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## The application of urban health equity assessment and response tool (Urban HEART) in Tehran; concepts and framework

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### Abstract

**Background:** Inequalities in health are ever increasing among different communities of either affluent or disadvantaged especially in urban areas. To identify and address inequalities in health and its determinants among societies, urban health equity assessment and response tool (Urban HEART) in four 'policy domains' related to social determinants of health, has been developed by WHO Kobe Centre (WKC) and piloted in several countries. The tool was extended to six policy domains in Tehran and the number of indicators was doubled. This paper describes the concept of Urban HEART, its development, study protocol and pilot implementation in Tehran.

**Methods/Design:** Sixty five indicators in 6 domains related to inequalities in health and social determinants of health (SDH) namely 'physical and infrastructure', 'human and social', 'economic', 'governance', 'health', and 'nutrition', were developed and approved in an international workshop held in Tehran in April 2008. A comprehensive questionnaire with 12 sections was developed to be administered in a large population based survey in Tehran.

**Discussion:** This is the first report of urban health equity assessment and response tool (Urban HEART) project which was conducted in Tehran. Year 2010 has been devoted to 'Urbanisation and Health' by the World Health Organisation, when 1000 cities are supposed to join a global plan to raise health in the urban areas. The Urban HEART project is supposed to play an important role henceforth.

**Keywords:** health inequality, urban HEART, social determinants of health

### Background

Studies over the past decades have consistently shown inequalities in health status among socioeconomic groups, gender, ethnici-

ty, geographical area and other measures associated with social determinates, which influence health notoriously[1-3]. Social determinants such as occupation, education, life style, basic amenities, house overcrowding and in

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general terms, economic circumstances affect the health of the population in different generations over decades[4]. Inequalities may even adversely affect health status as shown in animal models[5]. Income inequality has been shown to correlate with health status in different countries[6].

Talking about 'health inequality' in public health implicitly denotes 'socioeconomic inequality in health'[7]. The distinction between 'inequity' and 'inequality' in health is rather a philosophic dilemma (theories of 'justice' and 'society')[8]. To acknowledge the importance of striving for equity -in particular health equity-, it is necessary to know how extensive are the differentials in health and its determinants found in the Globe today. In every part of the world, and in every type of political and social system, differences in health have been noted between different social groups in the population and between different geographical areas in the same country[9].

There is consistent evidence that disadvantaged groups have poorer survival chances, dying at a younger age than more favoured groups. For example, a child born to professional parents in the United Kingdom, can expect to live over 5 years longer than a child born into an unskilled manual household.[10] According to the final report by the Commission on Social Determinants of Health (CSDH), in Japan or Sweden people can expect to live more than 80 years; Brazil, 72 years; India, 63 years; and in one of several African countries, fewer than 50 years. And within countries, the differences in life chances are dramatic and are seen worldwide[11]. In France, the life expectancy of a 35 year old university lecturer is 9 years more than that of an unskilled manual worker of the same age[12]. In Hungary, the Budapest Mortality Study found that males living in the most depressed neighbourhoods had a life expectancy of about 4 years less than the national average, and 5 years less than those living in the most fashionable residential district[13]. In

Spain, twice as many babies die among families of rural workers as among those of professionals[12]. In Iran, infant mortality rate in poor provinces was 2.34 times more than affluent areas in 2005 [14].

The way in which health inequality has customarily been documented is by comparing differences in the average health across groups, for example, by sex or gender, income, education, occupation, or geographic region. In the controversial World Health Report 2000[15, 16], researchers at the World Health Organization criticized this traditional practice and proposed to measure health inequality across individuals irrespective of individuals' group affiliation [17].

Large gaps in mortality can also be seen between urban and rural populations and between different regions in the same country. For example, infant mortality rates in the USSR in 1987 were over 21/1000 live births in urban areas, compared with over 31/1000 live births in rural areas[18]. The Commission on Social Determinants of Health (CSDH) calls for 'closing the health gaps in a generation', in its final report in 2008[11].

Reducing such health inequalities have been the main objective of health development efforts, including global targets such as the Millennium Development Goals (MDG), which require monitoring to evaluate progress towards achieving set targets.

