



# Primary development and validation of a quantitative health policy impact assessment tool (HEPIAT): The case of Iranian targeted subsidy plan

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## Abstract

**Background:** As a primary phase of a Health Impact Assessment (HIA) on the Iranian Targeted Subsidy Plan (TSP), this study was conducted to assess the psychometric properties of a newly developed quantitative Health Policy Impact Assessment Tool (HEPIAT).

**Methods:** In 2014, multistage cluster sampling was employed to recruit 509 key informants in Sanandaj, Iran, to participate in this cross-sectional study. A comprehensive literature review was conducted to develop the initial draft of HEPIAT. Content validity was determined by a consensus panel of experts, and construct validity and factor structure of the HEPIAT were assessed using Exploratory Factor Analysis (EFA). Reliability was assessed utilizing the Cronbach's alpha coefficient and the test-retest reliability coefficient.

**Results:** Applying EFA, the optimal solution including 35 items and 6 factors was emerged, which accounted for 64.94% of the total variance. The mean items' relevancy, clarity, simplicity, and their total mean±SD score were 88.3±0.2, 90.1±0.5, 86.1±0.7, and 89.6±0.4, respectively. The scores of intra-class correlation coefficients (ICC) and internal consistency reliability for all the factors were ranged from 0.67 to 0.89. HEPIAT demonstrated an appropriate validity, reliability, functionality, and simplicity.

**Conclusion:** Although further works in different settings are warranted, HEPIAT may be a practical and useful quantitative instrument in socioeconomic-related HIAs aimed to inform policymakers and stakeholders on the health impacts of their decisions and plans.

**Keywords:** Health impact assessment, Targeted subsidy plan, Instrumentation, Health determinants, Healthy public policy

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## Introduction

World Health Organization (WHO) defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (1). According to the broad definition of health, a wide range of economic, social, behavioral, environmental, and biological factors influence the health of communities (2). Also, in recent two decades, there is an increasing knowledge on the effects of social design and social and environmental factors on the health of people (3-6). An important aspect of such social and economic factors in-

fluencing community health is policies and plans adopted and implemented in different communities by decision makers, stakeholders and policymakers.

Unfortunately, in the most of plans and policies, there is a neglect on the impacts of community health which, in many cases, results in irreversible problems for public health. In other words, there is a need for investigating the impact(s) of policies, plans and measures, outside from the health sector, on public health. Such investigations may help in maximizing the opportunities for com-

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### ↑What is “already known” in this topic:

There is a need for investigating the impact(s) of policies, plans, and measures, outside from the health sector, on public health. Health Impact Assessment (HIA) is a tool that may address this need. In order to assess the potential impact(s) of socioeconomic policies on health and its determinants, standard and accurate instruments are needed.

### →What this article adds:

This study reported the psychometric properties of Health Policy Impact Assessment Tool (HEPIAT) designed for conducting HIA of socioeconomic policies. HEPIAT may help health researchers and policymakers in assessing the impacts of a policy or plan on human health and its determinants.

munity health promotion and maintenance. Health Impact Assessment (HIA) is a tool that may address this need.

According to the WHO, HIA is “a combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population” (7). HIA is a mean that helps planners and decision-makers to understand the consequents of their decisions on community health (8). It, also, provides a mechanism for cooperation between different systems and sectors to remove the gap between research, policy-making, and administration of health-related policies, programs, and projects (9). Then, HIA bridge the gap between public health and environmental policymaking (10) and may be considered as a means for assessing the potential impacts, both positive and negative, of such policies and programs on health (11).

Preventing the prevalence of poverty and social crises may be noted as one of the most important objectives while planning socio-economic projects in the governments, especially in developing countries like Iran. Such efforts aim to establish social equality in the society, even at the cost of losing some parts of the economic efficiency (12). Nonetheless, it is necessary to assess the extent to which the socio-economic plans, projects and policies may improve health and its social determinants and, also, social equality in a society. In a literature review, few studies were found on the development of instruments aiming to assess the potential outcomes of such policies. Nadrian et al., in a study reported the development and psychometric properties of an instrument designed to assess the impacts of urban traffic on social determinants of health and wellbeing in an urban area in Iran (13). As a reason for such scarceness in the number of HIA related trustworthy instruments, they noted the novelty of HIA which has not, yet, been well introduced as a significant public health method nor an instrument for socially responsible policy and practice (14). WHO emphasizes on conducting HIA on all policies, decisions, projects and measures implemented in all countries to determine their impacts on health and, thereby, take timely necessary actions to reduce the possible negative impacts on public health. However, HIA has, so far, been remained unknown in the most of developing countries. In Iran, HIA has not only been conducted on no policy or project, but also no primordial study has been performed on preparing the prerequisites of such investigations.

In order to refine the economic structure of the country, the ninth government in Iran designed a comprehensive plan called Economic Revolution Plan within which the most important project was the Targeted Subsidies Plan (TSP) approved by the government in 2010. This project was directly associated with the Iranian people life throughout the country. TSP may be defined as a direct or indirect payment of financial aid, economic franchising or a specific excellence to households, nongovernmental and governmental organizations in order to achieve a series of predefined goals (12).

