

RELATIONSHIP BETWEEN GREEN SPACE AND MENTAL WELL BEING OF
HEBI'S COMMUNITY

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DEDICATION

This project report is dedicated to my parents. Although there are many difficulties in the process of writing the proposal, my parents have always supported me and encouraged me.

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ABSTRACT

Green space is the most important to cities and human beings because it can improve the ecological environment, improve the quality of life of residents, and improve the mental health of residents. Many countries or cities increase green space in order to improve the sustainable development of the city. However, there are many factors that affect the ecological environment and residents' health. Due to the complex influencing factors, not every city can obtain the expected results after completion. Regardless of the purpose, green spaces are important to cities and residents. However, due to the variety and complexity of factors, it is necessary to identify this intrinsic correlation to understand the magnitude of the impact that produces more people using it. Therefore, the goal of this project report is to evaluate how having access to green space affects urban people' health. The findings demonstrate that residents' mental health is highly impacted by the quality of urban green space, and that residents' activities, landscape aesthetics, green space amenities, cleanliness, and number of green spaces can greatly increase residents' pleasure. Therefore, we can enhance the quality of green space to draw in more users, enhancing citizens' mental health and wellbeing in the process.

ABSTRAK

Ruang hijau adalah yang paling penting kepada bandar dan manusia kerana ia dapat meningkatkan persekitaran ekologi, meningkatkan kualiti hidup penduduk, dan meningkatkan kesihatan mental penduduk. Banyak negara atau bandar meningkatkan ruang hijau untuk meningkatkan pembangunan mampan bandar. Walau bagaimanapun, terdapat banyak faktor yang mempengaruhi persekitaran ekologi dan kesihatan penduduk. Disebabkan faktor pengaruh yang kompleks, tidak setiap bandar boleh memperoleh hasil yang diharapkan selepas siap. Tanpa mengira tujuan, ruang hijau adalah penting kepada bandar dan penduduk. Walau bagaimanapun, disebabkan kepelbagaian dan kerumitan faktor, adalah perlu untuk mengenal pasti korelasi intrinsik ini untuk memahami magnitud kesan yang menghasilkan lebih ramai orang menggunakannya. Oleh itu, matlamat laporan projek ini adalah untuk menilai bagaimana akses kepada ruang hijau mempengaruhi kesihatan penduduk bandar. Penemuan menunjukkan bahawa kesihatan mental penduduk sangat dipengaruhi oleh kualiti ruang hijau bandar, dan aktiviti penduduk, estetika landskap, kemudahan ruang hijau, kebersihan dan bilangan ruang hijau boleh meningkatkan keseronokan penduduk. Oleh itu, kami boleh meningkatkan kualiti ruang hijau untuk menarik lebih ramai pengguna, meningkatkan kesihatan mental dan kesejahteraan rakyat dalam proses itu.

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CHAPTER 1

INTRODUCTION

1.1 Research background

The world experienced rapid urbanization during the last century, which is still occurring in various parts of the world. Cities now house more than half of the world's population, and this figure is expected to rise to two-thirds by 2050. (UN Department of Economic and Social Affairs 2015). At present, the process of urbanization in various countries in the world is advancing and accelerating. Urbanization within reason has the ability to benefit the environment. For instance, the environment can alter in a way that improves people's living conditions, fosters social development, and lessens the effects of human activity on the environment through land leveling, the installation of water conservation facilities, environmental greening, and other actions. However, there will be some difficulties. For instance, urbanization will lessen biodiversity, diminish the amount of land used for agriculture, contaminate the soil, create land subsidence, increase air pollution, and exacerbate the heat island and greenhouse effects, cause traffic congestion, and result in a housing shortage. A large number of farmers have abandoned their farmland rich life and left the original cultivated land, making people more willing to live in the city.

Many times, cities are better than villages. People living in cities can get a richer material life. For example, people can get more kinds of food, more advanced medical conditions, more convenient and fast transportation, better educational resources and so on. All these can improve human happiness index and quality of life. But sometimes the countryside is better than the city. Because of the backward transportation, the pace of life in the countryside is slower than that in the city. Therefore, the countryside can provide mankind with a better natural environment and better air quality, which is good for human health. Therefore, the happiness of

people living in cities does not seem to be higher than that of people living in rural areas. With the development of urbanization, more and more children seem to have never seen the real nature. They can only see it in the city's parks. The rest of the time is accompanied by reinforced concrete, but it is farther and farther away from nature. The negative effects of long-term accumulation of social industrialized production affect the healthy development of human settlements.

