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A "HEALTHY CITY" MODEL ON THE BASIS OF ENVIRONMENTAL INDICATORS IN KERMANSHAH, IRAN

The purpose of this study is to present a model of Healthy City on the basis of environmental indicators in Kermanshah, Iran. The study has used both qualitative and quantitative methods of data collection. The samples included 36 managers in charge of health-related organizations, 23 city representatives, and 36 faculty members. As the results suggested, "air pollution" and "traffic density", "city's beauty", "water quality" and "relative surface of areas covered with green space in the city" have been the most important environmental indicators for Kermanshah.

Key words: *health, urban health, healthy city, World Health Organization, health indicators, environmental indicators, socioeconomic indicators, lifestyle, urbanization, Kermanshah*

INTRODUCTION

Cities are facing different challenges, such as lack of clean water and sewerage facilities, air pollution, environmental hazards, unsafe housing, road accidents, congestion, violence and injuries, unhealthy diets and lifestyle and low levels of physical activity.

The WHO encourages cities to target and solve local problems and engage people from various parts of the community in the Healthy City process. The approach involves facilitating collaboration among citizens and people from business, government and other sectors of society who recognize that their

synergy could be used to maintain and improve the wellbeing of the entire community[1].

A Healthy City (HC) program is concerned about the physical, social, economic and spiritual determinants of health and the essential elements necessary to improve health and the environment. The approach works on the principle that health and quality of life can be improved by modification of living conditions at home, school, workplace in the, city - places or settings where people live and work. Moreover, it creates an awareness of factors related to the pace of urbanization and population growth rates, as well as the impact of national development plans on cities and poverty in urban slums and squatter settlements[2].

The development of healthy cities is a global initiative prompted by the World Health Organization to improve the health of people who are influenced by urbanization. This helps promote standards of living and creates harmony between people, their surroundings and society. The HC concept aims at placing health high on the agenda of local political decision-makers, key groups at city level and the population at large[3], and promoting comprehensive local strategies for health and sustainable development, and ultimately, seeking to enhance the physical, mental, social, and environmental health and wellbeing of the people who live and work in cities and related municipalities in various regions of the world.

The HC project was developed initially in the WHO European Region in 1987 as a means of implementing the Ottawa Charter at local city and municipality level. The HC project is built firmly on the principles and values underpinning both WHO's Health for All strategy[4], WHO Health 21[5], and Local Agenda 21[6]. Consequently, a particularly strong emphasis is given in this urban settings approach to equity, social justice, participatory governance and solidarity, intersectoral collaboration and action to address the broad determinants of health. HC approaches have been gradually extended over different countries of the world.

According to WHO definition, health promotion is a process of offering, both to individuals and communities, the possibility of having greater control of health factors to improve their health. Health promotion seeks to improve the well-being and actualize the health potential of individuals, families, groups and

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[1] Kenneth J, Sherriff N, Hall C, Review of Brighton and Hove Healthy City Programme Phase IV, University of Brighton, International Health Development Research Centre, 2008, p. 19

[2] WHO Regional Office for the Eastern Mediterranean, *Training manual for the healthy city program*, 2007, pp. 5–36.

[3] Kickbusch, I. (1989). Healthy cities: a working project and a growing movement. Health Promotion. 4 (2). pp. 77-82; Tsouros, A. (1995a). Twenty steps for developing a healthy cities project (2nd ed), Copenhagen, World Health Organization.

[4] World Health Organization (1978) Primary Health Care: a Report on the Conference on Primary Care held in Alma-Ata, Geneva, WHO; World Health Organization (1981) Global strategy for health for all by the year 2000. Geneva WHO; World Health Organization (1998). Health for all in the twenty-first century. Pan American Journal of Public Health. 4 (2). pp. 132–141.

[5] World Health Organization (1999) Health 21: Health for all in the 21st century Copenhagen, WHO

[6] Dooris, M (1999) Healthy cities and local agenda 21: the UK experience – challenges for the new millennium Health Promotion International 14 4 pp 365–375; World Health Organization (1997a). Twenty steps for developing a healthy city project, (3rd ed.). Copenhagen: World Health Organization.

communities, regardless of their health status or age. It is the aggregate of all purposeful activities designed to improve personal and public health through a combination of strategies, including:

- Health education and awareness;
- Environmental modification;
- Healthy lifestyles and behavioral changes;
- Nutrition[7].