The question that confined the minds of the researchers in the present study was to what extent TSP have had im-

pacts, positive or negative, on the health of Iranian residents, and, also, what strategies may be suggested to decrease the possible negative and increase the possible positive impacts of this project on the Iranians public health. Therefore, applying the Merseyside Model (15) a retrospective HIA study with a mixed method approach was designed to assess the impacts of TSP on the Iranian residents' health and its determinants.

To start the quantitative phase, there was a need for a valid and reliable instrument to assess the impacts of TSP. A reliable and validated instrument related to a specific subject is a prerequisite to study the subject and gather any required information with the highest accuracy and the least mistakes (16). Accordingly, in order to answer the question that a given socioeconomic policy or plan may have potential impact(s) on what domain of populations' health and its determinants, standard and accurate instruments are needed. This paper studies the psychometric properties of Health Policy Impact Assessment Tool (HEPIAT) designed for the quantitative phase of the study. Such instruments may help investigators in assessing current situation, precisely, aiming to suggest the best recommendations to improve the impacts of a policy or plan on human health and its determinants.

## Methods

### Participants

In this cross-sectional study, multi-stage cluster sampling was employed to recruit 520 key informants into the study, in Sanandaj, Iran, from June to September 2014, to participate in the study. The proportion of 10 samples per item (17) was considered to be appropriate for estimation of sample size in the present study. The key informants included school teachers, faculty members, health care providers and employees in different organizations including economy and finance, agriculture, banks as well as welfare and social security. Eleven key informants refused to participate in the study (response rate: 97.8%). The inclusion criteria for the organizational employees was being, at least, Bachelor of Science in a field of study and being the instant resident in Sanandaj for at least the previous 10 years. The diversity in the selected key informants ensured a broad representation of the target population. In this study, 20 schools (8 elementary, 5 guidance, 7 high schools), 5 universities, 15 health care centers, and 4 organizations were randomly selected. Clusters were sampled with likelihood proportional to the target population coverage (i.e., the higher coverage of the institution/organization, the higher recruitment). In total, 201 teachers, 52 faculty members, 151 health care providers and 100 employees participated in the study. Informed consent forms were completed and signed by all respondents.

### Ethical Approval

Ethical approval for the study was provided from the ethical committee of Islamic Azad University, Sanandaj Branch (Ethical Code: 92/3/2618).

### Instrumentation

Designing a new instrument may be conducted with qualitative research, literature review, and/or selecting items from available instruments or a mixture of these methods (18). HEPIAT development started with a comprehensive review of the existing literature (1, 4, 12, 13, 15, 19-29). The Merseyside Guidelines for HIA (15) was employed as a base to provide the instrument. Considering the novelty of the research topic, no similar instrument was found in the literature; so, it was focused on the studies investigated policy and economic related determinants of health and HIAs of political and economic plans (24-28).

Then, the abovementioned items along with the statements related to sociopolitical and economical plans as well as the determinants of health extracted from the literature. These original items and statements were translated into Persian by two native Persian translators and, the primary design of the questionnaire was conducted. In a consensus panel (including 4 specialists in health education and promotion and environmental health, an epidemiologist, a psychologist and a health economist), the initial questionnaire was reviewed and, then, translated back into English. In another expert panel, the proper items were constructed with a consideration on the cultural disparities between Iran and other communities from which the original studies had been selected.

The initial HEPIAT consisting two sections and 42 items was prepared. In section one, the key informants were asked to indicate that in what way the TSP has impacted on the health determinants in Sanandaj. The answer to this question had two options were possible: Positive (1) or Negative (-1). In section 2, they were asked to indicate on how much TSP has impacted on the listed health determinants. The answers to this section were ranged on a five-point Likert-type scaling (very low (1), low (2), moderate (3), high (4), very high (5)). The total score for each item was calculated as follows: the score in section 1 (1/-1) multiplied by the score in section 2 (1-5), which equals to a score ranged from -5 to +5. Then, the final scores of all items were summated to result in a single global score ranging from -210 to +210. The higher score indicated the more positive impact of TSP on the health determinant. The 0 score in a given item indicated that the impact of TSP on that item was neutral.

At the end of the questionnaire, demographic characteristics encompassing 7 items on the respondents' age, gender, education, occupation, income status and receiving subsidy portion were provided.

Fifteen key informants including 5 faculty members, 5 teachers, 3 health care providers and 2 welfare and social security employees) were interviewed face to face to examine the difficulty level of the items. Then, the results were discussed in a consensus panel- including 4 specialists in health education and promotion and environmental health, an epidemiologist, a psychologist and a health economist. The panel members were asked to report the level of importance of each item. Those items with Impact Score  $\leq 1.5$  (30) were excluded from the questionnaire.

The content validity of HEPIAT was determined in a

consensus panel of experts. All items reviewed and assessed, qualitatively, and their appropriateness and relevance to TSP as well as their necessity, significance, scaling and response format were evaluated. The feedback received from the consensus panel, was mostly regarding the wording and phrasing of items, which was used to revise and modify the instrument. The Content Validity Index (CVI) and Content Validity Ratio (CVR) were applied to validate the content of the instrument, quantitatively. In order to determine the CVR, 8 specialists in the area of health education and promotion, epidemiology, environmental health, health policymaking and health economy were asked to assess the necessity of each item on the basis of a 3-point Likert-type scale (It is necessary, It is useful but not necessary, It is not necessary). Those items with the value more than 0.62 (based on Lawshe table), were considered as necessary for the instrument (31). To determine the CVI (32), the abovementioned 8 specialists were, also, asked to assess the relevancy, clarity, and simplicity of each item. These three criteria were analyzed, separately, on the basis of a 4-point Likert-type scale. Those items with the CVI value less than 0.75, were considered as inappropriate (33) and, therefore, deleted from the questionnaire.

