review

The "Healthy City" project was conducted after the spread of urban issues, such as environmental pollution caused by motor vehicles and industrial activities. Two years later, WHO launched the "Healthy City" as a global movement and in 1986 provided a proposal for a small project aimed at improving health called the "Healthy City Project" [31].

Duhl and Sanchez argued that environmental, economic, and social conditions in urban areas could negatively or positively impact people's health. Since urban planning has an essential influence on the formation of those conditions, there are many connections between urban planning and health in cities [32]. The WHO's Healthy City Project was raised from foundational research investigating and exploring links between urban planning and public health and their relationship with cities' problems during different eras. The mentioned project contributed to the development of many healthy urban planning programs across different cities worldwide. Takano and Nakamura (2001) classified different city indices related to health levels and their influence, as well as the relationship between health determinants and their influence on the population's health. The degree of influence of health determinants on the health list was inspected by relapse investigation; continuous examinations analyzed the correlation between health determinants and health files [33].

Prasad et al. declared that the interest in developing and implementing metrics to determine the connection between urban living and health is increasing. The use of metrics as a method for analyzing various data and their correlations has increased,

especially for investigating urban determinant indices, which have impacts on public health. Advanced data collecting and analyzing methods and technologies allow researchers to create some standard worldwide metrics; however, there are still data gaps from less researched countries. Quality research in those countries requires international support to fill the gap in urban health metrics [34].

Pineo et al. stated that urban conditions impact citizens' general health and mental health. Progressively, professionals in assembled condition city divisions, for example, lodging, arranging, transport, and recovery, looked for new facilities and directions to establish how their particular approaches and choices could bolster the production of more advantageous urban communities [35]. The study introduced the improvement of a worldwide list to help city planners and experts comprehend their job in conveying health results through urban condition approaches and projects. Later, Pineo et al. made tools called the Urban Health Indicator (UHI) to show proof of the health effects of urban physical conditions. These tools can be used in the arrangement of manufactured conditions and important leadership [36]. UHI tools provide information at the regional (and lower) scale and essential data about health imbalances and ecological hardship. This audit statistical overview of UHI apparatuses investigates their tendencies and attributes (including counting how they seek to improve or address complex frameworks) to comprehend their potential use by metropolitan constructed condition strategies and planning.

After the epidemic, urban green areas serve as locations where individuals can socialize and spend time on their own. In addition to providing a place for people to socialize, it has been shown that plants in people's homes can help them relax. In this regard, people can experience and interact with nature in various ways, both physically and visually, by using different kinds of methods.

Healthy city planning can make it possible to implement a design concept that reduces dangers in long-term space organizations and creates safe areas for human use. This strategy not only fosters a healthy and safe environment, but it also gives cities the power to last and bounce back from disasters. Salutogenic healthy city design incorporates the concept of green space into every area of design, whether it is improving air quality or enhancing the visual appeal of a city's landscape. Green infrastructure comprises original natural systems in both internal and exterior space organizations, conserving biodiversity. Eco-friendly living can be achieved through utilizing nature's resources, constructing self-sufficient smart buildings and utilizing green energy and clean water systems.

3. Materials and Methods

The current research applied a descriptive, analytical, cross-sectional survey method. In 2017, after examining the theoretical foundations of the subject through a desk study, 384 questionnaires were distributed among the selected households as the unit of analysis of this research, the questionnaires were delivered to the homes, and sufficient explanations were given to each household (Figure 1). Cochran's formula was used, and it was understood that 384 questionnaires should be distributed. It was predicted that a number of questionnaires would not be answered or would be left incomplete; therefore, a total of 420 questionnaires were distributed to ensure that 384 questionnaires were answered. The total of 384 participants (291 men and 93 women) was divided into seven age groups, in which the age group of 35–40 years old consists of the highest number of participants. Finally, SPSS 22 and ArcGIS software were used to analyze the data. The data were also run through the TOPSIS model, and the distribution of the current situation was studied in terms of physical and mental health factors in environmental psychology and architecture.



Figure 1. Workflow of the research.

The purpose of choosing the city of Mahabad was its average population and easy access to the citizens. Cochran's formula was used to determine the sample size. The survey addressed "environmental quality", "vitality of local spaces", "readability", "physical quality", "identity", "social relations", and "quality of public spaces".

Cochran sampling was employed to determine the sample size because the large population will limit the number of homes to 56,200 in 2022. The city of Mahabad's population, households, literacy rate, and population dispersion determine the sample size. Additionally, the overall statistical population was separated into seven age groups for this questionnaire, with the age range of 35 to 40 years having the highest participation rate.

According the Table 1 the principal component decomposition model and the varimax orthogonal rotation approach were used to extract the factors from the values of 21 variables relevant to environmental quality criteria in various areas and localities of Mahabad city. Two tests should be run on the data to see if they can be used for factor analysis. The 1-KMO test establishes whether or not there are enough samples for analysis. This test yields a result that is a number between 0 and 1. This value must be more significant than or equal to 6 in order to be able to use a sampling's data for factor analysis.

Table 1. Correlation between data, for which the Bartlett 7 test ought to be applied.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
	Approx. Chi-Square	df	Sig.
0.846	8×10^3	211	

4. Results

The current situation analysis of urban health factors, including physical and mental health, which is affected by environmental psychology and urban design in Mahabad, was the basis of this research. After recognizing and rating the various regions of this city, the significance of this issue can be a clear indication of the quality of its respondents' physical and mental health. According to the questionnaire, the demographic status of the participants and descriptive statistics are as follows, as indicated in Table 2.

Table 2. The demographic status of the participants.

Demographic Characteristics	Classifications	Frequency	%
Gender	Male	66	66
	Female	34	34
Age	Under 25	25	25
	Between 25 and 45	52	52
	Over 45	23	23
Educational Level	Under Diploma	18	18
	Diploma	27	27
	Bachelor	50	50
	Master's and Higher	5	2
Career Status	Employee	16	16
	Worker	34.5	34.5
	Farmer	11	11
	Self-employed	23	23
	Unemployed	7.5	7.5
	Vendor	3.5	3.5
	etc.	4.5	4.5
Sense of Job Security	Very High	8	8
	High	12	12
	Medium	31.5	31.5
	Low	27.5	27.5
	Very low	21	21

As shown in Figure 2, urban design principles have a mean of 31.6, physical health has a mean of 24.86, and mental health has a mean of 17.