There are many factors that influence people's health and they are known as the determinants of health. These factors are often interactive and beyond an individual's control. The below diagrams summarize the main determinants of health according to their spheres of influence, starting from those at the individual level and moving through to those in the wider society (Figure 1).

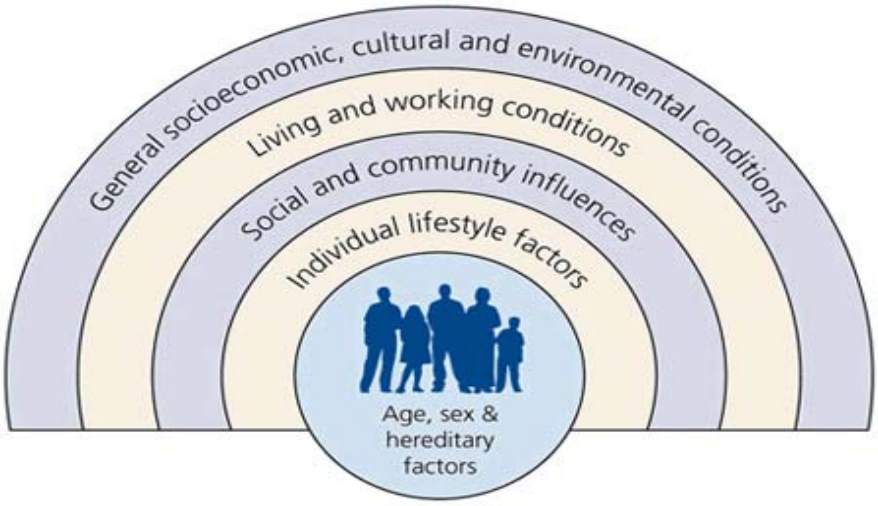

Figure 1. *The main determinants of health (A Social Model of Health)*[8]

This study presents a model of healthy city on the basis of environmental indicators in Kermanshah, Iran using ideas, experience and practical suggestions of urban managers, different specialists and people's representatives. It also attempts to introduce the most important environmental indicators in the city of Kermanshah and specify the strengths, weaknesses, threats, and opportunities of Kermanshah for every indicator.

Lipp and Premila[9] presented an overview of a review of indicators of inequality within the city health profiles, focusing on health status, well-being, services, economic conditions and the environment within cities. They described the rationale for this focus as "awareness of the problem brings you closer to the solution".

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[7] WHO Regional Office for the Eastern Mediterranean, *Training manual for the healthy city program*, 2007, pp. 5–36.

[8] Whitehead M. & Dahlgren G. What can we do about inequalities in health? Lancet, 1991, 338: 1059–1063

[9] Lipp A, Webster P, **Analysis of health profiles,** Report on the Integrated Meetings of the WHO European Healthy Cities Network and the Network of the European National Healthy Cities Networks/ Report on a WHO Business and Technical Meeting, Bursa, Turkey, 21–23rd September 2005 .World Health Organization 2006

Trevor Hancock[10] argues that an appropriate balance between the five forms of capital – natural, economic, social, built, and human – in a way that engages people from all sectors of the community, and ideally maximizes all these forms of capital simultaneously, is at the heart of the local governance for health and human development. According to Hancock there is no universal model that can or should be applied to all communities. What is needed is a model process that enables, supports and empowers communities to engage with their citizens – the various public, non-profit, community and private-sector organizations – to develop a shared vision and unique, tailored actions to achieve that vision. The mentioned approach must be based on the community's strengths and assets, not on its weaknesses and dysfunctions.

Taghvayee and Maeroufi[11] considered the implementation of an 'electronic city plan-a plan to accomplish the objectives of a HC approach. This plan was regarded to apply modern technologies of "IT & ICT" in performing the citizens' daily activities for implementing their economic and social expected roles and responsibilities.

METHODOLOGY

The study samples included all City representatives, senior managers in charge of organizations and institutions in Kermanshah, and faculty members.

Among the 23 city representatives were all parliament members from Kermanshah, all City Council members, 6 mayors of various municipal zones in Kermanshah, and 5 managers of non-governmental organizations. Out of the 23 members, 16 individuals filled out the questionnaires. The senior managers of organizations and institutions in Kermanshah included 36 managers in charge of organizations which directly or indirectly played a role in promoting the city health. Out of the 36 members, 33 individuals filled out the questionnaires. Faculty members included 36 experts and specialists of health and other sciences, associated with Social Determinants of Health. Out of the 36 individuals in this group, 31 completed the questionnaires. To consider the issue under question from different angles, some of the participants were selected to be interviewed. They included 5 City Representatives, 17 managers, and 19 faculty members.