The construct validity and factor structure of the HEPIAT were assessed by Exploratory Factor Analysis (EFA). In the present study, EFA was conducted on the data collected from 509 key informants applying the principal component factor analysis with varimax rotation.

The reliability of HEPIAT was assessed utilizing the Cronbach's alpha coefficient- as the most common method applied to examine the internal consistency of instruments (34). Also, the test-retest reliability coefficient was calculated as follows: the questionnaire was completed, on a second occasion, by 25 randomly selected key informants, 8-12 days later. The Intra-class correlation coefficients (ICC) with 95% confidence intervals (CI) were calculated and those items with an ICC equal to or more than 0.70 were considered as acceptable. The Pearson's correlation coefficient test was applied to determine the correlations, and to compare the construct validities, between the dimensions of the HEPIAT.

### Statistical analysis

The data were transferred into SPSS software program, version 17.0 for Windows, and the analyses were performed. Central tendency and variability measures were applied to summarize and organize the data. CVI and CVR were used to investigate the content validity. EFA was utilized to determine the construct validity and factor structure of HEPIAT. Also, the internal consistency of the instrument was assessed applying Cronbach's alpha coefficient method. ICC was, also, used to calculate the test-retest reliability coefficient. A series of descriptive statistic tests, independent sample t-test and one-way ANOVA tests were used to examine the associations between socio-demographic characteristics of the respondents and the mean score of the factors. Pearson's correlation coefficient was used to show the nature of associations between HEPIAT factors. A p-value  $< 0.05$  was considered as sta-

tistically significance.

## Results

The mean±SD age of the participants was 37.05±8.38. About 49% (n= 239) were male, 33% (n= 170) were school teacher and 60% (n= 309) were bachelor. Only 6.1% of all the respondents were not receiving their subsidy portion. Also, 94.1% reported having another income resource beside their subsidy portion. The demographic characteristics of the respondents and the associations between their demographic characteristics and the mean score of the factors are shown in Table 1.

In terms of face validity, the Impact Score for all HE-PIAT items was more than 1.5, and therefore no item was deleted; however, in qualitative content validity, some modifications were made on the wording and phrasing of some items. According to quantitative content validation, 5 items (such as “the commitment of the residents to keep the environment clean”, “The quality of students’ education” and “Land use”) were deleted due to low CVR value (less than 0.62). Also, in CVI assessment, 2 items with CVI value less than 0.75 were deleted. The mean items’ relevancy, clarity, simplicity, and their total mean score were 88.3±0.2, 90.1±0.5, 86.1±0.7, and 89.6±0.4, respectively. Eventually, 35 items remained.

The descriptive statistics (mean and SD) for the type of impact and the impact rate of the health determinants’ items are presented in Table 2. Overall, the mean score of items effect rate for all respondents was about moderate. In EFA, Kaiser-Meyer-Olkin (KMO) measure (KMO=0.945) and Bartlett’s Test of Sphericity (Approx. Chi-Square= 11523.529, df= 595, p<0.001) indicated sampling adequacy and suitable correlation matrix for factor analysis, respectively.

Six factors extracted with eigenvalues more than 1, by which, in total 64.94% of all variance between the items

was explained. Cattell’s scree test indicated that between 4 and 9 factors might be extracted. So, varying the number of factors, multiple runs of factor analysis was conducted and finally, the initial six-factor solution distinguished as the clearest pattern of loading. The rotated factor pattern coefficient for variable solution is shown in Table 3. For each factor, information is allotted regarding the initial eigenvalues (before rotation), variance accounted for after rotation (rotation sum of squares), percentage of variance explained (after rotation), intra-class correlation coefficients (ICC) with 95% confidence intervals (CI) and internal consistency reliability as showed by Cronbach’s alpha for each factor.

As it is shown in Table 3, one of the six factors had Cronbach’s alpha less than 0.7, which argues omitting of these factors. The simple structure and the best solution were determined considering visual inspection and the hyperplane count (35), respectively. Finally, the authors decided not to eliminate the items in factor 6. Therefore, this factor pattern considered as the optimal solution.

The factor pattern coefficient values were used to interpret the factors. As recommended by Gorsuch (35) and Tabachnick and Fidell (36), the cut-off of 0.40 was considered to include one item in the interpretation of a factor (Table 3). Factors were named as follow: Social Environment, Public Services Delivery and Accessibility, Financial Welfare and Accommodation, Household Socio-economic Development, Family Establishment and Housing and Substance Use. This solution accounted for 64.94% of the total variance.

Table 4 indicates the bivariate correlations for the factors. There were statistically significant positive correlations between the factors. The highest and the lowest correlations were observed between the factor 1 and 2 (r=0.814) and the factor 6 and 4 (r= 0.115), respectively.

