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# Child health-friendly neighbourhood: a qualitative study to explore the perspectives and experiences of experts and mothers of children under 6 years of age in Tehran, Iran

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## ABSTRACT

**Objectives** Creating health-supportive environments is one of the key strategies for health promotion. The WHO launched the Healthy Cities Initiative which has inspired other international organisations to develop settings-based health initiatives, such as the Child Friendly Cities by UNICEF. Our study aimed to explore the perspectives and experiences of experts, city council staff and mothers of children under 6 years of age in the city of Tehran, Iran regarding child health-friendly neighbourhoods for children of this age group.

**Design** The purpose of this qualitative research was to investigate the viewpoints and experiences of mothers of children under 6 years old as well as professionals. Data were collected from January to July 2022 through semistructured, indepth interviews using an interview guide. Data were analysed using the directed content analysis method with MAXQDA V.2020 software.

**Setting** The study was conducted in Tehran, Iran.

**Participants** Participants were selected from three main groups: experts, mothers and city council staff. Participants were invited to take part using variation purposive sampling techniques.

**Results** Data analysis led to a definition of the concept of child health-friendly neighbourhoods for children under 6 years old, with 6 dimensions, 21 subdimensions and 80 characteristics. The six dimensions included the provision of neighbourhood green space, cultural centres, health centres, access to services, transport and security. The characteristics we identified had similarities and differences with UNICEF's Child Friendly Cities.

**Conclusion** The concept of a child health-friendly neighbourhood for children under 6 years old is the result of a health-centred approach to a child-friendly city that provides a deeper understanding of the needs and services required to start a healthy life. This could contribute to further dialogue, research and actions to make all neighbourhoods a health-supportive environment as recommended by the Ottawa Charter for Health Promotion.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The main strength of this study is that the needs of children were identified and investigated from the perspectives of experts, city council staff and mothers of children under 6 years of age.
⇒ To the best of our knowledge, this study is the first to examine the characteristics of a child health-friendly neighbourhood and the needs of young children in the Iranian context.
⇒ One potential limitation is that fathers and children were not included in the study.
⇒ Based on the conditions in each neighbourhood, the needs of children in each neighbourhood may be different.

## INTRODUCTION

Acknowledging the role of social determinants of health and the birth of the field of health promotion in 1986 have created an important shift in understanding and thus strategies for protecting and promoting population health.[1] Based on the Ottawa Charter for Health Promotion, the creation of 'health supportive environments' is considered the third of the five main strategies for health promotion, before the development of individual health skills and provision of healthcare services.[2] Since then, the WHO has followed a health-promoting setting approach by launching its Healthy Cities Initiative in 1986.[2 3] Cities are an important place especially for children. It is estimated that by 2030 about 60% of urban residents will be under the age of 18.[4] For this reason, several initiatives were proposed to transform cities to healthier settings, such as the Child Friendly Cities initiated by UNICEF[4 5] and London's 2017 Living Cities project, with a view to creating child-friendly cities and using an urban design approach that focuses on children and their health across the lifespan.[6 7] There is an increasing focus on taking children's needs into account when designing cities and developing urban programmes and services more comprehensively. For example,

the international initiative 'City 95' looked at cities from the perspectives of 3-year-old children with an average height of 95 cm.[8 9]

A child-friendly city is one that prioritises the interests of children and their fundamental rights, including health, education and cultural opportunities, as well as safety and security, green spaces and play places. It refers to a city where children have a healthy start and have equal opportunities in life regardless of their ethnicity, religion, income, gender or abilities.[10 11] UNICEF proposed seven domains to explain the main indicators of a child-friendly city, namely playgrounds and green spaces, education and culture, health and children's health, access to services, participation in decision-making, safety and ease of transport, and children's security.[12]