Descriptive statistics containing demographic characteristics of the participants (age and education) are presented in Table 1 and 2.

Table 1

Demographic Characteristics Based on Age

Age	Number of individuals	Percentage
30-39	21	26.25
40-49	37	46.25
50-59	20	25
Above 60	2	2.5
Total	80	100

[10] Hancock T., Act Locally: Community-based population health promotion, Victoria BC. For The Senate Sub-Committee on Population Health, 2009, Appendix B: pp. 18–20

[11] Taghvayee A., Maeroufi S., Electronic City, Steps towards Healthy City objectives, Second international conference of electronic municipality (2009)

Table 2

Demographic Characteristics Based on Education

Level	Number of individuals	percentage
PhD	25	31.25
PhD students	2	2.5
MA or MSC	30	37.5
BA or BS	14	17.5
General practitioners	4	5
Specialist Practitioner	5	6.25
Total	80	100

The data were collected through a validated Likert-scale questionnaire (which entailed 19 Environmental Indicators), semi-structured interviews, and focus-group discussions. Using Cronbach's alpha, Delphi method, and expert judgments, the reliability and validity of the questionnaire were evaluated and ensured. To analyze the obtained data, descriptive statistics (demographic characteristics such as age and education) and inferential statistics (Friedman's test and SWOT) were applied. All the statistical analyses were performed using SPSS.

Data collection procedure

After the validity of the questionnaires was confirmed, they were distributed among the samples. After one month, 80 questionnaires were completed and returned to the researcher. Before analyzing the data, Cronbach's alpha was used to ensure the reliability of the questionnaire containing 74 Urban Health indicators[12]. After identifying the indicators and assigning their priorities, we interviewed the managers, city representatives and faculty members. The participants were required to express the weaknesses, strengths, threats and opportunities of every indicator and to suggest practical plans for the promotion of urban health indicators in Kermanshah.

Data analysis

The data collected through the Liker-scale questionnaire were submitted to statistical analyses such as mean, standard deviation, and reliability analysis (i.e. Cronbach's alpha).

The data collected from these interviews were content analyzed. SWOT analysis was also used. To propose an urban health strategy plan for Kermanshah, a comprehensive framework for strategy formulation was used. This framework includes four main stages:

1) Initial Stage: At this stage, Kermanshah urban health mission is determined and its statement is prepared;

2) Input stage: At this stage the information required to formulate strategies are determined. This stage includes IFE (Internal Factors Evaluation) Matrix and EFE (External Factors Evaluation) Matrix;

3) Matching stage: In this stage, after considering the information resulting from the previous stages, by taking into account the conditions of Kermanshah, the main internal factors (key strengths and weaknesses) and external factors

[12] The results for 19 Environmental indicators out of 74 Urban Health indicators are reported in this paper.

(strategic opportunities and threats) are matched to establish a balance between them. The instruments utilized at this stage are SWOT (Strengths, Weaknesses, Opportunities, and Threats) matrix and IE (Internal External) matrix.

4) Decision Stage: In the final stage, by utilizing QSPM (Quantitative Strategic Programming Matrix) the various strategy options identified in the previous stage are evaluated based on objective unbiased methods. This matrix determines the relative attractiveness of various strategies and therefore provides an objective basis for a specific strategy.

Stage 1 : Initiating stage	
Mission and Mission Statement	
Stage 2 : The input stage	
IFE Matrix	EFE Matrix
Stage 3 : Matching stage	
IE Matrix	SWOT Matrix
Stage 4 : The decision stage	
QSPM	

Figure 2. *General framework for formulating strategy*

The Environmental Indicators which were extracted based on the data obtained from the questionnaires are presented in Table 3.