Table 1. Relationship between the respondents’ characteristics and the mean score of the factors (n=486)

Variable	Category	n (%)	The extracted Factors					
			1 p	2 p	3 p	4 p	5 p	6 p
Age (year) (n=461) <sup>‡</sup>	Under 28	79(15.5)	0.001	0.001	0.003	0.001	0.001	0.097
	28-37	182(35.8)						
	38-47	153(30.1)						
	48≤	47(9.2)						
Gender (n=466) <sup>§</sup>	Male	239(49.0)	0.085	0.827	0.572	0.077	0.069	0.425
	Female	227(44.6)						
Occupation (n=495) <sup>‡</sup>	School teacher	170(33.4)	0.001	0.001	0.001	0.001	0.001	0.161
	Faculty member	32(6.3)						
	Health care provider	97(19.1)						
	Employee*	196 (38.5)						
Education (n=496) <sup>‡</sup>	Diploma	23(4.5)	0.109	0.009	0.348	0.03	0.097	0.187
	Super Diploma	96(18.9)						
	Bachelor	309(60.7)						
	Postgraduate	68(13.4)						
Income status (n=454) <sup>‡</sup>	Under 165 US\$	28(5.5)	0.001	0.001	0.001	0.001	0.001	0.142
	165 to 230 US\$	58(11.4)						
	230 to 330 US\$	134(26.3)						
	more than 330 US\$	234(46.0)						
Being paid the subsidy portion <sup>§</sup> (n=497)	Yes	466(91.6)	0.103	0.072	0.696	0.149	0.310	0.229
	No	31(6.1)						
Having any other income resource except for the subsidy portion <sup>§</sup> (n=499)	Yes	749(94.1)	0.435	0.023	0.430	0.149	0.188	0.297
	No	19(3.7)						

Factor 1= Social Environment; Factor 2 = Public Services Delivery and Accessibility; Factor 3 = others; Factor 4= Household socio-economic development; Factor 5= Family establishment and housing; Factor 6= Substance abuse; \*Employee in one of the following organizations: economy and finance, agriculture, welfare and social security and banks; <sup>‡</sup>One-way ANOVA test was used to analyze data. <sup>§</sup> One-sample t-test was used to analyze data

Table 2. Items' mean (M) and standard deviation (SD) of HEPIAT and type of impact and impact rate of the items