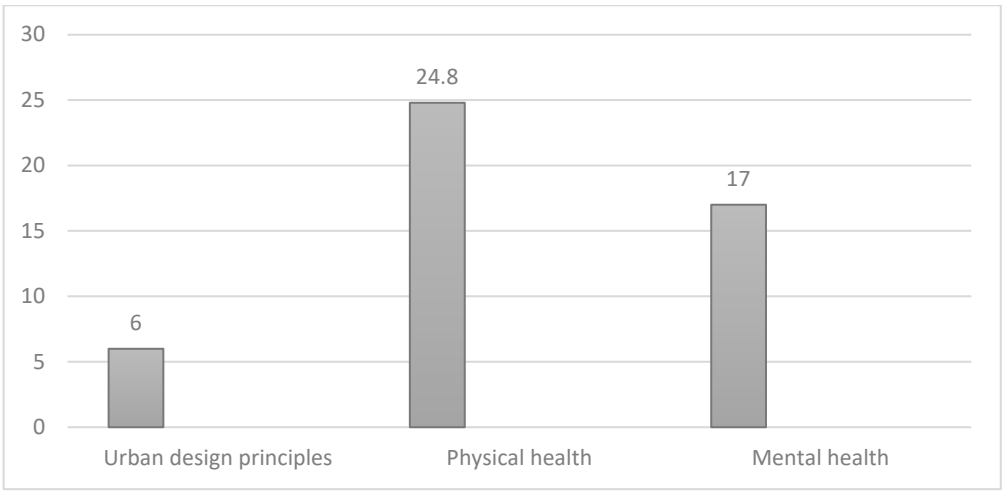
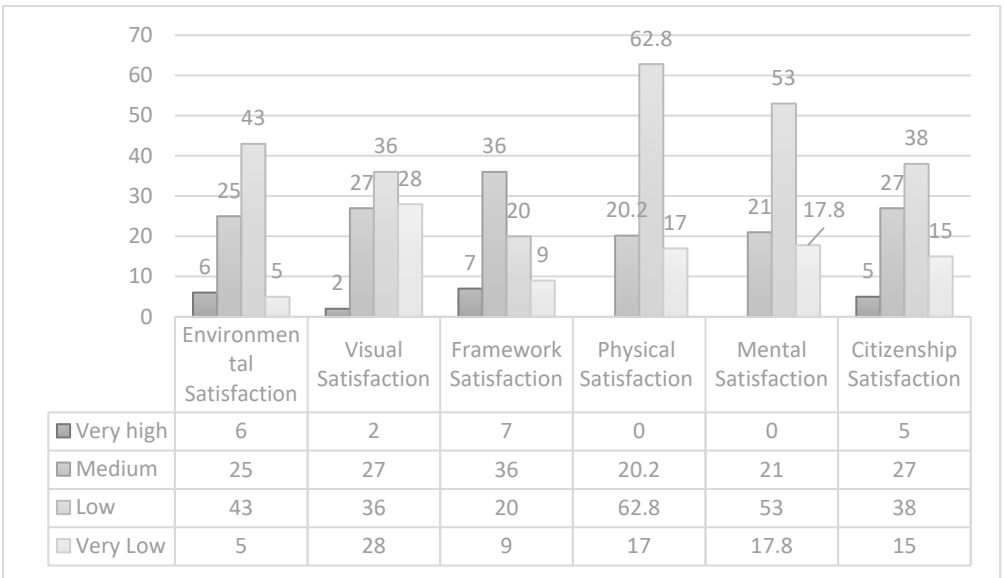


Figure 2. Boxplot of descriptive indices of variables.

Based on Figure 3, 6% of respondents assessed the satisfaction from the environmental factors as very high, 21% assessed as high, 25% as medium, 43% as low, and 5% as very low. Furthermore, 5% of respondents cited satisfaction from environmental factor as very high, 15% assessed as high, 27% as medium, 38% as low, and 15% as very low. In addition, the highest rate of responses in satisfaction level of respondents from environmental psychology and physical and mental health of respondents belongs to sub-index No. 1 about "Framework Satisfaction", with an average of 3.04 out of 5, while the rest of the means are below the average (3.00). Therefore, the lowest frequency of the averages belongs to sub-index No. 3, "Physical Health Satisfaction", with an average of 2.03 out of 5.



	Environmental Satisfaction	Visual Satisfaction	Framework Satisfaction	Physical Satisfaction	Mental Satisfaction	Citizenship Satisfaction
Very high	6	2	7	0	0	5
Medium	25	27	36	20.2	21	27
Low	43	36	20	62.8	53	38
Very Low	5	28	9	17	17.8	15

Figure 3. Distribution of research variables from respondents' point of view.

4.1. Distribution of Research Variables

The assumption of normality in this study is checked by the Kolmogorov–Smirnov test, and based on the distribution of variables, parametric or nonparametric tests were employed to prove the study's hypothesis [37]. Normality test hypotheses are as follows:

1. H0: Data in the distribution are not normal.

2. H1: Data in the distribution are normal.

According to the assumptions of this test, if the significance level in the numerical value is greater than 5%, H1 and the normality of the data are confirmed (Figure 3). Subsequently, if the level is significant by less than 5%, it confirms H0, and the data is not normal. The substantial level in the Kolmogorov–Smirnov test of studied variables (physical health: 0.102, mental health: 0.112, and design of urban spaces: 0.088) is more than 0.05, so all research variables are normal.

According to Table 3, the correlation between urban design principles and mental health is 0.746, while physical health is 0.712. In other words, the correlation between urban design principles with all health components is significant at 0.01 levels. A total of 21 variables related to environmental quality criteria in different regions and neighborhoods of Mahabad have been used to extract variables using the principal component analysis and varimax rotation method. To assess the relevance of the data for factor analysis, KMO and Bartlett tests were used.

Table 3. Pearson correlation among variables with fit lines.

	Urban Design Principles	Physical Health	Mental Health
Urban Design Principles	1	0.712	0.746
Physical Health	0.52	1	0.52
Mental Health	0.746	0.712	1

The KMO test specifies the sufficiency of samples for analysis, and the result should be greater than or equal to 0.6, while the Bartlett test should be significant. According to the data analysis, KMO is 0.847, and Bartlett's test of sphericity is significant at 0.01. Therefore, the data is appropriate for factor analysis. Table 4 shows the results of a factor analysis of the variables used to measure the quality of the environment in each region.

Table 4. Importance of environmental quality factors of region's ecosystem health.

No.	Factor	Correlations
	Environmental Quality	**0.895**
1	Green spaces and nature, lack of environmental pollution	0.801
2	Coordinating environment with residents' desire and culture, lack of noise pollution	0.652
	Local Spaces' Liveliness	**0.421**
3	Landscape and environmental aesthetic	0.598
4	Enjoying aesthetic location	0.471
5	Environmental artistic features (use of color in particular)	0.512
6	Access to daily services	0.459
7	Signs and symbols	0.601
	Readability	**0.598**
8	Stability and desire to continue living	0.524
9	Sense of belonging	0.532
	Framework Quality	**0.601**
10	Compatible neighborhood	0.503
11	Access to appropriate urban furniture	0.468
	Identity and Social Relationships	**0.532**
12	Interaction with urban managers to address environmental problems	0.520
13	Social and local responsibilities in relation to environmental quality	0.452
	Quality of Public Spaces	**0.709**
14	Pedestrian development spaces (e.g., safe walking and cycling routes)	0.429
15	Residential blocks	0.395
16	Access and distribution of sport facilities	0.701
17	Health and therapy facilities	0.487
18	Public transportation and traffic	0.660

Table 4. *Cont.*

No.	Factor	Correlations
19	Public spaces for children and elderly	0.638
20	Landscape and urban furniture	0.428
21	Signs and symbols in neighborhood	0.541

The primary data analysis shows that the environmental pollution factor, with a 0.895 factor load, is the most important factor in ecosystem health. The second most important factor is green spaces, parks, trees, and the lack of environmental pollution, which is characterized by a 0.801 factor load. The access and distribution of sports facilities and the legibility of the environment, with 0.701 factor loads, are the third factors on the list.

4.2. Impact of Environmental Quality Factors on Respondents' Health

The regression model has been used to look at how factors of environmental quality affect the health of people.

Based on Table 5, the adjusted determined coefficient between independent variables and dependent variables of health is 0.22. All independent variables, such as environmental quality, the vitality of local spaces, legibility, framework quality, identity, social relations, and quality of public spaces, make up 22% of the variance of respondents' health.