Although a child in the child-friendly city concept refers to an individual in the 0–18 years old age group,[13] most programmes and studies on child-friendly cities have focused on children 6–18 years old,[14–16] ignoring the needs of those under 6 years of age. Furthermore, the cities or neighbourhoods have mostly been studied from the perspectives of children's social rights, focusing on urban planning, social rights areas[17–20] and the livability of the city or neighbourhoods for children.[21] There was limited consideration of a health-centred approach to developing our understanding of children's needs.[22] Finally, the lack of specific indicators to measure the state of cities and neighbourhoods for children hinders the comprehensive implementation of a child-friendly city concept.[23 24] As context is a crucial factor in the implementation of a child-friendly city approach, the standards or criteria can vary, bearing in mind that they should reflect the conditions of the local context, institutions and organisations in each country.[22] Because they are among the most vulnerable, younger children may have demands that are different from older groups when it comes to neighbourhood features.[25] Besides, there is a limited number of studies that investigated the needs of children from the perspectives of mothers and relevant experts. Therefore, to fill this gap, especially within the Iranian context, a comprehensive mixed methods study was designed to develop a national Child Health-Friendly Neighborhood for Under 6 Years of Age Children (U6CHFN) and use it to explore the needs of young children under 6 years of age in Tehran. This article reports on the qualitative part of the study, which involved conducting semistructured interviews.

In June 2019, within the framework of a joint cooperation between the Ministry of Health and UNICEF to implement the global initiative 'Child Friendly Cities' in Iran, the first meeting of the National Child-Friendly City Coordination Committee was held at the Ministry of Interior of Iran. 12 cities, including Tehran, were selected to implement the Child-Friendly Cities framework. The population of children under the age of 6 in Tehran was 1 330 646 according to 2015 census.[26] Currently, Tehran and other selected cities are in the neighbourhood assessment phase.[27] For the purpose of this research, we define a child as someone who is less than 6 years old. Hence, the objective of this research was to investigate the viewpoints and encounters of specialists, municipal employees and mothers with children aged 6 and below in Tehran with regard to the creation of a child health-oriented community for this particular age group.

## METHODS

### Study design and setting

This was a qualitative study. Qualitative data were analysed using the directed content analysis method, which allowed new themes to emerge from the data.[28] This research used the Child-Friendly Cities framework developed by UNICEF.

### Study participants and sampling

Variation purposeful sampling techniques were used to recruit participants from the three main groups of experts, mothers and city council staff. Individuals with expertise and experience in infant psychology, urban planning and architecture, and health education and promotion comprised the experts. Tehran's Child-Friendly Cities Secretariat employed the municipal personnel. Mothers were included in the research as representatives of children under the age of 6 as they are the person most responsible for their care. Experts were interviewed at their workplace, while mothers who accompanied their children in parks were interviewed in the park.

Before starting the interview sessions, an official letter from the university was provided to the participants. The participants (mothers and experts) were provided with an explanation of the study and consent was obtained for participation (mothers and experts) and for conducting and recording the interviews.

### Data collection tools and techniques

Data were collected via semistructured, indepth interviews. The interviews were conducted face-to-face using an interview topic guide (online supplemental file 1). The principal investigator (PA), who had previous experience in qualitative data collection, interviewing and interview calibration, and who was unknown to the participants, conducted the interviews.

The subject of the interview was the opinion of the interviewees on the current state of their neighbourhoods and the changes that should be made to make neighbourhoods suitable and health-friendly to children under 6 years of age. The duration of the interview ranged from 20 to 60 min. Data saturation was verified by the research team after conducting 31 interviews. Nevertheless, three additional interviews were conducted to provide additional confirmation. In the end, no new data were discovered and the interview procedure was terminated. The study did not include any withdrawals from the participants. To improve the quality of data collection, the interviews were audio-recorded for verbatim transcription, with the consent of the participants. They were assured

Table 1 Demographic characteristics of the mothers

| Participant | Mother's age (years) | Child's age (years) |
|---|---|---|
| Interview 1 | 34 | 4 |
| Interview 2 | 24 | 1 |
| Interview 3 | 24 | 1 |
| Interview 4 | 36 | 4 |
| Interview 5 | 21 | 3 |
| Interview 6 | 36 | 3 |
| Interview 7 | 30 | 2 |
| Interview 8 | 37 | 4 |
| Interview 9 | 40 | 4 |
| Interview 10 | 37 | 6 |
| Interview 11 | 34 | 5 |
| Interview (12) | 34 | 5 |
| Interview (13) | 31 | 2 |
| Interview (14) | 35 | 2 |
| Interview (15) | 33 | <1 |

that their voices would be removed after the interviews. The interviewer (PA) recorded the participants' perspectives, thoughts and feelings about the research topic and the interviews in a notebook. The researcher took notes during data collection when necessary (online supplemental file 2).