#	How much have been affected Targeted Subsidies plan on following health determinants?	M(SD)*	Impact, n (%)			Impact rate (%)			
			Positive	Negative	Very low	Low	Moderate	High	Very high
1	Nurturing children and their socialization	2.56(1.26)	140(27.5)	252(49.5)	115(22.6)	100(19.6)	91(17.9)	93(18.3)	40(7.9)
2	Occupation and employment status of the residents	2.40(1.27)	212(41.7)	183(36.0)	154(30.3)	84(16.5)	94(18.5)	87(17.1)	26(5.1)
3	Income and expenses of the residents	2.56(1.121)	194(38.1)	238(46.8)	121(23.8)	85(16.7)	131(28.7)	83(16.3)	32(6.3)
4	Diet status (ie, the contents of household food basket)	2.63(1.18)	202(39.7)	236(46.4)	109(21.4)	94(18.5)	146(28.7)	91(17.9)	29(5.7)
5	Cigarette and Hookah use	2.42(1.15)	210(41.3)	155(30.5)	118(23.2)	115(22.6)	96(18.9)	70(13.8)	25(4.9)
6	Alcohol use	2.35(1.15)	241(47.3)	117(23.0)	121(23.8)	116(22.8)	107(21.0)	50(9.8)	24(4.7)
7	Substance use	2.29(1.16)	250(49.1)	115(22.6)	135(26.5)	103(20.2)	112(22.0)	49(9.6)	20(3.9)
8	Doing exercise by residents	2.33(1.10)	189(37.1)	175(34.4)	122(24.0)	112(22.0)	117(23.0)	60(11.8)	13(2.6)
9	Recreations performed by residents (ie, going to a park or movie)	2.37(1.07)	197(38.7)	191(37.5)	117(23.0)	108(21.2)	132(25.9)	57(11.2)	15(2.9)
10	Social justice (ie, equitable distribution of services provided by different organizations)	2.40(1.16)	235(46.2)	146(28.7)	132(25.9)	105(20.6)	118(23.2)	66(13.0)	22(4.3)
11	Joining in peer groups (ie, gathering elderly groups in parks)	2.45(1.19)	163(32.0)	204(40.1)	127(25.0)	90(17.7)	109(21.4)	92(18.1)	16(3.1)
12	Joining social networks (ie, using the internet)	2.50(1.23)	142(27.9)	239(47.0)	127(25.0)	83(16.3)	118(23.2)	88(17.3)	22(4.3)
13	Maintenance and improvement in Family relations	2.43(1.13)	186(36.5)	208(40.9)	130(25.5)	98(19.3)	127(28.0)	78(15.3)	15(2.9)
14	Community participation (ie, participation in charities)	2.45(1.17)	180(35.4)	191(37.5)	126(24.8)	95(18.7)	118(23.2)	81(15.9)	18(3.5)
15	Cultural participation (ie, attending art and literacy exhibitions)	2.34(1.15)	170(33.4)	182(35.8)	127(25.0)	109(21.4)	97(19.1)	75(14.7)	14(2.8)
16	Spiritual participation (ie, attending charity institutions or congregational prayers)	2.33(1.17)	159(31.2)	184(36.1)	134(26.3)	96(18.9)	96(18.9)	73(14.3)	14(2.8)
17	The housing ability among the residents	2.28(1.25)	246(48.3)	146(28.7)	165(32.4)	84(16.5)	110(21.6)	41(8.1)	37(7.3)
18	The rental housing ability among the residents	2.37(1.21)	234(46.0)	167(32.8)	142(27.9)	100(19.6)	115(22.6)	49(9.6)	38(7.5)
19	Public safety (ie, feeling of safety from existing socio-economic conditions)	2.52(1.25)	188(36.9)	198(38.9)	131(25.7)	86(16.9)	104(20.4)	84(16.5)	32(6.3)
20	The range of shopping (ie. The ability to buy things over than essential needs)	2.50(1.18)	186(36.5)	229(45.0)	124(24.4)	90(17.7)	144(28.3)	76(14.9)	26(5.1)
21	The quality of goods being shopped	2.48(1.16)	186(36.5)	225(44.2)	120(23.6)	98(19.3)	145(28.5)	68(13.4)	25(4.9)
22	Energy usage (ie, the amount of oil use)	2.74(1.21)	138(27.1)	275(54.0)	89(17.5)	97(19.1)	143(28.1)	79(15.5)	50(9.8)
23	The quantity and range of health service delivery	2.36(1.16)	175(34.4)	207(40.7)	134(26.3)	110(21.6)	127(25.0)	52(10.2)	24(4.7)
24	The quality of health service delivery	2.39(1.14)	188(36.9)	211(41.5)	130(25.5)	112(22.0)	137(26.9)	52(10.2)	21(4.1)
25	Urban services to take care of children's health	2.26(1.04)	172(33.8)	199(39.1)	125(24.6)	130(25.5)	134(26.3)	38(7.5)	14(2.8)
26	The time needed to access a given destination	2.40(1.11)	185(36.3)	219(43.0)	134(26.3)	95(18.7)	165(32.4)	53(10.4)	19(3.7)
27	Economic development trend (ie, the trend of constructing factories and industrial towns)	2.30(1.20)	219(43.0)	155(30.5)	151(29.7)	105(20.6)	115(22.6)	28(5.5)	31(6.1)
28	Visit physicians for follow-up among ill residents	2.15(1.13)	180(35.4)	222(43.6)	178(35.0)	109(21.4)	106(20.8)	34(6.7)	18(3.5)
29	Visit dentists for follow-up among ill residents	2.09(1.12)	203(39.9)	181(35.6)	178(35.0)	125(24.6)	72(14.1)	41(8.1)	17(3.3)
30	The willingness of families to give birth to more children	2.28(1.26)	280(55.0)	143(28.1)	163(32.0)	115(22.6)	81(15.9)	36(7.1)	44(8.6)
31	Marriage rates	2.16(1.17)	303(59.5)	104(20.4)	161(31.6)	138(27.1)	76(14.9)	28(5.5)	35(6.9)
32	Divorce rates	2.25(1.14)	263(51.7)	109(21.4)	141(27.7)	143(28.1)	72(14.1)	42(8.3)	24(4.7)
33	The study situation among the residents	2.08(1.04)	202(39.7)	157(30.8)	152(29.9)	129(25.3)	97(19.1)	24(4.7)	15(2.9)
34	Shopping book by the residents	2.09(1.05)	199(39.1)	177(34.8)	163(32.0)	120(23.6)	99(19.4)	25(4.9)	16(3.1)
35	Welfare and wellbeing among elderly	2.21(1.05)	178(35.0)	208(40.9)	148(29.1)	133(26.1)	113(22.2)	29(5.7)	17(3.3)

## Discussion

The aim of this study was to develop an appropriate instrument aiming to determine the TSP-related determinants of health in Sanandaj, Iran. While investigating construct validity, a six factor solution was found to yield a clearer pattern of factor loadings. This solution accounted for 64.94% of all variance between the items. About 54% of the total variance explained by the first three factors namely, Social Environment, Public Services Delivery and Accessibility and Financial Welfare and Accommodation. These findings strongly approve the conceptual analysis of socioeconomic-related determinants of health (37). In other words, the main conceptual components of health determinants which may be related to socioeconomic plans (29, 38, 39) were covered. The other three factors were related to Household Socio-economic Development (factor 4), Family Establishment and Housing (factor 5) and Substance Abuse (factor 6).

There were reasons to approve the six factors solution as the best solution. Firstly, by declining two factors, as

proposed by Cattell's scree test, there was about 6.8% decrease in the total variance. In the other hand, by expanding the factors to eight, the total variance increased only about 3%. Moreover, the clearest pattern of item loading was found in the six factors solution.

Moderate to strong associations were found between all factors, except for factor six, which showed low to moderate associations with the other factors. This low to moderate relationships may be attributed to the nature of this factor, which the 3 items loaded on were regarded to substance abuse- a component quite different from those of all other factors. The strongest and the weakest associations were found to be between factors 1 (Social Environment) and 2 (Public Services Delivery and Accessibility) and factors 4 (Household Socio-economic Development) and 6 (Substance Abuse), respectively. Such associations found between the factors may be considered as a reflection of the undeniable impacts of socioeconomic plans like TSP on all dimensions of human health and welfare.