Table 3

Environmental Indicators

№	Environmental indicators
1.	Air pollution
2.	Water quality
3.	Access to safe drinking water
4.	Per capita water consumption in homes
5.	Number of wastewater contaminants
6.	Sanitation (% of population with adequate sanitation facilities)
7.	Household waste collection quality index
8.	Household waste filtration quality index
9.	Relative surface area covered with green space in the city (including public parks, private and domestic gardens and forest)
10.	Public access to green space
11.	Abandoned industrial places
12.	Sports and leisure facilities
13.	Pedestrian streets (without passing vehicles)
14.	Cycling in the city (specific routes)
15.	Public transportation (number of available seats and places in public transport systems per 1,000 people)
16.	Extent of public transportation network coverage
17.	Living space for every citizen (in homes and settlements)
18.	Traffic density
19.	City’s beauty

Freidman test was used to analyze and rank these indicators in the four following states:

- Fierst state - general ranking of indicators (views of all samples are included)
- Second state - indicators ranking by representatives
- Third state - indicators ranking by managers
- Forth state - indicators ranking by faculty members

According to Table 4, Freidman test is significant in each four states based on the amount of Chi-square test and significance level which is less than critical significance level (0.05). Priority setting for indicators is shown in Table 5.

Table 4

Chi-Square Test Results for Environmental Indicators

	Case1	Case2	Case3	Case4
N	80	16	33	31
Chi-Square	742.46	345.00	453.76	456.83
Df	18	18	18	18
Sig.	0.00	0.00	0.00	0.00

Table 5

Priority setting for environmental indicators

№	Environmental Indicators	Friedman 1	Friedman 2	Friedman 3	Friedman 4
1.	Air pollution	17	17.23	16.14	16.93
2.	Traffic density	14.88	15.23	14.89	14.72
3.	City's beauty	13.29	14.01	13.55	13.34
4.	Water quality	13.13	12.98	13.09	13.12
5.	Relative surface of areas covered with green space in the city (including public parks, private and domestic gardens and forest)	12.13	12.19	12.67	12.43
6.	Public access to green space	11.52	11.89	12.52	11.78
7.	Access to safe drinking water	11.35	11.93	11.88	11.87
8.	Public transportation (number of available seats and places in public transport systems per 1,000 people)	11.16	12.03	11.77	11.23
9.	Sports and leisure facilities	11.06	11.46	11.56	11.65
10.	Household waste filtration quality index	10.71	11.05	11.71	10.77
11.	Household waste collection quality index	10.49	10.78	10.76	10.87
12.	Extent of public transportation network coverage	10.49	10.98	10.88	10.54

13.	Cycling in the city (specific cycling routes)	9.64	9.67	9.76	8.98
14.	Sanitation (percentage of population with adequate sanitation facilities)	9.44	9.59	9.87	8.66
15.	Number of wastewater contaminants	8.77	8.23	7.43	7.97
16.	Living space for every citizen (in homes and settlements)	5.11	6.46	4.88	5.28
17.	Pedestrian streets (without passing vehicles)	4.99	5.35	4.89	4.44
18.	Per capita water consumption in homes	2.88	3.24	3.55	2.98
19.	Abandoned industrial places	1.99	2.44	2.66	1.89

The results of the SWOT Analysis, IFE Matrix of Environmental Indicators

Expert workgroup wars requested to assign internal factors of environmental indicators a significance coefficient from 1 to 10 and a rank from 1 to 4 that after performing this phase the significance coefficient of each group was multiplied by its rank to obtain the score of each column. The total score was divided by 100 and the strengths of environmental indicators group was observed that dominate its weaknesses due to relative high score of 2.97 from 2.5. (Table 6)

Table 6

The Most Important Factors of IFE Matrix of Environmental Indicators

SW Factors of Environment Indicators Group	*Significance Coefficient*	*Rank*	*Score*
Strengths (s)			
Air pollution monitoring in Kermanshah city (1)	2	4	8
Filtration systems in several industries (1)	2	4	8
Urban water treatment facilities (2)	1	3	3
An organization to monitor drinking water quality (2)	1	3	3
Suitable access to drinking water (3)	2	4	8
Separate wastewater treatment facilities for important industries (5)	1	4	4
Urban wastewater treatment system (6)	1	4	4
Sites for waste recycling and fertilizer production (8)	2	2	4
Development of urban parks and greenswards and spaces (9)	1	2	2
Accessible parks and green spaces (10)	1	3	3
Sports clubs and gyms in the city (12)	1	3	3
Suitable infrastructure to construct pedestrian streets (13)	1	3	3
Potential biking routes for biking courses (14)	1	2	2
Traffic police coordination with municipality traffic department (18)	2	3	6