Table 5. Coefficients of the effect of regression model of independent variables on the dependent variable of mental and physical health.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	2.142	1.012	0.015	4.410	0.001
Environmental quality	0.018	0.012	0.110	1.790	0.005
Liveliness of local spaces	0.007	0.003	0.183	1.633	0.000
Readability	0.003	0.010	0.013	0.263	0.005
Framework quality	0.031	0.011	0.183	3.551	0.000
Identity and social relationships	0.007	0.007	0.079	1.529	0.000
Quality and public spaces in the city	0.034	0.009	0.391	3.528	0.000
	R = 0.483	R2 = 0.228	adjR2 = 0.209		
	std.err = 0.363	Durbin–Watson = 2.293	F = 8.841	Sig = 0.001	

The result shows that the level of significance in all factors is less than 0.01, and the coefficient of all components is positive and direct. So, if the other factors were constant, respondents' health in different regions would increase by increasing each factor. The importance of each factor considered in changing the respondents' health is determined using beta coefficients. The greater the beta, the more significant the effect would be in terms of respondents' health. The regression formula to predict the dependent variable is:

$$Y = (X1 \times 0.180) + (X2 \times 0.083) + (X3 \times 0.399) + (X4 \times 0.106) + (X5 \times 0.015) + (X6 \times 0.188) + 2.142 \quad (1)$$

where Y is "physical and mental health", X1 is "environmental quality", X2 is "the liveliness of local spaces", X3 is "readability", X4 is "framework quality", X5 is "identity and social relationships", and X6 is "quality and public spaces in the city". Accordingly, the quality and public spaces of the city have the most significant impact on respondents' health, so that for one unit of change in this factor, 0.391 units are made in the respondents' health. In contrast, the third factor, Readability, has the most negligible impact on respondents' health ($\beta = 0.015$).

4.3. 5.Levelling Urban Region of Mahabad by TOPSIS Method

The levelling of Mahabad's urban areas by cluster analysis has been done in the following order:

Step 1: Create an unscaled decision matrix

This process eliminates the fluctuations of various criteria and converts them to constant numbers so that each of the values is divided by the vector size of the same factor in this case. The comparison becomes meaningful [26]. Preparing an unscaled matrix is determined based on Equation (2), where unscaled matrix R_{ij} related to the mean of important environmental quality factors affecting the ecosystem health of Mahabad.

$$R_{ij} = \frac{d_{ij}}{\sqrt{\sum_{i=1}^{m} (X_{ij})^2}} \tag{2}$$

Step 2: Weigh the criteria

Since different criteria have different weights, various methods such as entropy, linmap, and special vectors can be used. In this study, the entropy method was used to determine the weight of each criterion and indicator using Equation (3). It should be noted that calculating E_{ij} is based on this equation.

$$W_j = \frac{E_j}{\sum_{j=1}^{n} E_j} \quad \text{and} \quad \sum_{i=1}^{n} W_j = 1 \tag{3}$$

Step 3: Calculate the normal weighted Vij matrix

This matrix is obtained by multiplying the matrix R_{ij} by the corresponding weight of W_j (diameter matrix), which is shown in Equation (4).

$$V_{ij} = W_j \cdot R_{ij} \tag{4}$$

Step 4: Obtain the best solution (A^+) and the worst solution (A^-)

These solutions are defined as Equations (5) and (6).

$$A^+ = \left\{ (\sum_{i}^{max} V_{ij} \quad j \in J) \cdot (\sum_{i}^{min} V_{ij} \quad j \in J''); \; i = 1, 2, \ldots, m \right\} = \left\{ V_1^+ \cdot V_2^+ \cdot V_3^+ \cdot \ldots \cdot V_N^+ \right\} \tag{5}$$

In this research, it is as follows:

A^+: 0.0304, 0.0323, 0.1509, 0.0448, 0.0455, 0.1052, 0.1101, 0.1321, 0.1143, 0.0730, 0.986, 0.0705, 0.0483, 0.1044, 0.1080, 0.548, 0.1559, 0.1733, 0.0009, 0.09992, 0.01068.

$$A^- = \left\{ (\sum_{i}^{min} V_{ij} \quad j \in J) \cdot (\sum_{i}^{max} V_{ij} \quad j \in J''); \; i = 1, 2, \ldots, m \right\} = \left\{ V_1^- \cdot V_2^- \cdot V_3^- \cdot \ldots \cdot V_N^- \right\} \tag{6}$$

In this research, it is as follows:

A^-: 0.0178, 0.0061, 0.0307, 0.0130, 0.01520, 0.0300, 0.0362, 0.0252, 0.0151, 0.0207, 0.0200, 0.0171, 0.0135, 0.0368, 0.0170, 0.210, 0.0246, 0.2000, 0.2240, 0.0138.

Step 5: Calculate distance criterion (difference between option i and the ideals)

The distance of i from the ideal positive of S_i^+ and the ideal negative of S_i^- and the calculation of them are as follows:

$$\forall_i = 1, 2, \ldots, m \qquad S_i^+ = \sqrt{\sum_{j=1}^{n} \left(V_i - V_j^+ \right)^2} \tag{7}$$

$$S_i^- = \sqrt{\sum_{j=1}^{n} \left(V_i - V_j^- \right)^2} \qquad \forall_i = 1, 2, \ldots, m \tag{8}$$

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^+} \qquad \forall_i = 1, 2, \ldots, m \forall_i = 1, 2, \ldots, m \quad 0 \le C_i^* \le 1 \tag{9}$$

Using Equations (7) and (8), the distance between the options (areas) is obtained from the positive and negative solutions, and using Equation (9), the closeness coefficient of each option to these solutions is calculated.

According to Table 6, the central area of Mahabad and Employee Township, respectively, ranked first and second in terms of environmental psychology and architecture, among other neighborhoods, for better physical and mental health conditions. In contrast, the neighborhoods of Ashabe Sefid and Kani Sufi Rashid are in a less beneficial environment.

Table 6. Comparison of E_{ij} and W_{ij} for important factors of environmental psychology.

Important Factors of Environmental Quality	E_{ij}	W_j
Green spaces and nature, lack of environmental pollution	3.62	0.11
Coordinating environment with residents' desire and culture, lack of noise pollution	2.93	0.13
Landscape and environmental aesthetic	3.00	0.02
Enjoying aesthetic location	4.98	0.05
Environmental artistic features (use of color in particular)	3.96	0.05
Access to daily services	3.05	0.01
Signs and symbols	6.05	0.05
Stability and desire to continue living	6.5	0.07
Compatible neighborhood	0.05	0.00
Access to appropriate urban furniture	4.72	0.04
Interaction with urban managers to address environmental problems	5.12	0.02
Social and local responsibilities in relation to environmental quality	5.97	0.00
Quality and public spaces in the city	2.57	0.01
Pedestrian development spaces (e.g., safe walking and cycling routes)	5.96	0.07
Residential blocks	3.14	0.02
Access and distribution of sport facilities	3.12	0.02
Health and therapy facilities	6.01	0.06
Public transportation and traffic	5.56	0.06
Public spaces for children and elderly	6.02	0.06
Landscape and urban furniture	5.58	0.06
Signs and symbols in neighborhood	3.47	0.03

This analysis demonstrates a direct correlation between social, cultural, and economic status with environmental psychology and urban design and the physical and mental health factor. The detailed study of the neighborhoods and different regions of the city shows that the Ashabe Sefid and Kani Sufi Rashid are among the peripheral areas of the city and are among the localities with a rooted weak economic context, which has a direct impact on other dimensions affecting the physical and mental health of the resident respondents. However, areas such as the central region and the Kramandan town—apart from the relative utilization of environmental quality factors and existing architectural psychology—have a favorable economic and cultural status, which have also had direct and indirect effects on the physical and emotional health of respondents.