Megacities may have been at higher risks for air pollution, road accidents, environmental hazards preservation, poverty, social isolation, physical inactivity, increased psychological stress, etc. Tehran city works hard to establish several mechanisms in order to achieve the goal to become an equitable mega-city in 20 years-time through proactive participation of its people to make the city a sustainable place to live.

#### *Urban-HEART*

Employing a recently developed tool to assess the gaps in health status of urban population and its determinants named Urban Health

Equity Assessment and Response Tool (Urban-HEART) that is developed by the WHO Centre for Health Development located in Kobe, Japan (WKC) may provide a contemporary example for inequality reduction efforts in urban areas. [19] 'Health Equity Assessment and Response Tool' helps countries and districts to systematically generate evidence to assess and respond to unfair health conditions and inequity in urban settings. It also stimulates city-to-city learning and sharing experiences among the countries and across regions.

An improved model in Tehran incorporates six domains of infrastructure, social and humanity development, economic, governance, health and nutrition. Most of these indicators are for the first time ever have been monitored in an urban area in such a large population-based survey taken based on mental health, social capital, quality of life, smoking, violence, disabilities, Fair Financial Contribution Index, calorie deprivation, transparency, citizen satisfaction, and social contribution.

#### *Goals of Urban HEART*

The 'Urban Health Equity Assessment and Response Tool' seeks to provide policy and decision makers at national and local levels, to:

1. Identify the differences between the health, health determinants and well being of people living in disadvantaged urban areas and the general population.
2. Determine appropriate, feasible, acceptable, and cost-effective strategies, interven-

tions and actions which should be used to reduce gaps between people living in the same city.

Employing Urban HEART may have several bi-products for different parties such as determining a unique index to measure inequities for policy makers, identifying current gaps and relationship to other indices for public health practitioners, and empowering interested parties whether community-based organisations, state or councils at localities, or ordinary inhabitants.

#### *How does the Urban HEART assess inequality?*

Urban HEART is rather a strategic approach to define and track equity and health equity in urban settings. The Urban HEART has a "health equity" assessment component to measure the "equity", and a "response" component that encourage urban local governments to employ the best approaches to fill the existing gaps.

The former component assists the authorities in cities to conduct a systematic assessment of unfair health conditions in the urban setting. To do this, it stimulates people to think about the equity aspect of indicators.

For ease of analysis, the tool suggests reviewing evidence within these four major policy domains:

1. Physical environment and infrastructure
2. Social and human development
3. Economics
4. Governance

- |   |
|---|
| <ul style="list-style-type: none"><li>• Improved health and social status of people living in urban poor/ disadvantage areas</li><li>• Stimulating communities mobilized to promote health -and its equity determinants</li><li>• Acknowledgement of the importance of the social determinants of health (SDH) in health equity</li><li>• Promotion of inter-sectoral action to reduce inequity in health and development at the city level</li><li>• Appreciate comparable equity data &amp; analysis</li><li>• Priority interventions/actions/ response planned and implemented</li></ul> |
|---|

Box 1. Expected achievements of Urban HEART

1. Physical and infra-structure.
2. Human and social development.
3. Economic.
4. Governance.
5. Health.
6. Nutrition.

Box 2: The six urban-HEART policy domains in Tehran model

These policy domains were extended to six domains in Tehran model; see below.

The health equity component also has a monitor and a matrix that enables policy and decision makers to assess health indicators (e.g. percentage of households with access to safe water) in such a way that a quick comparison can be made between the city and country (and ultimately global or international standards) and the extent of difference between disadvantaged city areas, the rest of the city and the country average. This process highlights and emphasizes the value of using evidence in decision making.

**Methods/Design**

*Establishment of Urban HEART team*

In October 2007 WHO country office offered the Urban HEART to Tehran Municipality and

working groups to subsequently organize in all four policy domains so could they compromise on the best indicators appropriate for equity assessment in Tehran alongside 4 the other pilot cities in the world. Sixty five indicators in 6 domains namely 'physical and infrastructure', 'human and social', 'economic', 'governance', 'health', and 'nutrition', were developed (Fig.1).