### Data analysis

The transcribed interviews were coded by the researcher (PA) shortly after each interview using directed content analysis techniques. UNICEF's Child Friendly Cities framework, with six main themes, guided the data analysis. MAXQDA V.2020 software was used to facilitate the data analysis. The coding process was carried out according to Graneheim and Lundman.[29] First, the transcriptions were examined word by word. The texts were then divided into units of meaning and were coded. Codes denoting a single theme were placed in a category based on a continuous comparison of similarities, differences and appropriateness. The next step classified the categories and subcategories. The summary categories and the central concept of each category were then identified. Finally, the concepts were reviewed based on the description of the internal themes considering the whole data.[29]

Graneheim and Lundman's[29] indices, including credibility, dependability, confirmability and transferability, were applied to check for accuracy and the robustness of the data analysis. Various strategies were used to increase the credibility of the data, such as member checks, long-term engagement with the subject and data review by the research team. The reliability of the findings was verified through implementation of measures such as the coding and decoding method during data analysis and documentation of all stages from inception to conclusion. Methods such as sampling with maximum diversity, detailed descriptions of the findings and the participants, sampling, the time and place of data collection, and observer control were implemented. The transferability of the findings was increased by recording all steps and the decisions made during the study and by reviewing and confirming the data analysis report by colleagues .

### Ethical consideration

Participants were provided with key information such as the purpose of study, the interview method, confidentiality of the information, the right to participate or withdraw and the procedure for storing the audio file. Furthermore, verbal informed consent to participate and audio-record the interviews was obtained from the participants (mothers and experts) at the beginning of each interview. A code was assigned to each participant to protect anonymity. In addition, the researcher kept the audio files of the interviews and were not shared with anyone.

### Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

## RESULTS

The characteristics of the study participants are summarised in tables 1 and 2.

### Dimensions and characteristics of the U6CHFN

Analysing the qualitative interview data, the results were categorised into 6 dimensions, 21 subdimensions and 80

Table 2 Demographic characteristics of the experts

| Participant | Expert's age (years) | Expert's sex |
|---|---|---|
| Interview (16) | 33 | Female |
| Interview (17) | 48 | Female |
| Interview (18) | 36 | Male |
| Interview (19) | 62 | Male |
| Interview (20) | 45 | Female |
| Interview (21) | 50 | Female |
| Interview (22) | 38 | Female |
| Interview (23) | 48 | Male |
| Interview (24) | 37 | Female |
| Interview (25) | 43 | Male |
| Interview (26) | 54 | Male |
| Interview (27) | 44 | Male |
| Interview (28) | 45 | Female |
| Interview (29) | 52 | Female |
| Interview (30) | 39 | Male |
| Interview (31) | 41 | Female |

Table 3 Emerging key dimensions and subdimensions of child health-friendly neighbourhoods (from the data)

| Dimensions | Subdimensions |
|---|---|
| Neighbourhood green space | Playground space for children |
| | Ergonomic play equipment |
| | Attractiveness of play equipment |
| | Creativity, art and culture in the park |
| | Comfortable space |
| Neighbourhood cultural centre | Art and creativity |
| | Self-care |
| | Life skills |
| | Citizenship skills |
| Neighbourhood health centre | Child health services |
| | Health education services |
| | Childcare |
| Services in the neighbourhood | Shopping centres and stores |
| | Entertainment and sports centres |
| Transport in the neighbourhood | Ability to use a stroller (easy) |
| | Street and neighbourhood safety |
| | Attractiveness of the traffic route (educational) |
| | Urban furniture (ergonomics) |
| Security in the neighbourhood | Security of educational space |
| | Park security |
| | Neighbourhood security |

characteristics. The six main dimensions included neighbourhood green space, neighbourhood cultural centre, neighbourhood health centre, services in the neighbourhood, transport in the neighbourhood and security in the neighbourhood (table 3).