Historical & archeological sites inside the city (19)	2	4	8
Sufficient level grounds (19)	1	2	2
Weaknesses (W)			
Insufficient air quality measurement devices (1)	1	3	3
Inadequate public transportation (1)	2	3	6
Consecutive draughts (2 & 3)	2	4	8
High leakages in water distribution system of Kermanshah (2 & 3)	1	2	2
Wastewater pollution from hospitals and treatment centers (5)	1	3	3
Water penetration to wastewater network (6)	1	2	2
Lack of complete recycling coverage in the province (7 & 8)	2	2	4
Uneven distribution of green spaces in the city (8)	1	2	2
Cultural weakness in maintenance & preservation of green space (9&10)	1	3	3
Cultural weakness regarding sports and physical education (12)	1	4	4
Low priority for construction of pedestrian streets (13)	1	3	3
Lack of appropriate biking culture among the public (14)	1	2	2
Insufficient highways and grade-separated intersections (18)	2	4	8
Low investment in public transportation (18)	1	2	2
Incorrect and unattractive city plan (19)	1	2	2
Inconsistent urban structures (19)	1	3	3
Total	100	-	2.97

EFE Matrix of Environmental Indicators

As with the previous case the significance coefficient of each group was multiplied by its rank to obtain the score of each column. The total score was divided by 100 and it was observed that the opportunities of environmental indicators group dominate its threats due to relative high score of 2.94 from 2.5. (Table 7)

Table 7

The Most Important Factors of EFE Matrix of Environmental Indicators

OT Factors of Environmental Indicators Group	Significance Coefficient	Rank	Score
Opportunities (O)			
National funding for air pollution control (1)	1	4	4
Gawshan dam as a stable source of sustainable future water supply (2)	1	4	4
Low water prices for water consumption (4)	1	1	1
Hospitals are required to construct separate waste treatment units (5)	2	4	8
Adequate moisture and organic substances for production of fertilizers (8)	1	3	3
Suitable water resource for developing green spaces (9 & 10)	1	2	2

Programs of recreational and sporting facilities available at the parks (12)	1	3	3
Tourist capacities increases the need for construction of pedestrian streets (13)	2	3	6
Radio & TV promoting biking culture (14)	1	2	2
Using traffic scholars and experts (18)	3	3	9
Registered historical sites as the world heritage monuments (19)	1	3	3
Climate conditions of the province and tourist attractions (19)	1	3	3
Threats (T)			
Micro dusts and particles originating from Iraq (1)	2	4	8
Surrounding industrial regions (1)	1	3	3
Excessive underground water consumption (2 & 3)	1	3	3
Urban population growth and increasing demand for water (2 & 3)	1	3	3
Lack of a national plan to regulate water consumption per capita (4)	1	2	2
Vegetables grown in low parts of the city contaminated with raw sewage (6)	1	2	2
Abundance of rodents in garbage collection sites (7)	1	2	2
Low rainfall and climate change and global warming (9)	1	3	3
The uncertain future of athletes and sports champions (12)	1	3	3
Disregarding biking culture in national debates (14)	1	2	2
Urbanization and increased density reduces psychological safety (17)	1	3	3
Lack of adequate standards for vehicles within the city (18)	1	4	4
Lack of regulations for issuing construction licenses (19)	2	2	4
Lack of care and maintenance of municipal services by citizens (19)	1	3	3
Total	100	-	2.94

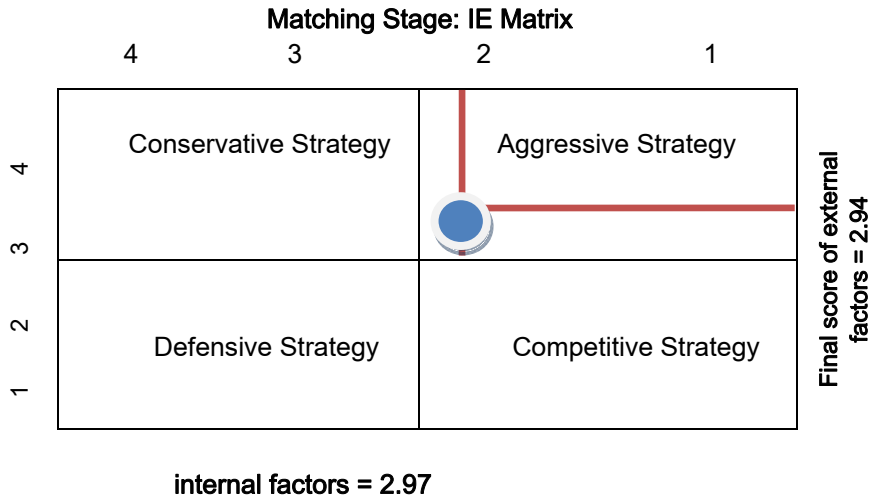

Figure 3. *IE Matrix of environmental indicators group*

The matrix results show that externally there is more opportunity and more strength internally; therefore aggressive or development strategy (SO strategy) must be implemented. To obtain the appropriate strategies for environmental indicators Quantitative Strategic Planning Matrix (QSPM) was used. QSPM is a high-level strategic management approach for evaluating possible strategies that provides an analytical method for comparing feasible alternative actions.