*Urban HEART workshop in Tehran*

In April 2008, Tehran welcomed delegates from Urban HEART pilot sites, WHO Centre for Health Development, located in Kobe Japan and WHO Office for Eastern Mediterranean Region (EMRO) to discuss and agree on the framework and to finalise the indicators. Delegates from India, Philippines, Zambia and Brazil attended the meeting. All pilot sites presented their works regarding the indicators used in their own countries to investigate inequalities in health.

Tehran team also presented its indicators, which was appreciated by the participants. The indicators are summarised in figure-2.

The main outcomes of Tehran workshop were: (a) orientation of all pilot countries with concept and methodology for implementation of Urban HEART (b) agreement on a set of indi-

<p><b>Physical and infra-structure</b></p> <ol style="list-style-type: none"> <li>1. Healthy water</li> <li>2. Accidents and injuries (5 indicators)</li> <li>3. Air pollution</li> <li>4. Noise nuisance</li> <li>5. Access to public transport</li> <li>6. Solid waste management</li> <li>7. Health centre utilisation</li> </ol>	<p><b>Human and social development</b></p> <ol style="list-style-type: none"> <li>1. Education: NER/ GER/ primary school completion/ Higher education (5 indices)</li> <li>2. Violence: domestic, street</li> <li>3. Smoking/ addiction</li> <li>4. Smoke-free places</li> <li>5. Mental health</li> <li>6. Social capital</li> </ol>	<p><b>Health</b></p> <ol style="list-style-type: none"> <li>1. Safe delivery</li> <li>2. Vaccination</li> <li>3. Teenage pregnancy</li> <li>4. Breastfeeding (excl &amp; 24m)</li> <li>5. IMR/ U5MR/ MMR</li> <li>6. HRQL</li> <li>7. Disability</li> </ol>
<p><b>Economic development</b></p> <ol style="list-style-type: none"> <li>1. Employment</li> <li>2. Residency in normal home/ Person/ room</li> <li>3. Fair Financial Contribution Index (FFCI)</li> <li>4. Household costs</li> <li>5. Absolute/ Relative poverty</li> <li>6. Social Welfare Index</li> <li>7. Human Development Index</li> </ol>	<p><b>Governance (Municipality)</b></p> <ol style="list-style-type: none"> <li>1. Annual reports</li> <li>2. Contracts transparency</li> <li>3. Satisfaction</li> <li>4. Responsiveness (Hot Lines)</li> <li>5. Community participation (local elections)</li> <li>6. Lawfulness</li> <li>7. Standard activities</li> </ol>	<p><b>Nutrition</b></p> <ol style="list-style-type: none"> <li>1. Calorie poverty</li> <li>2. Wasting</li> <li>3. Stunting</li> <li>4. LBW (IUGR/ NMR)</li> <li>5. BMI: obesity</li> <li>6. Food diary</li> <li>7. Food costs</li> <li>8. Cereal costs</li> </ol>

Fig. 1. Urban heart indicators in Tehran model



cators which proposed by each pilot countries; (c) developed a draft Plan of Action for introduction of Urban HEART. At the meantime, Tehran model with six policy domains and extended number of indicators was conceded.

*Establishment of Steering Committee:*

An inclusive steering committee chaired by the Deputy Mayor Tehran was established to decide upon all aspects of the pilot study, including the content of the questionnaire, timetables, co-ordination with relevant organisations such as police, official bureaus in different districts, district municipalities, investigation organisation, etc. The steering committee held its official meetings regularly before and after the pilot study to monitor and evaluate the process.

*Development of the tool*

Available sources of information at international, national and local levels were reviewed to determine the appropriate approaches for data collection for all 65 indicators. A Technical Advisory Committee (TAC) was set up to determine which data collection approach was appropriate for the next steps. TAC considered all available tools in the six policy domains. According to the documents reviewed in the working groups and TAC, some indicators were selected to be investigated through a main survey

(see below). Then various questionnaires to assess relevant indicators either generated by experts or previously validated, were suggested by working groups.

Among extremely extended, large and diverse tools, some were found un-validated, inappropriate, unfeasible or redundant. A comprehensive questionnaire, therefore, was developed by TAC so as to collect data for 42 indicators in 13 sections. TAC approach to reach to such an agreement with different parties including working groups and relevant organisations, was quite prolonged and complicated. To do this, each indicator was discussed in separate meetings inviting relevant experts from different units. Finally the Urban HEART questionnaire was developed which consisted of 12 sections as following:

A specific questionnaire to assess 'social capital' was added to the main tool, after pilot study. The social capital questionnaire had been employed in a couple of surveys at national and local levels prior to Urban HEART main survey.