These six dimensions are explained in detail in the following sections:

### Neighbourhood green space

Many participants believed that the presence of a park is one of the important dimensions of a child-friendly city, provided that the park has 'playground space for children', 'ergonomic play equipment', 'attractive play equipment', 'creativity, art and culture in the park' and 'comfortable space'. They argued that the quantity and quality of these features and their use were unsatisfactory. For example, one of the mothers stated:

> Part of the flooring (of the playground) is torn off, and my child once got his foot stuck on it, and fell down. They are all separated. The cracks are open. It is necessary that the floor of the park is healthy and soft. (Mother, Interview 8)

Another participant mentioned that:

> Currently, playground equipment in many parks is not suitable for children of this age in terms of height. The size of children is small, and it is necessary for them to have play equipment and chairs and benches that are suitable for the size of children. (Child psychologist, Interview 22)

### Neighbourhood cultural centre

Some interviewees believed that there was a need for community centres to offer educational and cultural activities that were age-appropriate, attractive and varied. Many educational topics were suggested, such as 'art and creativity', 'self-care', 'life skills' and 'citizenship skills', both from educational and recreational perspectives. Many families may have limited experience or skills in educating their children, and as a result some argued that self-care education should include protection from sexual assault. Consequently, professionals can significantly contribute to this effort. For example, one of the mothers discussed this point as follows:

> One of the educational points that I think my child needs now is that I don't know what to tell him about sexual issues, and I think it is necessary that a child educator who has studied and has experience in this field should teach him/her how to protect himself/herself from sexual abuse, education based on what they need to know, to be told so that they receive knowledge appropriate for their age. (Mother, Interview 14)

Another participant explained:

> My son reached the age of middle school, and he is afraid to go to the neighborhood and to the city. He is afraid of riding the bus alone, if I was a child, I would have gone to school alone … I think it is necessary to teach them about the urban lifestyle and about commuting within the neighborhoods. From preschool onwards, it is necessary to learn how to cross the street, how to cross the crosswalk and traffic lights, learn how to get on and off the bus, so that later they can use it, they don't have to be afraid anymore. (Urban planning and architecture expert, Interview 23)

### Neighbourhood health centre

From the participants' point of view, the neighbourhood health centre should provide 'child health services', 'health education services' and 'child care'. Many participants were not satisfied with the child health services and health education. For example, one of the mothers said:

> Health centers used to provide much better services for mothers and children, and education during pregnancy and about breastfeeding, but now they just fill in forms and do not provide any education. The health center should be a place to teach mothers how to breastfeed. how to sleep and bath the child, and to give advice and instructions to the father. (Mother, Interview 13)

### Services in the neighbourhood

One of the characteristics of a child-friendly neighbourhood according to the participants was adequate access to children's welfare services in the neighbourhood. They explained that, unfortunately, children's welfare services are usually neglected and therefore need to be addressed. For example, one participant explained:

> My child gets very upset and nervous when he comes to the shopping mall, because it is crowded, and he has to walk in the crowd. If there are baby strollers in all shopping malls, mothers can easily take the child with them, and the children even enjoy it. (Mother, Interview 13)

Several participants had suggestions for the creation of "children's entertainment and sports centers" in the neighborhood. These centres can be, for example, sports centres that have sports and swimming pools for children. For example, one participant pointed out:

> Every neighborhood can have grass playgrounds for children, as well as indoor sports centers, for example, a children's pool and they can play. (Urban planning and architecture expert, Interview 16)

### Transport in the neighbourhood

The participants argued that the sidewalks, streets and generally the environment for transporting children in the neighbourhood should be 'easy to use', 'attractive', 'educational', 'safe' and 'ergonomic'. One of the participating mothers said:

> The most important problem I have is that I can't take my baby out with the stroller, the sidewalks are full of stairs and up and down, you have to constantly lift and move the stroller with its weight, and when you take it on the street, cars honk and drive by at high speed. (Mother, Interview 13)