Since ancient times, people and nature have lived in harmony. Following an increase in income level due to the encouragement of economic growth and urbanization, urban inhabitants' demand for high-quality living conditions, particularly a green and healthy lifestyle, is rising. Policymakers and planners are pushed to accommodate new citizens in sustainable ways as urbanization rises (Barton, 2010; Murray & Lopez, 2017), particularly by providing green space. The Sustainable Development Goals (SDGs) of the United Nations (SDGs) emphasize increasing access to green spaces (Goal 11) and enhancing health and wellbeing (Goal 3). (United Nations, 2015).

Any area of grass or vegetation that has been specifically set aside for environmental, esthetic, or recreational objectives is referred to as an urban green space (Houlden, Weich, & Jarvis, 2017; Taylor & Hochuli, 2017). Quality, especially green and healthy life, is increasing after the improvement of income level. Urban green space is very important to human beings. It is an important activity place for residents to relax and communicate. Urban green space covers both the natural environment and urban man-made green space. It has the capacity to enhance urban environments and offer leisure and entertainment.

In the process of continuous urban development and construction, the attention to "green space" has never been lacking, or even increased year by year. In 1898, Howard put forward the concept of "garden city", which is an idea of harmonious coexistence of green space and human living space. The first urban park, New York Central Park, was established in 1858, and the development of urban green space entered a stage of rapid improvement. In China, the sustainable development strategy has been defined as the basic national strategy since 1993. The

outline of the 12th Five years plan clearly puts forward that we should take the road of green development and build ecological civilization. The recognition of the significance of green space has gradually become a social consensus.

The COVID-19 pandemic and the recent economic downturn have now had an impact on people's mental health, with a dramatic rise in depressive and anxious symptoms (Pan et al., 2020). Those of us who live in the reinforced concrete jungle cherish green space more than ever before. The covid-19 pandemic has made many countries close their doors and restricted people's way of action. Urban residents all over the world are keen to find parks and gardens - these places have brought unexpected peace and joy.

Theoretical developments have been achieved in the study of the impacts of green space on human mental health in both domestic and international research on the relationship between urban green space and residents' mental health. These theoretical developments serve as a roadmap for encouraging more healthful and scientific urban green space planning and design, in addition to confirming the numerous good effects of urban green space on Residents' health. However, the research on the mechanism of urban green space affecting residents' mental health has not reached a relatively consistent conclusion, the research on the correlation is not perfect, and the empirical research on the causality of the two is not comprehensive in foreign countries and scarce in China. The difficult point is still the intermediary factors and action process that may regulate this relationship.

This study looks ahead to the direction deserving of investigation in the future based on the pertinent research on the relationship between urban green space and inhabitants' mental health in order to provide reference for the pertinent research of urban green space.

1.2 Problem statement

Intuitively, we all know that nature is good for us, but its exact impact on our

physical and mental health may be difficult to express clearly. The quality of the living environment has recently been a significant issue for locals (for example, see Heimlich, 1989). Additionally, it has grown to be a crucial problem in spatial planning.

In terms of human study, there have primarily been three phases for the idea of "urban green space": urban open space, urban open green space, and urban green space. As the first stage, the concept of urban open space emphasizes the word "opening". For example, open public squares can alleviate people's mental fatigue caused by indifferent interpersonal relationships, and open parks can effectively alleviate the sense of depression caused by the high density of cities. As the second stage, urban open green space emphasizes not only "opening", but also "green". At the end of the 19th century, the "urban disease" brought by the rapid development of cities spread all over the world. At this time, mankind began to realize that open space must have green food such as plants, so as to really benefit people's physical and mental health development. In August 1976, Hong Kong passed and implemented the national parks act, and the urban greening rate in Hong Kong increased by 25% in the next 25 years. As the third stage, the concept of urban green space is the concise embodiment of the above two stages. The space formed by the building itself belongs to gray space, which can be contrasted with this. At this time, green space is not limited to open parks and other places, but also refers to private places such as front and rear yards of private houses. In the process of urban development and construction, China takes dynamic development as the principle, believes that green space is a unique semi natural or natural land available state in urban planning area, and seeks an effective method to integrate green space into urban development, which is the field we have been trying to explore and study.