*Psychometric properties of the tool*

The questionnaire was reviewed by experts and 'face' and 'content' validity of the tool established by the panel of national experts from various organisations. Advice from international experts was sought where required (e.g. in accidents and injuries, economic, and vaccination

- 1- House identification
- 2- General particulars of all family members
- 3- Home facilities and assets
- 4- Health, vaccinations and death status within the family
- 5- Accidents and injuries
- 6- Domestic violence
- 7- Disabilities
- 8- Responsiveness, satisfaction (with municipality activities)
- 9- Household costs
- 10- Smoking and addiction status
- 11- Mental health status (GHQ)
- 12- Health-Related Quality of Life (SF-12)

Box 3. Components of urban HEART questionnaire- Tehran model

Table 1. Socioeconomic indicators in selected districts in Tehran, 2009

District No.	Home owner (%)	Home area (mean in meters)	Time taken to reach public transport (in minutes)	Freezer ownership (%)	Cell phone ownership (%)	Car ownership (%)	Access to clean water (%)
3	62	131.1	12.4	90	82	48	100
5	72	86.9	9.8	84	94	64	100
8	60	88.28	12.2	90	74	40	100
12	66	85.02	9.6	78	80	36	100
20	62	90.54	12	54	64	26	100
Average	64.40	96.37	11.2	79.20	78.80	42.80	100
P value	0.23	0.002	0.01	<0.001	0.005	0.001	Ns

As shown in table-1, significant differences exist in most of physical and infra-structure indicators. Affluent districts (3&5) have better situation compared to disadvantaged areas (12&20).

sections). However, the validity and reliability required to be examined through the pilot study.

Psychometric properties of two parts of the tool, which were General Health Questionnaire (GHQ-28)[20-23] and Short Form-12 (SF-12) [24-28] as two well known globally administered questionnaires were established in hundreds of studies worldwide and in Islamic Republic of Iran. Therefore, there was no need to re-establish the psychometric properties of these two questionnaires. The social capital questionnaire, which was added to the tool after the pilot study, composed of four components, which measures "trust", "collective activities", "voluntary help", "unity", and "values". The internal consistence of all components was quite high, ranging from 0.86-0.96, which will be discussed elsewhere.

The first two sections of the tool were adopted from routine questionnaires which usually administered nationally within the census and other national surveys; therefore the validity and reliability were already put in place. The third part referred to the home assets, which was mainly adopted from other globally used tools such as World Health Survey [29, 30].

#### *Surveyor training*

A two-day workshop was organized to train

40 surveyors to ensure that they know how to communicate with the families and encourage them to participate in survey, and also identifying their capability to understand variable definitions, questionnaire instructions, sample finding, managing non-response cases, daily report and field supervision, and all details required for conducting the survey.

Each section was discussed by the relevant institute and high ranked experts to ensure the quality of knowledge transfer. After each lecture by the relevant expert, surveyors discussed the questions and related probable problems around the indices during separate working groups including role playing. Facilitators and lecturers were supervised and moderated the working groups discussions.

#### *Method of administration*

The main body of the questionnaire was questioned from the head of the family. In the absence of head of the household, the spouse or another adult member of the family was invited to answer the questions. The remaining two interviewed sections i.e. General Health Questionnaire (GHQ-28, for mental health), and Short Form (SF-12, for health-related quality of life) were interview administered to an available member of the household. Surveyors

Table 2. Health and determinants indicators in selected districts in Tehran, 2009

District No.	Children under 3 years of age (%)	Giving birth in last year (%)	Healthy delivery (%)	Suspected mental disorder (%)	Disability (%)	Unemployment rate (%)	Illiteracy rate (%)	Domestic violence (%)
3	0	0		28	4	20.69	0.03	0.04
5	6	0		37	2	11.67	0.03	0.12
8	10	4	100	36	2	10.53	0.06	0.1
12	6	6	100	46.20	10	20	0.07	0.12
20	4	2	100	51.10	8	37.08	0.12	0.18
Average	5.20	2.40	100	40	5.20	20.94	0.06	0.112

asked a member of the family (18 years or above) in both gender to fill both GHQ and SF-12 tools preferably by interview, however, due to cultural sensitivity and also to reduce the time required for investigation, the surveyors were instructed not to persist on interview if there was a willingness for self completion of the questionnaire. In case of illiteracy, disability or willingness of the respondent, the tools interviewed were interview administered to the households.