Another participant explained about the safety of shrubs or trees planted on the streets:

> It is better to plant tall trees in front of houses or low annual flowers and plants. We have had many cases where a child who was crossing the sidewalk, the blade of these shrubs hit him in the face and injured him, or their leaf has got stuck in his clothes. (Public health specialist, Interview 22)

One participant highlighted the need for traffic signs to be ergonomically designed for children under the age of 6:

> It is necessary that the green and safety light for the child and appropriate to the height of the child and the environment be considered from the origin which is the home of each child, to the destination where is a space designed for children, so that both drivers are required to obey the traffic law, and children feel safe from the presence of cars on the street to travel. (Urban planning and architecture expert, Interview 16)

Some participants argued that the frequency of the child's presence in the neighborhood could be increased by improving the "attractiveness of the child's walking route," for example by incorporating vegetation and painted walls. Some other participants argued that the presence of 'child friendly urban furniture' in the neighbourhood space that is based on the height and size of children under 6 years of age can facilitate the child's passage in the neighbourhood as it allows them to rest when needed.

### Security in the neighbourhood

Neighbourhood safety for children is an important dimension of a child health-friendly city that was frequently discussed by the participants. They discussed children's security from strangers and addicts in all areas of the neighborhood, especially in "parks," which are the main neighborhood spaces used by young children. For example, a participant explained:

> Security is very important in educational spaces. In these environments, it is necessary that CCTV [closed-circuit television] is controlled and there is surveillance. This security leads to the reduction of anxiety and stress in the city and neighborhood, the space that has a camera and is monitored creates a sense of security for the presence of the child, and the family can trust that place. (Specialist in urban planning and architecture, Interview 27)

A mother stated:

> I can't allow my daughter to play alone even in front of our door. I have often seen drug addicts going to the street and exchanging drugs. (Mother, Interview 10)

## DISCUSSION

The health of urban populations is directly affected by the ability of the urban environment to support the creation of safe neighbourhoods and healthy behaviours and habits during childhood.[30] Living in cities can expose children to risks and challenges, such as noise and air pollution, sedentary lifestyles, traffic hazards, crime, social isolation and disconnection from nature. However, it can also provide health-promoting resources and opportunities, such as education and healthcare.[30 31]

There is a limited number of studies that have documented the effect of neighbourhoods on children's health.[32 33] For instance, Dondi *et al*'s[34] study demonstrated that exposure to toxic air pollutants during infancy and childhood can affect the growth and development of the respiratory system, nerves, glands and immune system. Furthermore, it has the potential to elevate the likelihood of developing cancer in the future. It is estimated that the

1.7 million fatalities among children under the age of 5 each year are a result of disregard for the health and environmental aspects in cities.[31 32] Therefore, cities should provide a platform to protect children's health based on their needs.[30]

One of the challenges to implementing the concept of a child-friendly city is the difficulty in accurately identifying the needs of children that the city can provide for, given the large scale of the city and with inadequate research.[35] We focused on the smaller scale of the neighbourhoods and consulted with stakeholders, particularly mothers, to gain a more comprehensive understanding of the needs of children living in urban areas. This approach can be considered a strength of our study. The present study investigated the health needs of children that can be addressed by the neighbourhood. The perspectives of three key stakeholders, namely experts, city council staff and mothers, were explored. A qualitative approach was employed to gain a deeper understanding of their experiences and perspectives. Previous studies in this field have mostly taken a quantitative approach.[36–40]

The importance of the local environment in the health of children was underscored by the participants in this study, as indicated in the Results section. The participants suggested specific characteristics for various locations in the community that can support the preservation and promotion of health of children aged 0–6 years. Through data analysis, six dimensions were identified for a child-friendly neighbourhood, which closely resembled the seven dimensions of UNICEF's Child Friendly Cities concept,[41] as presented in table 4. However, a total of 80 child-friendly neighbourhood characteristics were developed, 23 of which were new items compared to the current UNICEF child-friendly city checklist. Some of these newly identified characteristics have been reported by other researchers[27 38 42]. However, there were few characteristics that were not reported in other studies, such as access to mother and child rooms in parks, sexual self-care education in child care facilities and child education centers, mental health screening for children, and child-friendly urban furniture.