In conclusion, despite increasing academic interest, empirical research on the potential advantages of green space for mental health has produced erratic and contradictory findings. This could be as a result of the intricate interaction between green space and mental health and how numerous unique environmental elements affect it. It's possible that other nations will not be able to use the evidence from industrialized nations. In order to come to a consensus on the association between

green space and mental health, empirical study in developing nations will be necessary. These nations have urban construction environments that are different from those in industrialized nations. For instance, Chinese cities have more compact urban forms and higher population and building densities than cities in the United States and Europe (Chen, Jia, & Lau, 2008; Liu et al., 2019), which offers a distinctive Asian perspective to confirm this association and explore the mediating role of sports activities and social cohesion.

1.3 Research gaps

We can see that each article's research material varies after reading a lot of sources. Very little is known regarding specific advantages of natural green infrastructure on human health, according to Michael L. McKinney and Alexandra VerBerkmoe's article, "Beneficial Health Outcomes of Natural Green Infrastructure in Cities" (NGI). to ascertain whether current research suggests that natural green infrastructure (NGI) enhances human health. The piece by Victoria Houlden A geographical examination of adjacent green space and mental well-being in London found a correlation between the quantity of green space within a radius of people's homes and mental well-being. In order to investigate the connections between private green space and hedonic and eudaimonic well-being, he will employ spatial techniques. The Ru Zhang piece The links between scientifically observed exposure to green spaces and mental health are as follows: The research on the connection between mental illness and exposure to green spaces is still inconclusive. We can infer the reasons behind the benefits of exposure to green environments for mental health. Article by Thomas Astell Burt, PhD According to Australia's Association of Urban Green Space With Mental Health and General Health Among Adults, Few people have thought about which forms of green space are more important for mental health. To determine whether having more specific forms of green space or overall green space is related to greater mental health. Natural settings and wholesome environments? by Sjerp de Vries Are those who reside in greener places healthier than those who reside in less green areas? This is the issue posed by an exploratory examination of the association between green space and health. To research the

connection between public health and the amount of green space in residential areas. In the literature above, Most of these studies are aimed at large cities in developed or developing countries, and there is little research on small cities. And the factors for health are also different.

1.4 Research questions

- 1.What are the factors that affect the quality of green space?
- 2.According to the characteristics of this area, does green space affect mental health?
- 3.What kind of green space environment contributes to the restoration value of mental health?

1.5 Aims and objectives of the study

The study aims to help understand the role of green space in different cities on mental health. In particular, it generates knowledge by looking for the relationship between green space and humans, which may eventually stimulate similar research elsewhere.

- 1.Identify the green space quality factors in relation improving the mental well being.
- 2.Analyze the relationship between green space quality and mental well being.
- 3.Recommend the best green space quality for mental well being benefit to people.

1.6 Research scope

In this study, the number of Hebi city residents who travel to visit green spaces is measured by Hebi City. As of 2022, the population is about 1.566 million (office portal of the National Bureau of Statistics of China). Hebi City is a small city in a developing country, and it also faces serious urban problems in the process of development, such as continuous population growth and increasing land demand.

1.7 Research significance

A vital component of the urban natural environment is green space. Planning for green space and human health greatly benefit from an understanding of its impact on the human spirit. With the increasingly prominent urban environmental problems, the quantity and quality of urban greening are relatively low, the lack and unreasonable layout of urban green space, and the factors restricting urban development also have an impact on human life and the quality of aquatic products. Therefore, how to reasonably plan, construct and manage green se, improve human living landscape and improve human life quality is an urgent problem facing mankind.

1.8 Summary

Currently, many cities are committed to various sustainable development to alleviate urban problems, especially in Southeast Asia. Also, some participating experiments obtained from other countries or cities may not be suitable due to differences in cultural background. For example, some studies suggest that the frequency of visits to green spaces will positively affect the mental health of Chinese residents; however, this phenomenon appears to be different from Hebi cities.