Table 3. Rotated factor pattern coefficients for variable solution (35 variables) of HEPIAT

How much TSP has had impacts on the following health determinants?	Factor pattern coefficient*					
	1	2	3	4	5	6
Cultural participation (ie, attending art and literacy exhibitions)	0.775					
Community participation (ie, participation in charities)	0.761					
Joining social networks (ie, using the internet)	0.709					
Spiritual participation (ie, attending charity institutions or congregational prayers)	0.696					
Maintenance and improvement in Family relations	0.684					
Joining in peer groups (ie, gathering elderly groups in parks)	0.623			0.336		
Doing exercise by residents	0.560			0.343		0.344
The quantity and range of health service delivery	0.346	0.666				
The quality of health service delivery		0.654	0.387			
The quality of goods being shopped		0.653		0.305		
Energy usage (ie, the amount of oil use)		0.636				
Public safety (ie, feeling of safety from existing socio-economic conditions)		0.611				
The range of shopping (ie. The ability to buy things over than essential needs)		0.609		0.332		
Urban services to take care of children's health		0.500	0.417			
The time needed to access a given destination		0.436	0.426			
Economic development trend (ie, the trend of constructing factories and industrial towns)		0.401	0.330		0.375	
Shopping book by the residents			0.706			
Welfare and wellbeing among elderly			0.699			
Visit physicians for follow-up among ill residents			0.693		0.339	
The study situation among the residents			0.689			
Visit dentists for follow-up among ill residents			0.604		0.443	
Social justice (ie, equitable distribution of services provided by different organizations)			0.401	0.383		
Income and expenses of the residents				0.767		
Diet status (ie, the contents of household food basket)				0.716		
Occupation and employment status of the residents				0.683		
Nurturing children and their socialization				0.605		
Recreations performed by residents (ie, going to a park or movie)				0.444		
Marriage rates					0.768	
The willingness of families to give birth to more children					0.682	
Divorce rates					0.643	
The housing ability among the residents					0.606	
The rental housing ability among the residents					0.570	
Alcohol use						0.860
Substance use						0.828
Cigarette and Hookah use						0.767
Initial Eigenvalues	14.35	2.75	1.82	1.37	1.26	1.12
Rotation sums of squares	9.96	7.76	6.81	1.02	8.46	9.73
Percent of variance explained	41.02	7.9	5.2	3.93	3.6	3.22
Cronbach $\alpha$	0.89	0.87	0.79	0.84	0.67	0.77
ICC (95% CI)	0.89	0.87	0.79	0.84	0.67	0.77
	(0.87-0.9)	0(0.87-0.89)	(0.75-0.81)	(0.82-0.86)	(0.62-0.71)	(0.730-.8)

Factor 1= Social Environment; Factor 2 = Public Services Delivery and Accessibility; Factor 3= Financial welfare and accommodation; Factor 4= Household socio-economic development; Factor 5= Family establishment and housing; Factor 6: substance abuse

A satisfactory internal consistency was found between all factors derived from the HEPIAT. On the basis of the reference table provided by Sim and Wright (40) and DeVillis (41), the Cronbach's alpha was ranged from moderate (0.67) to very high (0.89) for all the factors. Previous psychometric studies (13, 42-45) have used internal consistency to confirm the internal consistency of the instruments. Furthermore, the face and content validity as well

as CVI, ensured the simplicity, clarity and relevancy of the instrument.

To the best of our knowledge, this is the first study that investigates the health impacts of a socioeconomic plan in Middle East countries including Iran. Based on the literature review, some review studies were conducted on HIA in Iran introducing the subject (46, 47). Moreover, two HIA called studies in Tehran (48) and Shiraz (49), were

Table 4. HEPIAT factors Correlation Matrix

Factor	1	2	3	4	5	6
1	1					
2	0.814*	1				
3	0.706*	0.697*	1			
4	0.740*	0.746*	0.676*	1		
5	0.553*	0.627*	0.550**	0.603*	1	
6	0.170*	0.188*	0.160*	0.115*	0.245*	1

Factor 1= Social Environment; Factor 2= Public Services Delivery and Accessibility; Factor 3= Financial welfare and accommodation; Factor 4= Household socio-economic development; Factor 5= Family establishment and housing; Factor 6= Substance abuse

conducted to assess the health impacts of air pollution. Also, another study in Sanandaj (unpublished data), investigated the impacts of urban traffic-related measures on the health determinates, from which the first article, introducing the psychometric properties of the instrument designed for the quantitative phase of the study was published in 2014 (13). Accordingly, the present study, as a preliminary phase to conduct a HIA on Iranian TSP along with those mentioned above may give birth to HIA in Iran (13) and other Middle East countries, hoping to address the health-related outcomes of policies, plans and measures for stakeholders and policymakers in Iran and throughout the world, as well.