Security was a common concern among the participants, particularly among mothers. The discussion on neighbourhood security included parks, educational spaces and the surrounding area. Security has both objective and subjective dimensions. Objectively, it refers to the absence of danger and threats to a child's life.[43] Subjective security, on the other hand, refers to an individual's (here children or mothers) feeling of calmness and intimacy with a space, regardless of whether there is an actual hazard present.[44] According to other studies, children's presence in a neighbourhood may be impacted by the perceived or actual security issues.[44–46] It is crucial to remember that in order to preserve objectivity, subjective assessments must be identified as such.[45] Therefore, it is essential to address the dark and hidden corners of the neighbourhood, provide proper lighting, install security cameras and if possible have security guards in the areas.[46]

Although this study provided rich perspectives on the characteristics of a child health-friendly neighbourhood from three groups of stakeholders, due to lack of time we did not obtain the opinions of fathers and children. It should also be noted that, first, due to the qualitative nature of the study, only the typology of perspectives was provided rather than the prevalence of perspectives among the participants interviewed. In other words, the results cannot indicate what the main problems are that need to be addressed in the neighbourhoods. Also, the needs of children in each neighbourhood may be different. Quantitative research is therefore needed to identify priorities for future action. Due to the complexity, multidimensionality and subjectivity of the dimensions of health in the neighbourhood, we used a qualitative method. However, in order to assess and identify the existing needs of a neighbourhood, quantitative research is needed to evaluate these components so that we can identify the existing gaps for appropriate interventions.

**Table 4** Comparison among the identified domains of a child health-friendly neighbourhood for children under 6 years of age (from the data) and the UNICEF's Child Friendly Cities framework[42]

| Dimensions of U6CHFN | Dimensions of the UNICEF framework |
|---|---|
| Green space | Play and fun |
| Culture centre | Education |
| Health centre | Health and wellness |
| Access to services | Environmental sustainability and living conditions |
| Transport | Participation and citizenship |
| Security | Safety and protection |

U6CHFN, Under 6 Years Child Health-Friendly Neighborhood .

## CONCLUSIONS

The results of this study provide a deeper understanding of the health needs of children under 6 years of age that need to be met in order to provide a child-healthy neighbourhood. Thus, it contributes to further dialogue, research and intervention design to make neighbourhoods a health-supportive environment as recommended by the Ottawa Charter for Health Promotion. We suggest that in designing child-friendly cities and neighbourhoods, it is critical to take a comprehensive approach to the health needs of children of all ages, especially those aged 0–6. This involves providing secure and healthy settings and services in the neighbourhoods, as well as ensuring that natural and manmade infrastructure and services are responsive to children's actual health requirements. To this

end, this study highlighted the importance of access to neighbourhood green space, health services, transportation and security.

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**Contributors** All authors conceived and designed the study. PA was responsible for the interviews. PA and NK-M were responsible for data analysis. PA and NK-M were responsible for the initial draft and editing of the manuscript and approved the manuscript for submission. NK-M and AR revised the manuscript. All authors read and approved the final manuscript. NK-M is responsible for the overall content as the guarantor.

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**Ethics approval** The study was approved by the Ethics Committee at Shahid Beheshti University of Medical Sciences (IR.SBMU.PHNS.REC.1401.002).

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**Data availability statement** The data are not publicly available due to confidentiality of participants and data protection laws with respect to this study.