Reference

1. BB Lin, RA Fuller, R Bush, KJ Gaston, DF Shanahan. Opportunity or Orientation? Who Uses Urban Parks and Why. *Plos One*, 2014, 9(1): 1-8. <https://doi.org/10.1371/journal.pone.0087422>
2. Benjamin S. Johnson, Kristen M. Malecki PhD, MPH, Paul E. Peppard PhD, Kirsten M.M. Beyer PhD, MPH, MS. Andrea Kaltenbach. Expose to Neighborhood Green Space and Mental Health: Evidence from the Survey of the Health of Wisconsin. *Sleep Health*. Volume 4, Issue 5, October 2018, Pages 413-419. <https://doi.org/10.1016/j.sleh.2018.08.001>
3. Bo Qin, Wei Zhu, Jiejing Wang, Yanyan Peng. Understanding the relationship between neighbourhood green space and mental wellbeing: A case study of Beijing, China. *Cities*. Volume 109, February 2021, 103039. <https://doi.org/10.1016/j.cities.2020.103039>
4. Chen Shibin, Huang Fei. Application of SD method in the quality evaluation of green leisure in urban communities - a case study of Hangzhou. *AREAL RESEARCH AND DEVELOPMENT*. V01.33 No.6. Dec.2014. <https://www.doi.org/CNKI:SUN:DYY.0.2014-06-006>
5. Elizabeth Richardson, Jamie Pearce, Richard Mitchell, Peter Day & Simon Kingham. The association between green space and cause specific mortality in urban New Zealand: an ecological analysis of green space utility. *BMC Public Health*, 2010, 10: 240. <https://doi.org/10.1186/1471-2458-10-240>
6. Fu Yu, Zhang Gui. Study on sheltering function of urban green space in case of emergency in Guangzhou City. *Hunan Forestry Science & Technology*. 2012, 39(2). <https://www.doi.org/10.3969/j.issn.1003-5710.2012.02.014>
7. Han Wang, Xiaoling Dai, Jinglan Wu, Xingyi Wu, Xin Nie. Influence of urban

green open space on residents' physical activity in China. *BMC Public Health* volume 19, Article number: 1093 (2019). <https://doi.org/10.1186/s12889-019-7416-7>

8. HASSEN N. Green Space in the City: How Toronto's Green Spaces Promote Mental Health. *Wellesley Institute*, 2016[2016-02-04].
<http://www.wellesleyinstitute.com/healthy-communities/green-space-in-the-city-how-torontos-green-spaces-promote-mental-health/>.

9. Henrik Ernstson. The social production of ecosystem services: A framework for studying environmental justice and ecological complexity in urbanized landscapes. *Landscape and Urban Planning*. Volume 109, Issue 1, January 2013, Pages 7-17. <https://doi.org/10.1016/j.landurbplan.2012.10.005>

10. Huang Zihao. Advances in green space exposure associated public health effects. *Modern Preventive Medicine*, 2021, Vol.48, NO.1.

11. Huangqiaoling. Research progress of urban green space affecting human health. *Housing and Real Estate*. 2019,(09).

12. J Schipperijn, UK Stigsdotter, TB Randrup, J Troelsen. Influences on the use of urban green space – A case study in Odense, Denmark. *Urban Forestry & Urban Greening*, 2010, 9(1): 25-32. <https://doi.org/10.1016/j.ufug.2009.09.002>

13. Ji Mu Layi, Li Tao. Is the Age of Residents Related to Happiness? —A Study Based on the Empirical Analysis of CGSS 2015 Data. *Journal of Hexi University* 2020.36(03). <https://www.doi.org/10.13874/j.cnki.62-1171/g4.2020.03.018>

14. K Lachowycz, AP Jones. Towards A Better Understanding Of The Relationship Between Greenspace And Health: Development Of A Theoretical Framework. *Landscape & Urban Planning*, 2013, 118(3): 62-69.
<https://doi.org/10.1016/j.landurbplan.2012.10.012>

15. Kirsten M M, Beyer, Andrea, Kaltenbach, Aniko, Szabo, Sandra, Bogar, F Javier, Nieto, Kristen M, Malecki. Exposure to neighborhood green space and mental health: evidence from the survey of the health of Wisconsin. *International Journal of Environmental Research and Public Health*. 2014.11(3) : 3453-3472. <https://www.doi.org/10.3390/ijerph110303453>
16. Kondo M C, South E C, Branas C C. Nature Based Strategies for Improving Urban Health and Safety. *J Urban Health*, 2015, 92(5): 800-814.
<https://doi.org/10.1007/s11524-015-9983-y>
17. Lennon Mick, Douglas Owen, Scott Mark. Urban green space for health and well-being: developing an 'affordances' framework for planning and design. *Journal of Urban Design*, 2017(1): 778-795. <https://doi.org/10.1080/13574809.2017.1336058>
18. Li Zhi, Xie Zhaohui. The Review of the Domestic Research on the Subjective Well-being. *JOURNAL OF CHONGQING UNIVERSITY (Social Science Edition) Vol. 12 No. 4 2006*. <https://doi.org/10.3969/j.issn.1008-5831.2006.04.016>
19. Licia Natal Fernandes, Marcia Bicudo de Paula. Detection of Culex flavivirus and Aedes flavivirus nucleotide sequences in mosquitoes from parks in the city of Sao Paulo, Brazil. *Acta Tropica*, 2016, 157: 73-83.
<http://dx.doi.org/10.1016/j.actatropica.2016.01.026>
20. Liu Jing. The impact of public service satisfaction on the subjective well-being of urban.
21. Mark J. Nieuwenhuijsen, David Donaire-Gonzalez, Maria Foraster, David Martinez, Andres Cisneros. Using Personal Sensors to Assess the Exposome and Acute Health Effects. *Int. J. Environ. Res. Public Health* 2014, 11(8), 7805-7819. <https://doi.org/10.3390/ijerph110807805>
22. Matilda Annerstedt, Per-Olof Östergren, Jonas Björk, Patrik Grahn, Erik