Despite the reality that prospective HIA is the best practice, in some situations this may not be possible due to the lack of knowledge on HIA, delays in acquiring fund and with employing associates (11). For instance, in Iran before conducting this HIA on TSP, the plan had become finalized and implemented for four years. Hence, HEPIAT was designed to be used in this study, retrospectively. The latter reason may be that of case in Iran, as health associates have the least involvement while designing strategic planning and policy-making in the government, which urges the need for conducting some revisions in the way that a group of policymakers is established to design a plan or project. Including a steering group in the plan from the beginning of planning may reduce the negative health impacts of such plans to a minimum. As a limitation, we did not report the results of confirmatory factor analysis in the present paper, considering that the CFA results are presented in a path analysis paper, which has not been published, yet. Therefore, conducting confirmatory studies in similar populations is recommended.

Due to the novelty of HIA in developing countries like Iran, performing such studies may have several advantages such as increasing knowledge and awareness about HIA and its application around the countries, offering evidence for feasibility of HIA in different environments, increasing its political and socio-economical acceptability to help in achieving healthy public policy, and helping in curriculum designation for HIA educational courses (13), as well. Moreover, such studies may help local decision-makers to adopt the best healthy policies with (8) the least harmful outcomes may be considered as another advantage.

### Conclusion

The findings of the current study showed an appropriate validity, reliability, simplicity and functionality for HEPIAT. Researchers, community economic agencies, economic organizations, and health promoters interested in HIA may use this suitable instrument to offer high-quality information to economic stakeholders and decision makers on the health impacts of their decisions and politics. However, there is a need for further studies in order to compare the different aspects of the instrument while assessing different socio-economic plans being conducted in different communities. Comparing the HEPIAT dimensions with other public health indicators obtained from other studies is, also, recommended.

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### Conflict of Interests

The authors declare no competing interest.

### References

1. Centre for Health Promotion Studies NUoI, Galway. The National Health and Lifestyle Surveys. (Survey of Lifestyles, Attitudes and Nutrition, (SLAN)) and the Irish Health Behaviour in School-Aged Children Survey (HBSC). 2003.
2. Allwright S. Asthma trends in young adults in the Republic of Ireland: Prevalence of asthma and asthma-like symptoms in young adults in Dublin and Kilkenny/Wexford. PhD thesis, University of Dublin. 1996.
3. Frumkin H, Frank L, Jackson R. Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities. Washington DC: Island Press. 2004.
4. Frumkin H, Frank L, Jackson R. Urban sprawl and public health. Public Health Rep. 2002;117:201-17.
5. Jackson RJ. The impact of the built environment on health: an emerging field. Am J Public Health. 2003;93(9):1382-4.
6. Wilkinson R, Marmot, M. Social Determinants of Health: the Solid Facts. 2nd ed. ed. Copenhagen, Denmark: World Health Organization; 2005.
7. European Centre for Health Policy WHORoF. Gothenburg Consensus Paper. Health impact assessment: main concepts and suggested approach. Brussels. 1999.
8. Dannenberg AL, Bhatia R, Cole BL, Heaton SK, Feldman JD, Rutt CD. Use of health impact assessment in the US: 27 case studies, 1999–2007. Am J Prev Med. 2008;34(3):241-56.
9. Dannenberg AL, Bhatia R, Cole BL, Dora C, Fielding JE, Kraft K, et al. Growing the field of health impact assessment in the United States: an agenda for research and practice. Am J Public Health. 2006; 96 (2): 262-70.
10. University of California Los Angeles School of Public Health PpP. Health Impact Assessment: Information & Insight for Policy Decisions. Accessed October 19, 2005.
11. HIA. A Health Impact Assessment of Traffic and Transport in Ballyfermot. 2004.
12. UNDP. A policy framework for addressing inequalities in developing countries. 2012.
13. Nadrian H, Nedjat S, Taghdisi M, Shojaeizadeh D. Urban traffic-related determinants of health questionnaire (UTDHQ): an instrument developed for health impact assessments. Med J Islam Repub Iran. 2014;28:84.
14. Scott-Samuel A, Ardern K, Birley M. Assessing health impacts on a population. Available at: [http://www.sitiabruzzomolise.it/Atti\\_di\\_Convegno/2011/2011\\_04\\_09\\_vis/vis\\_OxfordHandbook\\_ScottSamuel.pdf](http://www.sitiabruzzomolise.it/Atti_di_Convegno/2011/2011_04_09_vis/vis_OxfordHandbook_ScottSamuel.pdf). 2010.
15. Kearns N, Pursell L. Evaluation of the HIA of Traffic and Transport in Ballyfermot. Galway National University of Ireland Galway. 2007.
16. Eslami M, Heidarnia A. Designing and determining validity and reliability of the questionnaire for the effect of HBM on users of two methods of birth control with pills and condoms. J Urmia Univ Med Sci. 2011;21(5):382-90.
17. Munro B, H. Statistical methods for health care research. 5th ed ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2004.
18. Frank-Stromborg M, Olsen SJ. Instruments for clinical health-care research: Jones & Bartlett Learning; 2004.
19. Ison E. The introduction of health impact assessment in the WHO European Healthy Cities Network. Health Promot Int. 2009;24(suppl 1):i64-i71.
20. Patz J, Campbell-Lendrum D, Gibbs H, Woodruff R. Health impact assessment of global climate change: expanding on comparative risk assessment approaches for policy making. Annu Rev Public Health. 2008;29:27-39.
21. Karanikolos M, Mladovsky P, Cylus J, Thomson S, Basu S, Stuckler