5. Discussion

The results of this study indicate that the surrounding environment influences the health dimensions of respondents. In other words, architecture and urban living environmental design can affect the health factors of its inhabitants.

5.1. Impact of Urban Spaces on Mental Health

Mental health is one of the most critical aspects of public health, which plays a decisive role in the personal and social lives of individuals. It is considered a favorable condition for individuals to fulfil their talents and abilities, adapt to usual and ordinary life stresses, act as benefactors, and take valuable measures for the community [38]. The characteristics of city design affect the severity and size of chronic patients in the population [39]. The epidemiologists' research illustrates a direct relationship between urban design as its controlling mechanism for improving health [40].

The impact of the socioeconomic characteristics of the neighborhood, at a level beyond the individual factors, is practical on the mental health of the residents of the neighborhood [41]. It has been observed that a low quality of environmental structures has increased the symptoms of depression [42]. Neighborhoods have different effects on individuals' physical and mental health [43]. Therefore, the physical and built environment of the neighborhood, defined in terms of variables such as air quality, proximity to the place of living, and level of noise, can directly affect the health of its inhabitants [44].

According to this study, 31.6% of questionnaire variables relate to urban design principles. This kind of research is important because urban design affects health factors [45], which is also the main focus area of the present paper. Figure 4 shows that the citizens of Mahabad who were questioned had the highest satisfaction with the framework, with a total of 71% (very high, high, and moderate). In dividing the quality of the framework into factors such as compatible neighborhood units and proper access to urban furniture, their importance in respondents' health becomes apparent. People's health and well-being can also be affected by having access to the right kind of urban furniture and neighborhood units that work well together [46–49].

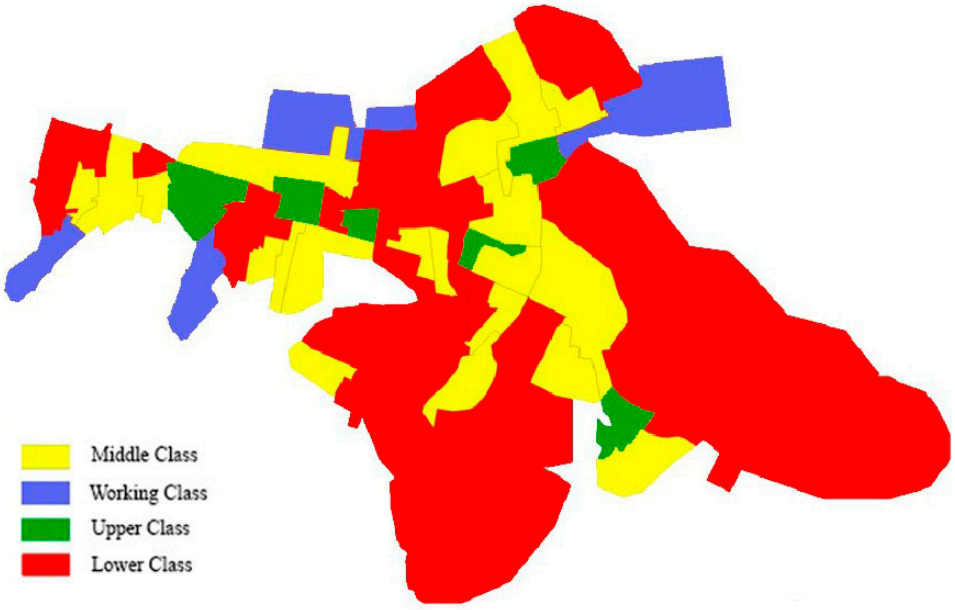


Figure 4. Geographic distribution of welfare in Mahabad.

The most important thing in this section is people's dissatisfaction. The highest dissatisfaction in Figure 3 appears to be with the variable of physical health, which the urban spaces of Mahabad could not provide. Other research has shown that both physical and mental health are better in cities with many places to exercise [50,51]. The official Iranian documents showed that diseases related to activities, such as obesity, blood pressure, and diabetes, were on the rise in Mahabad city (West Azarbaijan province) when the average of noncommunicable diseases was examined. They have similar conditions in comparison to the national average [52,53]. From the point of view of respondents, the lack and inadequacy of this variable in Mahabad indicates the high importance and originality of this research. Secondly, Figure 3 shows that 64% of Mahabad's citizens are dissatisfied with its urban environment. Research also shows how important cities' factors and the way they look are to health [54]. It is therefore necessary to improve the quality of life in Mahabad as well.

Additionally, the Kolmogorov–Smirnov test helped ensure the normality of the variables, which contributed greatly to the originality of the findings. The correlation between urban design principles and mental health is 0.746, physical health is 0.712, social health is 0.582, and spiritual health is 0.595, according to Pearson's correlation test. All health components are significantly correlated with urban design principles at the 0.01 level. For

factor analysis, KMO and Bartlett's tests were used to determine the relationship between the data. In this study, Table 2 shows that the environmental pollution factor, with a factor load of 0.895, is the most important factor in ecosystem health. Various studies have confirmed the importance of environmental pollution in public health [55,56].

This shows that the city of Mahabad, as an example of an intermediate city in Iran and most of the Middle East, is far from achieving the goals of sustainable development, and politicians and planners have not yet found an effective solution to reduce environmental pollution in the city of Mahabad or in Iran. In the last few years, dust particles have made the pollution in the western cities of Iran worse, which makes this number even more important [57,58]. Physical health is most affected by environmental pollution.

In Table 4, we see the importance of green spaces, parks, trees, and the absence of environmental pollution as the second most important factors for the health of the ecosystem. The results show that public health can be improved by increasing the connection between the citizens of Mahabad and nature and natural elements in their urban environment. The findings of this study have also been confirmed by numerous other studies. According to research conducted in Sao Paulo, Brazil, trees and green spaces can lower blood pressure when there are more of them [59]. According to another study conducted in Strasbourg, France, the presence of urban trees and urban green spaces also played an important role in reducing air pollution [60].

However, research shows that green spaces, parks, and trees can also have a positive effect on mental health [61]. Despite these results, Mahabad city has much less green space per capita than standard Iran, and there is a need to increase green space, parks, and urban trees [62,63]. A factor of 0.70 is assigned to access and distribution of sports facilities in Table 2. In Mahabad, sports facilities and their space are highly important and needed. By providing citizens with appropriate and sufficient access to sports facilities and their dedicated spaces, citizens are encouraged to exercise and be physically active. According to research, physical activity as a type of exercise has a positive effect on health [64]. The citizens of Mahabad have understood this importance as a need, and in the future, an emphasis should be put on creating sports facilities and creating their space.