The pilot study lasted for two days. Two hundred and fifty questionnaires were completed by households in 5 selected districts of Tehran.

#### *Supervision and Monitoring*

There were two main monitoring systems to guarantee proper implementation of the survey. Every two surveyors had a mentor to ensure proper field work, and each district had a high ranked supervisor among academia to observe all relevant activities within the district and check the quality of sampling, data collection, communication with families, and complying with standards. Mentors were experienced in various national field surveys including the last census took place in 2006. Field investigators were asked to refer any problem during the survey to their mentors and supervisors using their own cell phones for such purpose.

District supervisors (university academic members) were also encouraged to follow-up

their assigned field closely to feedback the investigators and also to homogenise and consistent the survey. Any comments about the instructions and questionnaire, either from investigators or supervisors were appreciated to make necessary amendments after the survey. A steering committee chaired by the principal investigator of the project was responsible for any guideline and direction for the whole survey.

#### *Process evaluation*

Technical groups were also responsible for evaluation of the process and outcome of data collection and analysis. By completion of data analysis within the technical groups, a two days workshop was organised to discuss the quality of data collection and analysis.

In this workshop, each question was reviewed to determine whether it is necessary to be placed in the questionnaire, its understandability, relevance with other questions, avoiding redundancy, etc.

#### *Pilot study*

In late June 2008, fifty families from 5 selected districts of Tehran, totally 250 households in totals were stratified randomly selected using GIS data of Tehran to test the questionnaire. The tool was understandable to respondents and took around 25 minutes. Results indicated understandability of the tool in one hand and on the other hand disparities in different indices.



Amendments were considered for the questionnaire based on expert group comments and feedbacks by respondents.

#### *Sample selection*

Five districts were chosen to demonstrate the highest differences. According to available data in the Municipality, we proposed districts 12 and 20 as the most disadvantaged areas and district 3 as the most affluent. Districts 5 and 8 were selected as middle class zones. Sample size for pilot testing of the tool was 50 households in each 5 districts, which made the total sample as 250 households.

Using GIS maps and a software to select random numbers, blocks were randomly identified to be included in the survey. We required eight households in each block according to an eight-box table, which stands for four age groups (15-24, 25-44, 45-64, and over 65 years) for both sex. Employing a standard sample finding in population surveys, investigators started sample finding in each block by counting all houses first (by counting rings and excluding business places, and vacant houses/ flats), and then the total house numbers were divided by eight to reach the 'gap number'. Following this, the investigator had to start the sample finding from the far right hand side using a random number, and then skipping the 'gap number' so as to find the second house. No substitution was permitted to ensure the randomisation.

#### *Data entry and processing*

Data were entered into a software package specifically designed and developed for this survey in Squell. Several outputs into SPSS, Excel, and Access were accomplished. Data analysed by SPSS v.15 and discussed by various technical groups to ascertain the concurrent validity, reliability, and comparability with other available data at local and national levels.

#### *Lessons learnt from the pilot*

Problems raised during the two-day pilot sur-

vey were as follows:

- 1- Case finding and sample selection, including:
  - a. Case finding according to the instructions
  - b. Evacuated and abandoned houses
  - c. Temporary left houses due to residents travelling
- 2- Communication with families and discussing the importance of the project to encourage their cooperation
- 3- Survey instructions; mainly in
  - a. section two (General Particulars of the Family Members),
  - b. section four (Health: giving birth, breast feeding, vaccination)
  - c. section nine (GHQ)
  - d. section ten (economic questions)
- 4- Necessary amendment made in some sections especially in occupation, insurance coverage, disability, accidents, smoking, violence etc. These sections were then revised in a workshop immediately organised after the pilot study.