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## REFERENCES

1 Hine D. Book of the month public health at the crossroads: achievements and prospects. *J R Soc Med* 2004;97:450–1.
2 Public Health at the Crossroads: Achievements and Prospects. 2nd Ed. Cambridge: Cambridge University Press, 2004:303.
3 WHO. The 1st international conference on health promotion, ottawa. 1986. Available: https://www.who.int/teams/health-promotion/enhanced-wellbeing/first-global-conference [Accessed 12 Oct 2022].
4 WHO. The Bangkok Charter for Health Promotion in a Globalized World. Geneva, 2005.
5 Buffel T, Phillipson C, scharf T. Ageing in urban environments: developing 'age-friendly' cities. *Crit Soc Policy* 2012;32:597–617.
6 UNICEF. Child Friendly Cities and Communities Handbook, 2018. Available: https://www.unicef.org/eap/reports/child-friendly-cities-and-communities-handbook [Accessed 19 Oct 2022].
7 UNICEF. Advantage or Paradox? The Challenge for Children and Young People of Growing Up Urban. 2018. Available: https://data.unicef.org/resources/urban-paradox-report/
8 Williams S, Gill T. Designing for Urban Childhoods. Publisher Arup, 2017.
9 Kalache A, Kickbusch I. A Global Strategy for Healthy Ageing. World health; 1997. Available: https://iris.who.int/bitstream/handle/10665/330616/WH-1997-Jul-Aug-p4-5-eng.pdf [Accessed 19 Oct 2022].
10 Vincelot J. Urban95: a global initiative linking early childhood development and the urban field. *Cities & Health* 2019;3:40–5.
11 INEE. Guidelines for Child Friendly Spaces in Emergencies, 2011. Available: https://inee.org/sites/default/files/resources/GEC_GPC_Child_Friendly_Spaces_Guidelines_for_Field_Testing.pdf [Accessed 12 Oct 2022].
12 UNICEF. The State of the World's Children 2012: Children in an Urban World. New York; 2012. Available: https://www.unicef.org/media/89226/file/The%20State%20of%20the%20World%27s%20Children%202012.pdf [Accessed 19 Oct 2022].
13 UNICEF. Children's Rights and Habitat –Working towards Child-Friendly Cities, 2007. Available: https://digitallibrary.un.org/record/233327?v=pdf [Accessed 19 Oct 2022].
14 Greenbaum C. Protection of Children during Armed Political Conflict: A Multidisciplinary Perspective. Publisher Intersentia nv, 2006.
15 Cohen DA, Ashwood JS. Proximity to school and physical activity among middle school girls: the trial of activity for adolescent girls study. *Natl Health Inst* 2014;118:1381–425.
16 Satispi E. Policy development of the child-friendly city: case study of south tangerang city regional government. *5051* 2018;3:105–12.
17 Dehghan Mehrjerdi E. *Child and adolescent friendly city with safety approach, case study: andisheh city 2016, msc thesis*. Islamic Azad University, Yazd Branch, Department of Urban Planning,
18 Thomas G, Thompson G. A Child's Place, 2004. Available: https://lx.iriss.org.uk/sites/default/files/resources/A%20child%27s%20place.pdf [Accessed 29 Feb 2024].
19 Prihantini P, Kurniawati W. Mapping of child friendly parks availability for supporting child friendly city in Semarang. The 3rd geoplanning-international conference on geomatics and planning. *E Environ Sci* 2019;313:012035.
20 Amiri M. A study of conceptual framework of educational rights of child. *J Axiol Educ* 2016;1:196–207.
21 Saridar Masri S. Integrating youth in city planning: developing a participatory tool toward a child-friendly vision of Eastern Wastani – Saida. *Alex Eng J* 2018;57:897–909.
22 Agarwal MK, Sehgal V, Ogra A. Creating a child-friendly environment: an interpretation of children's drawings from planned neighborhood parks of Lucknow City. *Societies (Basel)* 2021;11:80.
23 Gill T. The benefits of children's engagement with nature: a systematic literature review. *Child Youth Environ* 2014;24:10–34.
24 Yao S, Xiaoyan L. Exploration on ways of research and construction of chinese child-friendly city---- a case study of changsha. *Procedia Eng* 2017;198:699–706.
25 Wilhelmsen T, Øvreås S, Roll-Hansen H, *et al*. Developing child-friendly cities: young children's participation in urban planning. *J Child Edu Soc* 2023;4:274–90.
26 Namazi A, Rafiey H. A systematic review of studies on the factors affecting the quality of life in the general population of Iran. *J Health Lit* 2021;14:17–30.
27 UNICEF. 12 Cities Piloted for Child Friendly Cities Initiative in Iran, 2020. Available: https://www.unicef.org/iran/en/press-releases/12-cities-piloted-child-friendly-cities-initiative-iran [Accessed 29 Feb 2024].
28 Selvi AF. Qualitative Content Analysis. The Routledge Handbook of Research Methods in Appliedlinguistics. 2019. Available: https://www.taylorfrancis.com/chapters/edit/10.4324/97 80367824471-37/qualitative-content-analysis-ali-fuad-selvi
29 Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today* 2004;24:105–12.
30 Yang Y, Shi L, Jin X, *et al*. Association of perinatal factors with suspected developmental delay in urban children aged 1-36 months - a large-scale cross-sectional study in China. *BMC Pediatr* 2023;23:11.
31 Zhang Y, Kang L, Zhao J, *et al*. Assessing the inequality of early child development in China - a population-based study. *Lancet Reg Health - West Pac* 2021;14:100221.
32 Mvoundza Ndjindji O, Minto'o Rogombe S, Mougola Bissiengou P, *et al*. Allergen sensitization and polysensitization pattern of adults and children in an urban Sub-Saharan African setting (Libreville, Gabon). *J Allergy Clin Immunol Glob* 2023;2:23–9.
33 Cai K, Li C. Street dust heavy metal pollution source apportionment and sustainable management in a typical city-Shijiazhuang, China. *Int J Environ Res Public Health* 2019;16:2625.
34 Dondi A, Carbone C, Manieri E, *et al*. Outdoor air pollution and childhood respiratory disease: the role of oxidative stress. *Int J Mol Sci* 2023;24:4345.