According to Table 4, residential blocks, landscape, and pedestrian development spaces are the least effective or ineffective factors in the health of the ecosystem, with factor loads of 0.395, 0.428, and 0.429, respectively. This result might be influenced by variables such as public awareness and literacy levels in Mahabad city, as well as the knowledge and culture of the native people. However, when the research on these three factors is examined, it can be said that they contribute to the health of the ecosystem (human society and the environment). According to research conducted in Liverpool, housing blocks can affect residents' mental health [65]. Furthermore, research shows that the elderly who have more access to open space and nature live healthier and happier lives [66]. Pedestrian development space and landscape factors are also affected by this fact. Nowadays, one of the principles of healthy urban planning is to pay attention to landscape design and open spaces to improve the general health of citizens. Research has shown that natural elements, such as water in landscapes, affect sick children. Positive psychological effects are associated with it [67]. Physical activity can help the physical, mental, and social health of the elderly by creating therapeutic landscapes and getting people to move around [68].

Furthermore, pedestrian spaces should be planned and designed so that they provide not only easy access for pedestrians, but also uniform and suitable opportunities for physical fitness activities for citizens as well as enrich their spiritual and cultural lives. Improve the physical condition, health, and quality of life by living a healthy and civilized life [69]. Although these three factors (residential blocks, landscape, and pedestrian development spaces) did not have sufficient factor loads in this study, other researchers have demonstrated that they need to be considered and developed to improve Mahabadi citizens' health.

This study examined how environmental quality factors affect people's health using a regression model. Table 3 shows that all factors have a significance level of less than 0.01,

and their coefficients are positive and direct. A unit of change in this coefficient changes the health of citizens by 0.391 units for every unit of change in the quality and public space component of the city. In public spaces, the general public has the right to enter and be present without being controlled. A street, a park, a square, a market, or a mosque is an example of public space. Despite their functional scale and a diverse and wide audience, this category of spaces contributes the most to the collective life of citizens. A healthy and prosperous urban society will be created by improving the quality of these types of spaces more than any other type of space. In addition to public spaces, Tibbalds considers cities and towns to be very important. Among human contacts and interactions, he said, public space carries the greatest volume. Those are the parts of the urban fabric that are physically and visually accessible to the general public [70].

This interpretation, as this research demonstrated, can play a significant role in improving the quality of public spaces, which is directly related to society, which in turn can enhance the quality of life of citizens (of Mahabad) by improving their general health (physical and mental) [71]. Two factors, "readability" and "identity and social relations", have the smallest impact on respondents' health. However, this does not mean that these factors are completely ineffective. The legibility of a city is directly influenced by its artificial, historical, and natural elements, and from this point of view, it can be said that Mahabad has excellent legibility. However, this study discovered that legibility has no significant impact on respondent health, despite the fact that the research was conducted in Ardabil [72].

5.2. Impact of Urban Spaces on Physical Health

Physical characteristics of urban spaces include factors and features of the human environment that affect physical health and the two behaviors of physical activity and nutrition of individuals.

On the other hand, safety from traffic accidents and crime security are two characteristics that are common in all three components of the behavioral model and have a significant correlation with the physical activity of individuals. Safety was defined in some studies as having "access rate" [73]; it is measurable with criteria such as motor traffic, pavement buffers, sidewalk and pavement widths, and road tilt and security measures such as crime statistics and inadequate street lighting [74,75]. The existence of urban spaces such as local parks, public spaces, walking paths, and outdoor cycling routes is highly effective in encouraging people to be more active physically [76]. This feature is expressed in some high-quality research [77] in both source–destination and expected route. The existence of places, urban spaces, and facilities should be associated with their excellent level of accessibility to enhance individuals' physical activity.

5.3. Urban Spaces and Social Dimension

The key to the success of public space is the existence of an exchange platform. In the social dimension, the feeling of improvement and the quality of communication between people with family, friends, colleagues, and the community are explained. The social dimension has four key principles in urban design. The first principle is the relationship between people and space. The second principle is about the public domain and public life, which are related to personal and family life. The third is security, and the fourth principle relates to access control [74].

Figure 4 shows which neighborhoods and areas of Mahabad can have the most welfare and public health based on our research. By examining neighborhoods and residential areas in greater detail, we can see that neighborhoods with better economic, cultural, and literacy conditions are also better in terms of urban design factors, resulting in a better quality of life. Thus, these neighborhoods are superior in terms of "quality and public space", "vitality in local spaces", and "quality of framework". Various studies have shown that urban design factors, along with economic, cultural, and awareness factors, improve respondents' health (physical and mental). It has also been found that wealth and health

are a two-way relationship, with one directly affecting the other. As the economic situation improves, people's health improves, and as their health and mental and physical strength improve, they also improve their economic status. However, cultural and political variables can also play a crucial role in improving economic status and health [68]. Public policy, economics, and politics influence population health. Countries with social democratic regimes, higher public spending, and lower income inequality have healthier populations. There are significant gaps in the evidence on the relationship between political economy and health. When implemented through policy and practice, it has beneficial effects on health.

6. Conclusions

With the threat of climate change and the current global energy crisis, both developed and developing nations must innovate in the energy industry and practice responsible consumption. Therefore, the necessity for sustainable energy policies seems to be of the utmost importance. The effect of these tactics on human health should be considered, though, when making decisions in this field. Citizens play a crucial role in urban spaces, just as their health does as an essential component of the urban environment. The purpose of this study is to examine how Mahabad's design factors affect residents' health.

As the primary factors influencing Mahabadi citizens' health and well-being, five key factors of urban design are emphasized: "Quality and public spaces in the city", "Liveliness of local spaces", "Framework quality", "Environmental quality", "Identity and social relationships", and "Readability." According to the research, Mahabad city's neighborhoods with the indicated factors, particularly those with high levels of economic, cultural, and social development, are able to improve their residents' mental and physical health. A similar study can be conducted in other medium-sized Iranian cities using the methodology and significance of this study. The strength and progress of a nation are directly influenced by its health. The results of this study may pave the way for future research on Mahabad's size. This study was conducted to determine the quantity and quality deficiencies of urban design factors that affect public health in different localities, particularly marginal areas, in order to improve the quality of urban design and, therefore, the general health and quality of life of Mahabadi citizens at different levels.

This paper investigates different environmental psychology and architectural indices of eight main neighborhoods of Mahabad city, including Ashabe Sefid, Shayegan Garden, Municipality, Employee Township, Kani Sufi Rashid, Central District, University College, and Kani Sufi Taha. Mahabad is one of the most important cities in the Kurdistan region of Iran. Focusing on this city's environmental psychology and urban architecture and how they affect people's health, it was clear that environmental problems had made people's physical and mental health worse. This study revealed that respondents have several problems in understanding the environment; however, this does not mean that respondents are not aware of the concept of health and the environment. The state of the urban visual structure and ornaments (especially in neighborhoods such as Ashabe Sefid, Kani Sufi Rashid, Municipality, and Kani Sufi Taha) is profoundly indicative of the condition of urban fabrication, color, and appearance as well as factors promoting a sense of tranquility and vitality.

Many of the health factors of these neighborhoods are threatened, and many issues, such as the lack of mental relaxation of citizens, have been created because of inappropriate architectural appearances and harsh and challenging environments. The problem has been encountered in the neighborhoods, and the turning point of this article is that many citizens, after presenting the authors' explanations, have understood how their surroundings affect their mental health. Other urban areas, such as Shayegan Garden, Township of Employees, and Central Region are university campuses, which appear to be better than other neighborhoods. Based on the results, these neighborhoods are not a good place to measure mental and physical health, according to the theories behind these studies that define environmental and health psychology.