Skärbäck, Peter Währborg. Green qualities in the neighbourhood and mental health – results from a longitudinal cohort study in Southern Sweden. *BMC Public Health* volume 12, Article number 337 (2012) Cite this article. <https://doi.org/10.1186/1471-2458-12-337>

23. Robin S Waples, Michael J Ford, Krista Nichols, Marty Kardos, Jim Myers, Tasha Q Thompson, Eric C Anderson, Ilana J Koch, Garrett McKinney, Michael R Miller, Kerry Naish, Shawn R Narum, Kathleen G O ' Malley, Devon E Pearse, George R Pess, Thomas P Quinn, Todd R Seamons, Adrian Spidle, Kenneth I Warheit, Stuart C Willis. (2022). Implications of Large-Effect Loci for Conservation: A Review and Case Study with Pacific Salmon. *Journal of Heredity*, Volume 113, Issue 2, March 2022, Pages 121-144. <https://doi.org/10.1093/jhered/esab069>

24. Ru Zhang, Chun-Qing Zhang, Ryan Rhodes. The pathways linking objectively-measured green space exposure and mental health: A systematic review of observational studies. *Environmental Research*. Volume 198, July 2021, 111233. <https://doi.org/10.1016/j.envres.2021.111233>

25. Sjerp de Vries, Robert A Verheij, Peter P Groenewegen, Peter Spreeuwenberg. 2003. Natural Environments – Healthy Environments? An Exploratory Analysis of the Relationship between Greenspace and Health. *Environment and Planning A*, vol. 35(10), pages 1717-1731. October. <https://doi.org/10.1068%2Fa35111>

26. Sjerp de Vries, Sonja M.E. van Dillen, Peter P. Groenewegen, Peter Spreeuwenberg. Streetscape greenery and health: Stress, social cohesion and physical activity as mediators. *Social Science & Medicine*. Volume 94, October 2013, Pages 26-33. <https://doi.org/10.1016/j.socscimed.2013.06.030>

27. SUN Pei-jin, LU Wei. The Correlation between Urban Green Space and Residents' Physical Activity and Health Outcome: A Case Study of Dalian. *South Architecture*. 2019(3). <https://www.doi.org/10.3969/j.issn.1000-0232.2019.03.034>

28. Sunpeijin. Research on the impact of residential environment on health from the

perspective of dimension.

29. Thomas Astell-Burt, Xiaoqi Feng. Association of Urban Green Space With Mental Health and General Health Among Adults in Australia. *Original Investigation, Public Health*. July 26, 2019. https://www.researchgate.net/publication/334717060_Association_of_Urban_Green_Space_With_Mental_Health_and_General_Health_Among_Adults_in_Australia

30. Victoria Houlden, João Porto de Albuquerque, Scott Weich, Stephen Jarvis. (2019). A spatial analysis of proximate green space and mental well-being in London. *Applied Geography, Volume 109, August 2019, 102036*. <https://doi.org/10.1016/j.apgeog.2019.102036>

31. Wang Fenglong, wang Donggen. The research progress of subjective well-being measurement and Its Enlightenment to the construction of smart city. *Progress in Geography*. 2015, Vol.34. Issue (4):482-493.
<https://doi.org/10.11820/dlkxjz.2015.04.010>

32. Wang Hui. Analysis on the impact of education level and income level on Residents' well-being -- An Empirical Study Based on cgss2015 data. *Journal Of Tasting The Classics*. 2020.07.