CONCLUSION

According to the research findings, indicators “air pollution”, “traffic density”, “city’s beauty”, “water quality” and “relative surface of areas covered with green space in the city” are the most important environmental indicators in Kermanshah respectively.

With regard to internal factors affecting environmental indicators group, it was observed that the strengths of environmental indicators dominate their weaknesses. Concerning external factors affecting this group of indicators, it was noticed that the opportunities of environmental indicators dominate their threats. After matching Internal and external factors, it was found out that there were externally more opportunities and internally more strengths; therefore, aggressive strategies must be implemented to utilize the external opportunities in order to enhance the internal strengths.

Based on the results, in the present situation the following aggressive strategies are appropriate for Environmental Indicators Group:

- Prevention of Environmental Pollution
- Sustainable development and continuous improvement of environmental indicators
- Development of Ecotourism
- Training Human Resources
- Applying the capacity of international organizations for urban health promotion
- Improving the quantity and quality of living spaces of city dwellers
- Improving public transportation

Considering diversity in social, cultural, political, economic and environmental features of different cities, one important program can be ”The Establishment of Regional Indicators on Urban Health in the City of Kermanshah”. To do this, the suggested urban health indicators by the study samples can be considered and investigated.

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ՓԵՅՄԱՆ ԴՈՒՍԹԻ
ԵՊՀ սոցիոլոգիայի ֆակուլտետի ասպիրանտ

«Առողջ քաղաքի» մոդելն ըստ Իրանի Քերմանշահ քաղաքի շրջակա միջավայրի ցուցիչների.- Սույն հոդվածի նպատակն է ներկայացնել «առողջ քաղաքի» մոդել՝ հիմք ընդունելով Իրանի Քերմանշահ քաղաքի բնապահպանական ցուցանիշները: Կիրառվել են տվյալների հավաքագրման քանակական և որակական մեթոդներ: Հետազոտության ընտրանքային համախումբը բաղկացած է առողջապահության առնչվող կազմակերպությունների 36 ղեկավարներից, քաղաքի կառավարման 23 ներկայացուցիչներից և պրոֆեսորադասախոսական կազմի 36 անդամներից: Ուսումնասիրության արդյունքների համաձայն՝ «օդի աղտոտվածությունը», «երթևեկության խտությունը», «քաղաքի գեղեցկությունը», «ջրի որակը» և «քաղաքի կանաչապատ տարածքների հարաբերական մակերեսը» Քերմանշահ քաղաքի ամենակարևոր բնապահպանական ցուցիչներն են:

Հիմնաբառեր. *առողջություն, քաղաքային առողջություն, «առողջ քաղաք», Առողջապահության համաշխարհային կազմակերպություն, առողջության ցուցանիշներ, բնապահպանական ցուցիչներ, սոցիալ-տնտեսական ցուցիչներ, ապրելակերպ, քաղաքաշինություն, Քերմանշահ:*

ПЕЙМАН ДУСТИ
Аспирант факультета социологии ЕГУ

Модель “здорового города”, основанная на экологических показателях иранского города Керманшах.- Целью настоящей статьи является представление модели “здорового города”, основываясь на экологических показателях иранского города Керманшах. В исследовании были использованы различные количественные и качественные методы сбора данных. Исследуемая выборка состоит из 36 руководителей организаций здравоохранения, 23 правительственных представителей и 36 членов профессорско-преподавательского состава. Результаты исследования показывают, что “загрязненность воздуха”, “плотность движения”, “красота города”, “качество воды” и “относительная поверхность озелененных площадей города” соответственно считаются самыми важными экологическими показателями города Керманшах.

Ключевые слова: *здоровье, городское здоровье, “здоровый город”, Всемирная организация здравоохранения, показатели здоровья, экологические показатели, социально-экономические показатели, образ жизни, урбанизация, Керманшах.*