#### *Examples of findings from the pilot study*

Two hundred and fifty questionnaires were completed in interview administered survey and returned to the survey office. Since no missing data were allowed in the survey instructions, all questionnaires were completed carefully in interviews. Examples of the results are demonstrated in Tables-1&2.

#### *Sample size for the main survey*

Following the pilot study, the statistic expert group analysed the data and based their analysis on indicators with the highest variability such as 'owning car and freezer', 'literacy', 'health insurance coverage', and 'area per capita'. Using sample size formula:

$$n = \frac{z^2 p(1-p)}{d^2}$$

The number of households required in each district was calculated as 880 augmented with a

10% correction, which resulted in 960 households per district and 21120 households in Tehran totally. The Greater Tehran has 22 districts, which were considered as 22 strata and each household was considered as a unit.. We used stratified (to all 22 districts) two-dimensional systematic sampling to avoid internal cluster correlation.

### Discussion

This is the first report of Urban Health Equity Assessment and Response Tool (Urban HEART) project which was conducted in Tehran, the capital of Iran along with two other megacities (Sao Paolo and Manila), which were selected to pilot test of this project. Data from different parts of this project will be published gradually. The focus of this paper was to describe the conceptual framework, study protocol, the tool, its development process and findings from a small scale test prior to the main Urban HEART survey in Tehran.

Urban HEART, which is based on social determinants of health (SDH) approach, has been developed to respond the increasing demand of urban health, due to rapid urbanization worldwide, ever expanding the health gap between advantaged and poor quintiles, emerging feature of non-communicable diseases, and insufficient attention to development of health system in urban and suburbs, particularly in developing countries. According to the local experience in Iran, i.e. development of successive five-year plans after the Islamic Revolution, MDG indices, the information system in Iranian Primary Health Care Network [31], and the 25-year perspective plan -which has been recently endorsed by all levels of decision makers in the country-, the original indicators suggested by WKC [19] were adopted to the local situation and extended to cover all determinants of health in 65 indicators.

The main threats to this approach which involves large population based survey might be sustainability over time and the cost. Not all

megacities can afford and support this type of community based survey on more than 22000 households. Nevertheless, routine data are rather incomplete, low quality, which may not satisfy researchers and policy makers' real needs to reduce health inequalities among the population. [32-34] A moderate approach could be developed gradually by strengthening the routine data collection system and expanding it to meet the necessary requirements, though collecting some types of data such as mental health, health related quality of life and social capital which are self administered, are inevitable. These data may be collected in rather longer periods.

Establishment of 'equity in health' passes through demonstrating 'health inequalities', that is differences in health and its determinants among localities and social groups. Urban HEART has chosen this approach to illustrate the health gaps between cities/ localities, which was proven to be effective in our experience alongside previous studies.[34] We believe that displaying differences between localities will raise sufficient awareness and commitment in various levels of power hierarchy to respond to health inequalities and direct resources to reduce the gaps.

The questionnaire overall sounds understandable, valid and easy to use. It was improved substantially using interviewees, interviewers, supervisors and other experts' comments after the pilot study, to be used in the main survey. Most of the questionnaire sections were developed for the first time, such as vaccination, economic, accidents and injuries, disabilities, violence, employment, insurance, and social capital. Including all these in one survey enabled us to compare several determinants of health at the same time.

As mentioned before, the Urban HEART project has two major parts, which are 'assessment' and 'response'. [19] All we have done - which reported here and in several papers hereafter- was about 'equity (or inequality) assess-

ment'; much more should be done about response. The 'response' part -in our view- may be incorporated in four types, independently or in parallel. The first so called 'evidence based policy making', which is in the level of the Parliament, City Council, or the Government, to endorse relevant acts, regulations etc. to respond the health and its determinants gaps. The second is called 'evidence based practice' by the local authorities to perform in response to the gaps in their local areas. Third is 'inter-sectoral collaboration' specifically for those activities beyond health sector to alleviate health determinants inequalities co-ordinately. And the last could be carried out by the communities and non-government organisation in the form of 'community based initiatives (CBI)'.

Year 2010 has been devoted to 'Urbanisation and Health' by the World Health Organisation, [35] when 1000 cities are supposed to join a global plan to raise health in urban areas. The Urban HEART project is supposed to play an important role henceforth.

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