35 Bechtel RB, churchman A. Handbook of environmental psychology, 2014. Available: https://www.wiley.com/en-jp/Handbook+of+Environmental+Psychology-p-9780471405948 [Accessed 19 Oct 2022].
36 UNICEF. Children's Rights and Habitat: Working towards Child-Friendly Cities, 2007. Available: https://digitallibrary.un.org/record/233327?v=pdf [Accessed 19 Oct 2022].
37 Wang D, Choi J-K, Shin J. Long-term neighborhood effects on adolescent outcomes: mediated through adverse childhood experiences and parenting stress. *J Youth Adolesc* 2020;49:2160–73.
38 Kharazmi O, Zarghani H, Johari L, *et al*. Evaluating potential of mashhad in converting into child friendly city with an emphasis on playgrounds and green spaces -child health. *Env Health Eng Manage* 2018;5:57–60.
39 Carroll P, Witten K, Kearns R, *et al*. Kids in the city: children's use and experiences of urban neighbourhoods in Auckland, New Zealand. *J Urban Des* 2015;20:417–36.
40 Mohamed DA. An investigation of al-ahsa city in terms of quality standards and principles of child-friendly cities: a critical analysis. *qas* 2023;25.
41 Moayedfar S, Safaei F. Planning a child-friendly city in order to promote adolescent participation (case study: Abadeh city). *J Desert Geogr Explor* 2019;7:247–87.
42 Child Friendly Cities Initiative (CFCI): Self-Assessment Tool for Local Authorities, Available: https://www-unicef-org.translate.goog/greece/en/documents/child-friendly-cities-initiative-cfci-self-assessment-tool-local-authorities [Accessed 19 Oct 2022].
43 Building Better Cities with Young Children & Families. Bernard Van Leer Foundation, 2017. Available: https://bernardvanleer.org/app/uploads/2017/10/BvLF-8-80-Cities-Report-Final.pdf [Accessed 29 Feb 2024].
44 Lucchesi ST, Larranaga AM, Ochoa JAA, *et al*. The role of security and walkability in subjective wellbeing: a multigroup analysis among different age cohorts. *Research in Transportation Business & Management* 2021;40:100559.
45 Daneshvar Anbaran F, Alizadeh K, Jafari H. The role of security in the presence of children in public spaces of Shandiz City. *PyR* 2021;9.
46 Lotfi S. A study of the feeling of security in public spaces (Case study of Shiraz metropolis). *J Urban Plann Res* 2014;5:23–45.