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References

1. Berardi, U.; Jafarpur, P. Assessing the impact of climate change on building heating and cooling energy demand in Canada. *Renew. Sustain. Energy Rev.* **2020**, *121*, 109681. [CrossRef]
2. Bazazzadeh, H.; Pilechiha, P.; Nadolny, A.; Mahdavinejad, M.; Hashemi safaei, S.S. The Impact Assessment of Climate Change on Building Energy Consumption in Poland. *Energies* **2021**, *14*, 4084. [CrossRef]
3. Bazazzadeh, H.; Nadolny, A.; Safaei, S.S.H. Climate Change and Building Energy Consumption: A Review of the Impact of Weather Parameters Influenced by Climate Change on Household Heating and Cooling Demands of Buildings. *Eur. J. Sustain. Dev.* **2021**, *10*, 1. [CrossRef]
4. Sohani, A.; Cornaro, C.; Shahverdian, M.H.; Samiezadeh, S.; Hoseinzadeh, S.; Dehghani-Sanij, A.; Pierro, M.; Moser, D. Using Building Integrated Photovoltaic Thermal (BIPV/T) Systems to Achieve Net Zero Goal: Current Trends and Future Perspectives. In *Towards Net Zero Carbon Emissions in the Building Industry*; Sayigh, A., Ed.; Springer International Publishing: Cham, Switzerland, 2023; pp. 91–107. [CrossRef]
5. Hoseinzadeh, S.; Nastasi, B.; Groppi, D.; Astiaso Garcia, D. Exploring the penetration of renewable energy at increasing the boundaries of the urban energy system—The PRISMI plus toolkit application to Monachil, Spain. *Sustain. Energy Technol. Assess.* **2022**, *54*, 102908. [CrossRef]
6. Gilani, H.A.; Hoseinzadeh, S.; Esmaeilion, F.; Memon, S.; Garcia, D.A.; Assad, M.E.H. A solar thermal driven ORC-VFR system employed in subtropical Mediterranean climatic building. *Energy* **2022**, *250*, 123819. [CrossRef]
7. Huber, M.; Knottnerus, J.A.; Green, L.; van der Horst, H.; Jadad, A.R.; Kromhout, D.; Leonard, B.; Lorig, K.; Loureiro, M.I.; van der Meer, J.W.M.; et al. How should we define health? *BMJ* **2011**, *343*, d4163. [CrossRef]
8. Schweitzer, M.; Gilpin, L.; Frampton, S. Healing Spaces: Elements of Environmental Design That Make an Impact on Health. *J. Altern. Complement. Med.* **2004**, *10*, S71–S83. [CrossRef]
9. Gordon, D.L.A. *Planning Twentieth Century Capital Cities*; Routledge: London, UK, 2006. [CrossRef]
10. Bahrainy, H.; Khosravi, H. The impact of urban design features and qualities on walkability and health in under-construction environments: The case of Hashtgerd New Town in Iran. *Cities* **2013**, *31*, 17–28. [CrossRef]
11. Inzulza-Contardo, J.; Moran-Figueroa, P. Towards an analytical framework based on the principles of Civic Design. The case of post-earthquake Talca, Chile 2010–2016. *Cities* **2018**, *72*, 356–368. [CrossRef]
12. Mahdavy, H. *Patterns And Problems Of Economic Development In Rentier States The Case Of Iran*; Studies in the Economic History of the Middle-East; Oxford University Press: Oxford, UK, 1970.
13. Azami, M.; Mirzaee, E.; Mohammadi, A. Recognition of urban unsustainability in Iran (case study: Sanandaj city). *Cities* **2015**, *49*, 159–168. [CrossRef]
14. Mansourianfar, M.H.; Haghshenas, H. Micro-scale sustainability assessment of infrastructure projects on urban transportation systems: Case study of Azadi district, Isfahan, Iran. *Cities* **2018**, *72*, 149–159. [CrossRef]
15. Rouhi, M.; Usefi, H.; Hasan, M.; Vizheh, M. Ethnicity as a risk factor for postpartum depression. *Br. J. Midwifery* **2012**, *20*, 419–426. [CrossRef]
16. O'Shea, M.T. *Trapped Between the Map and Reality: Geography and Preceptions of Kurdistan*; Routledge: London, UK, 2004. [CrossRef]
17. Ahmad, Z.; Ahmad, N. Urbanism, Space and Human Psychology: Value Change and Urbanization in Malaysia. *Eur. J. Soc. Sci.* **2009**, *11*, 464–470. [CrossRef]
18. Knöll, M.; Roe, J.J. Ten questions concerning a new adolescent health urbanism. *Build. Environ.* **2017**, *126*, 496–506. [CrossRef]
19. Zinatizadeh, S.; Azmi, A.; Monavari, S.M.; Sobhanardakani, S. Evaluation and prediction of sustainability of urban areas: A case study for Kermanshah city, Iran. *Cities* **2017**, *66*, 1–9. [CrossRef]
20. Reiser, R.A. A history of instructional design and technology: Part II: A history of instructional design. *Educ. Technol. Res. Dev.* **2001**, *49*, 57–67. [CrossRef]
21. Hanson, J. Urban transformations: A history of design ideas. *Urban Des. Int.* **2000**, *5*, 97–122. [CrossRef]

