

The Slums in the Mirror of Health: A Systematic Review Analysis from Iran

Abstract

Background: One billion worldwide population is living in slum areas that mostly accompanied with high rates of poverty, illiteracy, unemployment, unhealthy situation, and inappropriate health-care services. The prediction of enormous growth of slums by 2030 led to a raise to address the “plight of slums” in Sustainable Development Goals (SDGs). **Methods:** To address evidence-based health-related priorities, we conducted a systematic review to summarizing evidences on health situations of slums population in Iran. Six electronic databases were systematically searched for published studies without any restriction on age, sex, and language to assess health situations of slums in Iran reported by following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol. All identified articles were screened, quality assessed, and data extracted by two authors independently. **Results:** The finding of this systematic review in addition to overall view categorized in five categories: health system, reproductive health, infectious diseases, noncommunicable diseases and their risk factors, social issues besides overall situation of Slums. **Conclusions:** Community-based participatory interventions with socioeconomic approach on modifiable risk factors; active response of health system; establishment new health care centers in slum areas; augmenting the quality of care; active case finding; and elevating health knowledge, attitude, and practice is crucial to achieve SDG’s in Slum area.

Keywords: Health, Iran, poverty areas

Background

Over the past decades, rapid urbanization was accompanied by the slums expansion, mainly in large in low-income and middle-income countries (LMICs).^[1] Slum inhabitants are often vulnerable in comparison to other areas,^[2] and morbidity and mortality for several health problems are worse in slum residents than other populations, due to relative poverty, lack of security, lack of financial resources, and lack of political commitment.^[3] Slumming is usually seen as a “breeding ground” for social problems, such as crime, drug and alcohol addiction, high rates of mental diseases as well as suicide.^[4] A study revealed that morbidity rate in slum area was higher than other area with better socioeconomic status.^[5] Also, the other studies demonstrated slums people in the less-developed countries faced major problems of child health related to access to safe water and sanitation,^[6] and more infant or child mortality and also

infectious diseases.^[7,8] Accordingly, by the rapid growth of slums in LMICs, we need to reduce health inequity and promote environmental and health status particularly in slum and disadvantaged areas in middle east.^[9]

In Iran, slums expand by growing urbanization and hosting several thousand migrants from rural areas to large cities.^[10,11] Unfortunately, the poverty, unemployment rate, and maternal and neonatal mortality rates in slum area were higher than urban area of Iran.^[12] Also, risky behavior, and infectious diseases including HIV/AIDS, hepatitis B and C, and sexually transmitted diseases was more obvious in disadvantaged area in Iran.^[13] Despite many advancements in deprived areas in Iran, such as access to safe water, primary health care, and social services, there is need to specific interventions.^[14,15]

So, there is need to urgent action to reverse their current situation. To make cities and human settlements inclusive, safe, resilient, and sustainable as a sustainable development goal.^[16] We should be

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implement appropriate interventions to improve slums health. In this way, we must find ways to motivate key local policy makers for partnership and resource mobilization to improve health outcomes in slums. As, slum-specific health priorities might be different from the national or even urban area,^[17] this review aimed to provide an inclusive picture of slum's health-related situations in Iran based on conducted studies for implementing all interventions for all outcomes that it does have.

Methods

This systematic review followed the aim of study to create a comprehensive and reliable evidence for health-related conditions contributing to slums in Iran.

Terms' definition

Slums defined as “a densely populated usually urban area marked by crowding, dirty run-down housing, poverty, and social disorganization.”^[17] and the World Health Organization defined human health as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.”^[18]

Data sources and search strategy

We carried out a systematic search among three international databases; PubMed/Medline, Institute of Scientific Information, and Scopus. In addition, as the study setting in this systematic review was Iran, we searched three national bibliography databases; IranMedex, Scientific Information Database, and Irandoc from 1990 to 2019, but without language restriction and limitation on sex and age.

To obtain the most comprehensive and efficient results, we searched these data sources using Medical Subject Headings terms, Emtree, and related keywords. Moreover, in national databases, we considered related Persian keywords in addition to English search terms. In search strategy, we considered “Poverty Area*” OR suburban OR ghetto* OR shant OR shack* OR bidonville* OR bustee* OR bosti* OR squat* OR “informal settlement” OR barrada OR “barrio baja” OR taudi* OR “irregular settlement” OR “informal housing” OR favela OR basti besides slums OR slum. Geographic area limited to Iran by considering various related search words, such as Iran, I.R. Iran, Iranian, and Persia. To achievement additional studies, we reviewed manually the references and citations of relevant articles. In this way, we included primary studies identified from searching the references from other review articles identified in the search that fitted inclusion criteria. All kinds of published studies performed in Iran related to slums health were included. We included related studies to health of slum involving various aspects of health of urban slum dwellers. The full electronic search strategy in PubMed present in Table 1.