- D, et al. Financial crisis, austerity, and health in Europe. *Lancet*. 2013;381(9874):1323-31.
22. Ayyub B. Risk analysis in engineering and economics: CRC Press; 2014.
23. Dixon J, Scura L, Carpenter R, Sherman P. Economic analysis of environmental impacts: Routledge; 2013.
24. De Allegri M, Ridde V, Louis VR, Sarker M, Tiendrebéogo J, Yé M, et al. The impact of targeted subsidies for facility-based delivery on access to care and equity—Evidence from a population-based study in rural Burkina Faso. *J Public Health Policy*. 2012;33(4):439-53.
25. Ruopeng A. Effectiveness of subsidies in promoting healthy food purchases and consumption: a review of field experiments. *Public Health Nutr*. 2013;16(07):1215-28.
26. Capacci S, Mazzocchi M, Shankar B, Macias JB, Verbeke W, Pérez-Cueto FJ, et al. Policies to promote healthy eating in Europe: a structured review of policies and their effectiveness. *Nutr Rev*. 2012;70(3):188-200.
27. Frost J, Sonfield A, Zolna M, Finer L. Return on investment: a fuller assessment of the benefits and cost savings of the US publicly funded family planning program. *Milbank Q*. 2014;92(4):696-749.
28. Murray SF, Hunter BM, Bisht R, Ensor T, Bick D. Effects of demand-side financing on utilisation, experiences and outcomes of maternity care in low-and middle-income countries: a systematic review. *BMC Pregnancy Childbirth*. 2014;14(1):1.
29. Stewart M, Visker, JD., Cox, CC. Community Health Policy Assessment of a Rural Northeast Missouri County using the Centers for Disease Control and Prevention's CHANGE tool. *Health Promot Perspect*. 2013;3(1).
30. Lacasse Y, Godbout C, Series F. Health-related quality of life in obstructive sleep apnoea. *Eur Respir J*. 2002;19(3):499-503.
31. Lawshe CH. A quantitative approach to content validity1. *Pers Psychol*. 1975;28(4):563-75.
32. Waltz CF, Strickland OL, Lenz ER. Measurement in Nursing and Health Research. Nueva York, Springer; 2005.
33. Polit DF, Beck CT, Owen SV. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health*. 2007;30(4):459-67.
34. Polit D, Beck C, Hungler B. Analyzing quantitative data. Essentials of nursing research methods, appraisal and utilization. 2006:396-426.
35. Gorsuch R. Exploratory factor analysis: Its role in item analysis. *J Pers Assess*. 1997;68(3):532-60.
36. Tabachnick B, Fidell LS. Using multivariate statistics. 4th ed. 2001.
37. Currie C. Social determinants of health and well-being among young people: World Health Organization Regional Office for Europe Copenhagen, Denmark; 2012.
38. Marmot M, Allen J, Bell R, Bloomer E, Goldblatt P. WHO European review of social determinants of health and the health divide. *Lancet*. 2012;380(9846):1011-29.
39. Ahnquist J, Wamala SP, Lindstrom M. Social determinants of health—a question of social or economic capital? Interaction effects of socioeconomic factors on health outcomes. *Soc Sci Med*. 2012;74(6):930-9.
40. Sim J, Wright C. Research in health care: concepts, designs and methods. Nelson Thornes; 2000.
41. DeVellis RF. Scale development: Theory and applications. Sage publications; 2016.
42. Parshall MB. Psychometric characteristics of dyspnea descriptor ratings in emergency department patients with exacerbated chronic obstructive pulmonary disease. *Res Nurs Health*. 2002;25(5):331-44.
43. Toopchian A, Kanani, S., Babazadeh, T., Allahverdipour, H., Nadrian, H. Development and Psychometric Properties of a Condom Use and Its Cognitive Determinants Questionnaire (CUCDQ). *Open access Maced J Med Sci*. 2017 5(1):79.
44. Yari A, Nadrian H, Rashidian H, Nedjat S, Esmaeilnasab N, Doroudi R, et al. Psychometric properties of the Persian version of Social Capital Questionnaire in Iran. *Med J Islam Repub Iran*. 2014;28:17.
45. Jahangiry L, Nadrian H, Mahdavi B, Allahverdipour H, Kousha A. Primary Development and Psychometric Properties of PRECEDE Model-based Scales for Brucellosis Prevention among an Iranian Rural Population. *Arch Clin Infect Dis*. 2017; 12 (3): e62957.
46. Jaafarzadeh N. Review on Health Impact Assessment (HIA), Its frame of structure and types. 2009.
47. Shojaei P, Malekafzali H, Karimloo M, Sajjadi H, Forouzan AS, Mohammadi F. Review Models of Health Impact Assessment. *Soc Welfare Q*. 2013;12(47):7-28.
48. Naddafi K, Hassanvand M, Yunesian M, Momeniha F, Nabizadeh R, Faridi S, et al. Health impact assessment of air pollution in megacity of Tehran, Iran. *Iran J Environ Health Sci Eng*. 2012;9(1):1.
49. Gharehchahi E, Mahvi AH, Amini H, Nabizadeh R, Akhlaghi AA, Shamsipour M, et al. Health impact assessment of air pollution in Shiraz, Iran: a two-part study. *J Environ Health Sci Eng*. 2013;11(1):1.