22. Akhondzadeh-Noughabi, E.; Alizadeh, S.; Ahmadvand, A.-M.; Minaei-Bidgoli, B. FTiS: A new model for effective urban management: A case study of urban systems in Iran. *Cities* **2013**, *31*, 394–403. [CrossRef]
23. Jelokhani-Niaraki, M.; Hajiloo, F.; Samany, N.N. A Web-based Public Participation GIS for assessing the age-friendliness of cities: A case study in Tehran, Iran. *Cities* **2019**, *95*, 102471. [CrossRef]
24. Reiner, T.A. *The Place of the Ideal Community in Urban Planning*; University of Pennsylvania Press: Philadelphia, PA, USA, 1963; ISBN 9781512806113.
25. Wolny, A. Are suburban commuters confined to private transport? A case study of a medium-sized functional urban area (FUA) in Poland. *Cities* **2019**, *92*, 82–96. [CrossRef]
26. Dilani, A. Architecture: The beneficial health outcomes of salutogenic design. In *Design for Health*; Routledge: London, UK, 2017. [CrossRef]
27. Duhl, L.J.; Sanchez, A.K. *Sanchez Healthy Cities and and the City Planning Process: A Background Document on Links between Health and Urban Planning*; WHO Regional Office for Europe: København, Denmark, 1999.
28. Liu, W.; Zhang, T.; Lai, D. Inverse design of a thermally comfortable indoor environment with a coupled CFD and multi-segment human thermoregulation model. *Build. Environ.* **2023**, *227*, 109769. [CrossRef]
29. Yao, W.; Li, X.; Cao, W.; Li, G.; Ren, L.; Gao, W. Research on the influence of indoor thermal environment and activity levels on thermal comfort in protective clothing. *Energy Build.* **2023**, *279*, 112681. [CrossRef] [PubMed]
30. Shakouri, M.; Ghadamian, H.; Hoseinzadeh, S.; Sohani, A. Multi-objective 4E analysis for a building integrated photovoltaic thermal double skin Façade system. *Sol. Energy* **2022**, *233*, 408–420. [CrossRef]
31. Takano, T.; Nakamura, K. An analysis of health levels and various factors of urban environments for healthy cities projects. *J. Epidemiol. Community Health* **2001**, *55*, 263–270. [CrossRef]
32. Prasad, A.; Gray, C.B.; Ross, A.; Kano, M. Metrics in Urban Health: Current Developments and Future Prospects. *Annu. Rev. Public Health* **2016**, *37*, 113–133. [CrossRef]
33. Pineo, H.; Glonti, K.; Rutter, H.; Zimmermann, N.; Wilkinson, P.; Davies, M. Urban Health Indicator Tools of the Physical Environment: A Systematic Review. *J. Urban Heal.* **2018**, *95*, 613–646. [CrossRef]
34. Lopes, R.H.C. Kolmogorov-Smirnov Test. In *International Encyclopedia of Statistical Science*; Springer: Berlin/Heidelberg, Germany, 2011. [CrossRef]
35. Mir, M.A.; Ghazvinei, P.T.; Sulaiman, N.; Basri, N.; Saheri, S.; Mahmood, N.; Jahan, A.; Begum, R.; Aghamohammadi, N. Application of TOPSIS and VIKOR improved versions in a multi criteria decision analysis to develop an optimized municipal solid waste management model. *J. Environ. Manag.* **2016**, *166*, 109–115. [CrossRef]
36. Health, M.; Action, G. *Mental Health Gap Action Programme: Scaling up Care for Mental, Neurological, and Substance Use Disorders*; WHO Regional Office for Europe: Geneva, Switzerland, 2008; ISBN 9789241596.
37. Lowe, M.; Boulange, C.; Giles-Corti, B. Urban design and health: Progress to date and future challenges. *Heal. Promot. J. Aust.* **2014**, *25*, 14–18. [CrossRef]
38. Jackson, L.E. The relationship of urban design to human health and condition. *Landsc. Urban Plan.* **2003**, *64*, 191–200. [CrossRef]
39. Schieman, S.; Meersman, S.C. Neighborhood Problems and Health Among Older Adults: Received and Donated Social Support and the Sense of Mastery as Effect Modifiers. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* **2004**, *59*, S89–S97. [CrossRef]
40. Galea, S.; Ahern, J.; Rudenstine, S.; Wallace, Z.; Vlahov, D. Urban built environment and depression: A multilevel analysis. *J. Epidemiol. Community Health* **2005**, *59*, 822–827. [CrossRef] [PubMed]
41. O'Campo, P.; Salmon, C.; Burke, J. Neighbourhoods and mental well-being: What are the pathways? *Heal. Place* **2009**, *15*, 56–68. [CrossRef] [PubMed]
42. Wen, M.; Fan, J.; Jin, L.; Wang, G. Neighborhood effects on health among migrants and natives in Shanghai, China. *Health Place* **2010**, *16*, 452–460. [CrossRef] [PubMed]
43. Golembiewski, J.A. Salutogenic architecture in healthcare settings. In *The Handbook of Salutogenesis*; Springer: Berlin/Heidelberg, Germany, 2016. [CrossRef]
44. Conley, L. Improving Well-Being With Naber: Creating A Mobile App Experience to Help People Move and Thrive in a New Neighborhood. 2018. Available online: https://uh-ir.tdl.org/handle/10657/3142 (accessed on 9 September 2022).
45. Roux, V.D. Investigating neighborhood and area effects on health. *Am. J. Public Heal.* **2001**, *91*, 1783–1789. [CrossRef] [PubMed]
46. Saberifar, R. Investigate the Relationship between Urban Furniture and Utilization of Urban Spaces with Mental Health. 2018, Tehran, Iran, 10.29252/hrjbaq.3.2.89, hrjbaq.ir. Available online: https://hrjbaq.ir/article-1-48-en.html (accessed on 9 September 2022).
47. Jafari, M. The Role of Urban Furniture in the Mental Health of the Elders in Regions 1 and 2 of North of Tehran and Regions 19 and 20 of South of Tehran. ijeprjournal.org. Available online: https://www.ijeprjournal.org/article.asp?issn=2395-2296;year=2016;volume=2;issue=3;spage=184;epage=187;aulast=Jafari (accessed on 9 September 2022).
48. Koohsari, M.J.; Mavoa, S.; Villanueva, K.; Sugiyama, T.; Badland, H.; Kaczynski, A.T.; Owen, N.; Giles-Corti, B. Public Open Space, Physical Activity, Urban Design and Public Health: Concepts, Methods and Research Agenda. Elsevier: Amsterdam, The Netherlands, 2015; Available online: https://www.sciencedirect.com/science/article/pii/S1353829215000295 (accessed on 9 September 2022). [CrossRef]