Study selection and data collection process

At the first stage of study selection process, the two reviewers read the titles and abstracts independently. If they did not related to our study objectives, then these articles excluded. We included original articles. To achieve comprehensive results, review articles considered for backward and forward assessment of their references and citations. Qualitative studies, letters, editorial, and all of other article types were excluded.

In second stage, for all of included articles, full texts reviewed by two independent reviewers for quality assessment and data extraction. In cases of difference between reviewers, the third reviewer resolved discrepancy.

Quality assessment and data extraction

For quality assessment of included articles, we used the critical appraisal skills program checklists.^[19] The assessment conducted by two independent reviewers. Discrepancies have resolved by a third reviewer. Risk of biases assessed in individual studies based on mentioned tool.

Data extraction sheet was designed including two main parts of; study characteristics', and extracted data. The study characteristics sheet contained; article's specifications, corresponding author's characteristics, study's method, and study's quality scale. The data extraction sheet also, contains detailed information on prevalence of outcome, Odds ratio (OR), main conclusion, and comments. In Figure 1, the process of study selection and data collection process reported according to PRISMA Flow Diagram.^[20]

Data synthesis

We systematically categorize results according to various aspects of health in slums. So in this review, each aspect of results summarized and presented in different tables.

Ethical consideration

As this study is a systematic review, it did not need to ethical approval. Regarding ethical consideration in this study, we cited all scientific documents.

Results

Considering inclusion and exclusion criteria, of 126 articles, 78 abstracts screened and consequently 25 articles that met eligible criteria remained for data extraction [Figure 1]. All retrieved articles published in English or Persian language and related to 1990 to 2019. Three interventional study, a historical cohort study, a case control study, a descriptive analysis of information in health centers, two data analysis of referral system and screening, and remained article by 18 cross sectional study bring out this systematic review results. All studies were at sub-national level. Except two studies that use information of referral systems, the others targeted households or individual people live in suburban and slums

Table 1: Search strategy in PubMed

((("Poverty Area"[Title/Abstract] OR suburban[Title/Abstract] OR ghetto*[Title/Abstract] OR shunt[Title/Abstract] OR shack*[Title/Abstract] OR bidonville*[Title/Abstract] OR bustee*[Title/Abstract] OR bosti*[Title/Abstract] OR squat*[Title/Abstract] OR "informal settlement"[Title/Abstract] OR barrada[Title/Abstract] OR "barrio baja"[Title/Abstract] OR taudi*[Title/Abstract] OR "irregular settlement"[Title/Abstract] OR "informal housing"[Title/Abstract] OR favela[Title/Abstract] OR "basti besides slums"[Title/Abstract] OR slum[Title/Abstract])) OR ("Poverty Area*" OR suburban OR ghetto* OR shunt OR shack* OR bidonville* OR bustee* OR bosti* OR squat* OR "informal settlement" OR barrada OR "barrio baja" OR taudi* OR "irregular settlement" OR "informal housing" OR favela OR "basti besides slums" OR slum[MeSH Terms])) OR ("Poverty Area"[Other Term] OR suburban[Other Term] OR ghetto*[Other Term] OR shunt[Other Term] OR shack*[Other Term] OR bidonville*[Other Term] OR bustee*[Other Term] OR bosti*[Other Term] OR squat*[Other Term] OR "informal settlement"[Other Term] OR barrada[Other Term] OR "barrio baja"[Other Term] OR taudi*[Other Term] OR "irregular settlement"[Other Term] OR "informal housing"[Other Term] OR favela[Other Term] OR "basti besides slums"[Other Term] OR slum[Other Term])

AND

((iran OR iranian OR i.r.iran OR persia[MeSH Terms])) OR (iran[Other Term] OR iranian[Other Term] OR i.r.iran[Other Term] OR persia[Other Term]) OR (iran[Title/Abstract] OR iranian[Title/Abstract] OR i.r.iran[Title/Abstract] OR persia[Title/Abstract])

AND

((health[MeSH Terms]) OR health[Other Term]) OR health[Title/Abstract]