33. Wang Ke, Xu Honggang, Zhao Ying. Seasonal retired immigrants' daily activities, Health and wellbeing: An analysis of exposure to green space in destination. *Human Geography*. Vol.36. No1 2021/2. <https://www.doi.org/10.13959/j.issn.1003-2398.2021.01.006>

34. Wang Lan, Jiang Xiji, Wang Zihan, (USA) Anne Vernez Moudon. A Review of Researches on the Impact of Green Space on Respiratory Health and Its Comprehensive Analysis Framework. *Landscape architecture*, 2021, 28 (5): 10-15
<https://www.doi.org/10.14085/j.fjyl.2021.05.0010.06>

35. Wang Lan, Zhang Yalan, Wang Zihan. Quantitative Research Progress on Green

Spaces for Chronic Non-Communicable Respiratory Diseases. *Urban green space and public health. South Architecture* 2021.3.

<https://www.doi.org/10.3969/j.issn.1000-0232.2021.03.001>

36. Wang Shifu, Liu Zheng. Challenges and opportunities of linear urban green space as a strategic resource for the Healthy Cities. *Urbanism and Architecture. Issue 24, 2018.*

37. Wang Xindi. Research on the influence of small green space on mental fatigue recovery based on virtual reality scene.

38. Wangzhipeng, Wang Wei. An Empirical Study on the Impact of Green Spaces in Residential Areas on the Mental Health of Residents under COVID-19. *Landscape Architecture Frontiers, 8(6), 46-59.* <https://doi.org/10.15302/J-LAF-0-020009>

39. WU Renwei. On the subject of urban green space system planning. *CITY PLANNING REVIEW. 2000, 24(4).* <http://dx.chinadoi.cn/10.3321/j.issn:1002-1329.2000.04.007>

40. Wu Rong, Pan Zhuolin, Liu Ye, Li Zhigang. The effect of streetscape greenery on residents' mental health:A case study of Guangzhou. *Geographical Research* 2021, Vol. 40, Issue (8): 2272-2291. <http://www.dlyj.ac.cn/CN/10.11821/dlyj020200143>

41. Yao Yanan, Huang Qiuyun, Li Shuhua. Study on the Relationship between Green Space around Workplace and Physical and Mental Health:IT Professionals in Beijing as Target Population. *Chinese Landscape Architecture. 2018, 34(9).*

<https://www.doi.org/10.3969/j.issn.1000-6664.2018.09.004>

42. Ye Liu, Ruoyu Wang, George Grekousis, Yuqi Liu, Yuan Yuan, Zhigang Li. Neighbourhood greenness and mental wellbeing in Guangzhou, China: What are the pathways? *Landscape and Urban Planning. Volume 190, October 2019, 103602.*

<https://doi.org/10.1016/j.landurbplan.2019.103602>

43. Ying Jun. The Research of city green space for the human.
<https://www.doi.org/10.7666/d.y1111764>
44. Yu Jiali, Yan Lijiao, Deng Jinyang, Li Jian. Study on the influence of urban green space on the physical and mental welfare of residents. *Acta Ecologica Sinica*, 2020,40(10): 3338-3350. <https://www.doi.org/10.5846/stxb201908241759>
45. Yu Yanghang. Research on the influence mechanism of urban community public service satisfaction on Residents' well-being
46. Yuan Qing, Zhao Jiaxuan, Leng Hong. Research on the Impact of Green Space Activity Behavior in Winter Residential Districts on the Mental Health of the Elderly. *Chinese Landscape Architecture*. 2022 issue 3 45-50, 6 pages in total.
<https://www.doi.org/10.19775/j.cla.2022.03.0045>
47. Zhang Danting, Chen Chongxian, Hongbo, Li Shuhua. Impact of urban green space on Residents' health and its sustainability. *Journal of Northwest University(Natural Science Edition)*, 2020,50(06).
<https://www.doi.org/10.16152/j.cnki.xdxbzr.2020-06-008>
48. Zhang Fuwen. Study on ecological optimization of green space structure in contiguous residential areas in central urban area - a case study of Chengdu
49. Zhang Yingjie, Shi Haiying, Cheng Baodong. A Review of the Impact of Urban Green Space on Residents' Mental Health. *World Fores. try Research*. 2021,34(2).
<https://www.doi.org/10.13348/j.cnki.sjllyj.2021.0010.y>
50. Zhu Lingling. A Survey of Urban Open Space Research. *Dooes & Windows*. 2012(9X):220-220+222.