49. Koohsari, M.J.; Badland, H.; Giles-Corti, B. (Re) Designing the Built Environment to Support Physical Activity: Bringing Public Health Back into Urban Design and Planning. Elsevier: Amsterdam, The Netherlands, 2013. Available online: https://www.sciencedirect.com/science/article/pii/S0264275113000978 (accessed on 9 September 2022).
50. Peykari, N.; Larijani, B. A multi-sectoral approach to combatting non-communicable diseases: Iran's experience. *J. Diabetes Metab. Disord.* **2019**, *18*, 719–720. [CrossRef]
51. Peykari, N.; Hashemi, H.; Dinarvand, R.; Haji-Aghajani, M.; Malekzadeh, R.; Sadrolsadat, A.; Sayyari, A.A.; Asadi-Lari, M.; Delavari, A.; Farzadfar, F.; et al. National action plan for non-communicable diseases prevention and control in Iran; a response to emerging epidemic. *J. Diabetes Metab. Disord.* **2017**, *16*, 3. [CrossRef]
52. Fathi, S.; Sajadzadeh, H.; Sheshkal, F.M.; Aram, F.; Pinter, G.; Felde, I.; Mosavi, A. The Role of Urban Morphology Design on Enhancing Physical Activity and Public Health. *Int. J. Environ. Res. Public Health* **2020**, *17*, 2359. [CrossRef] [PubMed]
53. Briggs, D. Environmental pollution and the global burden of disease. *Br. Med. Bull.* **2003**, *68*, 1–24. [CrossRef] [PubMed]
54. Lu, Z.N.; Chen, H.; Hao, Y.; Wang, J.; Song, X.; Mok, T.M. The Dynamic Relationship between Environmental Pollution, Economic Development and Public Health: Evidence from China. Elsevier. Available online: https://www.sciencedirect.com/science/article/pii/S0959652617317250?casa_token=WVLfnjUyQ2MAAAAA:Mns8VVxE7cxnukFUsy4GHwdv4J-oGqgbctgzDn9NNw486J0hBR8jua5--97HvQPQVBkelrWK (accessed on 9 September 2022).
55. Omid, N.S.; Qasim, T.A.; Morteza, M. Statistic and Synoptic Analysis of Dust Phenomena in West of Iran. *J. Arid. Reg. Geogr. Stud.* **2012**, *2*, 63–81. Available online: https://jes.ut.ac.ir/article_29154.html?lang=en (accessed on 9 September 2022). [CrossRef]
56. Boloorani, A.D.; Nabavi, S.O.; Bahrami, H.A.; Mirzapour, F.; Kavosi, M.; Abasi, E.; Azizi, R. Investigation of dust storms entering Western Iran using remotely sensed data and synoptic analysis. *J. Environ. Health Sci. Eng.* **2014**, *12*, 1–12. [CrossRef]
57. Moreira, T.C.; Polizel, J.L.; Santos ID, S.; Silva Filho, D.F.; Bensenor, I.; Lotufo, P.A.; Mauad, T. Green Spaces, Land COVER, Street Trees and Hypertension in the Megacity of São Paulo. mdpi.com. Available online: https://www.mdpi.com/624352 (accessed on 9 September 2022).
58. Selmi, W.; Weber, C.; Rivière, E.; Blond, N.; Mehdi, L.; Nowak, D. Air Pollution Removal by Trees in Public Green Spaces in Strasbourg City, France. Elsevier. Available online: https://www.sciencedirect.com/science/article/pii/S1618866716301571?casa_token=SuxfeTQmidEAAAAA:_T7n85yhXvL7QIWZC_indPRKqlZJDm_nv5uF8ODYfUtxs8anjYBq8oMvxnK-x2eWSu5MReER (accessed on 9 September 2022).
59. Wood, L.; Hooper, P.; Foster, S.; Bull, F. Public Green Spaces and Positive Mental Health–Investigating the Relationship between Access, Quantity and Types of Parks and Mental Wellbeing. Elsevier. Available online: https://www.sciencedirect.com/science/article/pii/S1353829216303689?casa_token=ckX7M7m5tZMAAAAA:He57g6ALuUBkBGTaDXdN7eNbfCumk5T99ercQYuoZ_c6ygPcWwb6411TfqLgaI-YjHPsM_Hd (accessed on 9 September 2022).
60. AGENCY, N. Per Capita Green Space in Mahabad is Lower than the National Standard [Persian]. IRIB news Aganny, 2016. Available online: http://www.iribnews.ir/fa/news/2061515 (accessed on 9 September 2022).
61. Hosseinzadeh, D. How Much is Green Space, Mahabadi Per Capita? [Persian]. Rahdana Information Network, Dana Agency: Tehran, Iran, 2016. Available online: https://www.dana.ir/news/1289781.html (accessed on 9 September 2022).
62. Haskell, W.L.; Blair, S.N.; Hill, J.O. Physical Activity: Health Outcomes and Importance for Public Health Policy. Elsevier. Available online: https://www.sciencedirect.com/science/article/pii/S0091743509002199?casa_token=nxFEMh8rihEAAAAA:XxEaFs2E9RumnDK_6Ue72OAzQwMmYylVLRpy4opW-qzGIAOTbYBo3HCxVdkPun9-BNOcqLKb (accessed on 9 September 2022).
63. Green, G.; Gilbertson, J.M.; Grimsley, M.F. Fear of Crime and Health in Residential Tower Blocks: A Case Study in LIVERPOOL, UK. academic.oup.com. Available online: https://academic.oup.com/eurpub/article-abstract/12/1/10/591454 (accessed on 9 September 2022).
64. Rappe, E.; Kivela, S.L.; Rita, H. Visiting Outdoor Green Environments Positively Impacts Self-Rated Health among Older People in Long-Term Care. journals.ashs.org. Available online: https://journals.ashs.org/horttech/view/journals/horttech/16/1/article-p55.xml (accessed on 9 September 2022).
65. Allahyar, M.; Kazemi, F. Effect of Landscape Design Elements on Promoting Neuropsychological Health of Children. Elsevier. Available online: https://www.sciencedirect.com/science/article/pii/S1618866721003605?casa_token=71unJaDOp5IAAAAA:Hxdlz5jZaiPIl664YtFyE5oHtlAKVTA-Sn7C1l-KT-diWghrCqOj5XM071QgxgTNTzELRvYw (accessed on 9 September 2022).
66. Marques, B.; McIntosh, J.; Kershaw, C. Healing Spaces: Improving Health and Wellbeing for the Elderly through Therapeutic Landscape Design. 2019. Available online: https://openaccess.wgtn.ac.nz/articles/journal_contribution/Healing_spaces_improving_health_and_wellbeing_for_the_elderly_through_therapeutic_landscape_design/12413336 (accessed on 9 September 2022).
67. Wang, F.; Zhang, R.; Dong, S.; Liang, L. Urban Planning and Design of Pedestrian Space from Perspectives of Fitness. Elsevier. Available online: https://www.sciencedirect.com/science/article/pii/S1877705811048612 (accessed on 9 September 2022).
68. Tibbalds, F. Making People-Friendly Towns; Spon Press: 2001. Available online: https://www.routledge.com/Making-People-Friendly-Towns-Improving-the-Public-Environment-in-Towns/Tibbalds/p/book/9780415237598 (accessed on 9 September 2022).
69. Rad, V.B.; Ngah, I.B. Assessment of Quality of Public Urban Spaces. *Sci. Int.* **2014**, *26*, 335–338. Available online: http://www.sci-int.com/pdf/200550752865-335-338--Bigdeli%20Rad--SS--MALAYSIA--PAID[2]%20GP%20Revised%20Back.pdf (accessed on 9 September 2022).
70. Azimi, E.; Sattarzadeh, D.; Bolillan, L.; Tarf, A.A.; Asli, M.F. Evaluation of the effect of physical-environmental factors of public spaces on the mental health of citizens (Case study: Ardabil city). *J. Appl. Res. Geogr. Sci.* **2021**, *20*, 307–319. [CrossRef]

71. Badland, H.M.; Schofield, G.M.; Witten, K.; Schluter, P.J.; Mavoa, S.; Kearns, R.A.; Hinckson, E.A.; Oliver, M.; Kaiwai, H.; Jensen, V.G.; et al. Understanding the Relationship between Activity and Neighbourhoods (URBAN) Study: Research design and methodology. *BMC Public Health* **2009**, *9*, 224. [CrossRef] [PubMed]
72. Kirtland, K.A.; Porter, D.E.; Addy, C.L.; Neet, M.J.; Williams, J.E.; Sharpe, P.A.; Neff, L.J.; Kimsey, C.D., Jr.; Ainsworth, B.E. Environmental measures of physical activity supports: Perception versus reality. *Am. J. Prev. Med.* **2003**, *24*, 323–331. [CrossRef] [PubMed]
73. Adlakha, D.; Hipp, J.A.; Brownson, R.C.; Eyler, A.A.; Lesorogol, C.K.; Raghavan, R. 'Can we walk?' Environmental supports for physical activity in India. *Prev. Med.* **2017**, *103*, S81–S89. [CrossRef]
74. Hipp, J.A.; Reeds, D.N.; van Bakergem, M.A.; Marx, C.M.; Brownson, R.C.; Pamulapati, S.C.; Hoehner, C.M. Review of Measures of Worksite Environmental and Policy Supports for Physical Activity and Healthy Eating. *Prev. Chronic Dis.* **2015**, *12*, 140410. [CrossRef]
75. Krizek, K.J.; Johnson, P.J. Proximity to Trails and Retail: Effects on Urban Cycling and Walking. *J. Am. Plan. Assoc.* **2006**, *72*, 33–42. [CrossRef]
76. CABE Space. *The Value of Public Space: How High-Quality Parks and Public Spaces Create Economic, Social and Environmental Value*; CABE Space: London, UK, 2004.
77. McCartney, G.; Hearty, W.; Arnot, J.; Popham, F.; Cumbers, A.; McMaster, R. Impact of Political Economy on Population Health: A Systematic Review of Reviews. *Am. J. Public Health* **2019**, *109*, e1–e12. [CrossRef]

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