Publication date from 1990/01/01 to 2020/12/31

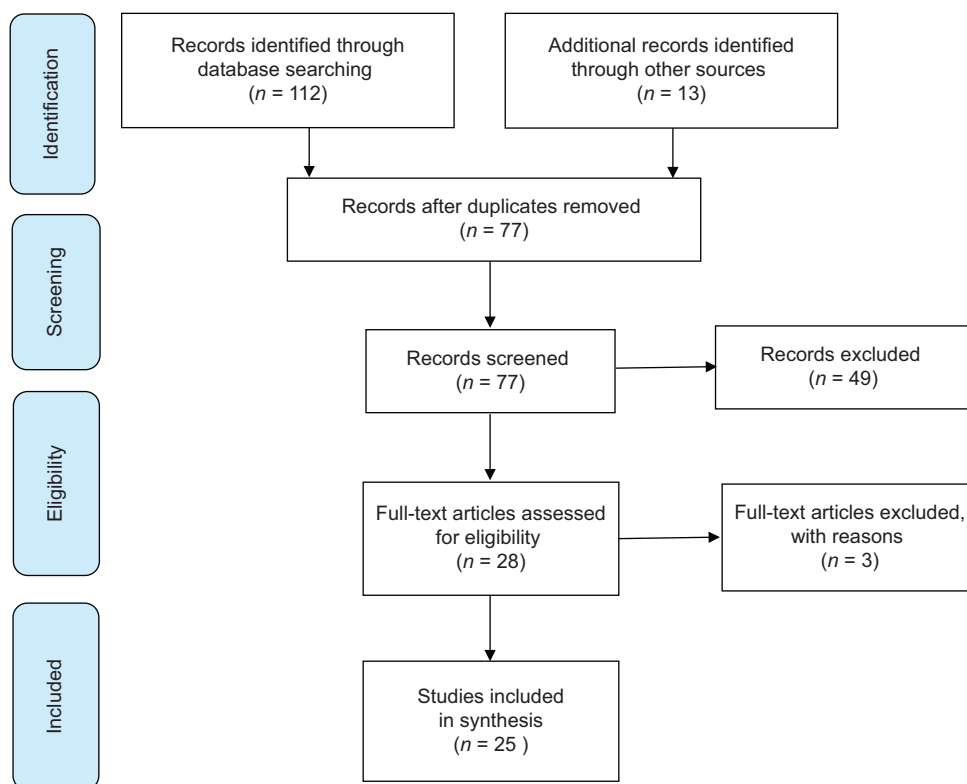


Figure 1: PRISMA flow diagram

area. In general, present result attributed to 1769 household, 35918 individuals (4164 children), and 374 peoples attempt to suicide. Eight studies focused on female sex and the remained considered both sex. In included articles, health-related subjects were studied. Therefore, we categorized them according to their main theme in seven categories; *Quality of life, Reproductive health, Communicable diseases, Non-communicable diseases (NCDs) and their risk factors, Mental health, Social health, and Health system*. The result of one article present in three categories. The details of results presented in Table 2.

Quality of life

Four articles address quality of life in slums of Kermanshah and Hamadan. Their participants' recruitment was done through random sampling methods. They were young-adult. Two studies focused on female sex and the others considered both sex.^[21-24]

The studies revealed that women worried about their security and health. The woman reported the health-related quality of life factors in slums were not acceptable they need to improve physical, and environmental health. The

Table 2: Health Related Issues in Slums

Reference	Study Design	Study Setting	Study Year	Sample size and sampling method	Sex	Age	Results and Conclusion	Suggestion
Quality of Life Rajabi Gilan, N, 2014 ⁽²¹⁾	Cross-sectional study	Six marginal areas of Kermanshah city	2014	555 people/ Multistage random sampling	Female	Adult	The highest and lowest mean scores of the respondents' quality of life were reported for physical health domain (55.6±17.4) and environmental health domain (44.7±16.0), respectively. The health-related quality of life of women in marginal areas of Kermanshah was not in an acceptable level	Set Health related quality of life in slums as priority that needed special policies.
Sajadzadeh, H, 2017 ⁽²²⁾	Descriptive-analytic investigation	Hamadan (Dizaj)	2017	351 household/ Random sampling	Both	Adult	57.8% of participants said quality of transportation is good According to opinion of 48.1% of participants, quality of social environment is good. 71.5% of participants said quality of physical environment is bad. The betterment of the social environment quality has the most necessity in slum.	Implementation of interventions by socio-cultural approach would be the most effective factor in improving the quality of neighborhood life in the area.
Ghasemi R, 2015 ⁽²³⁾	cross-sectional study	Kermanshah	2015	576 women/ systematic random sampling	Female	15-81 years	23% of participants were not satisfied with the quality of their leisure time. Unavailability of facilities by 36%, and financial problem by 14.1% report as main barriers to attempt pleasure activities in leisure time. 25.3% of women whom had academic education attempt to sport in their leisure time. Single women have more sport activities compare with other women. Three significant leisure times' activities was pastime activities, face to face relationships and physical exercises.	Increase sports activities play an important role in improvement quality of leisure time.
Ghasemi, S. R. 2019 ⁽²⁴⁾	cross-sectional study	Kermanshah	2015	432 residents of informal settlements/two stage random sampling	Both	Over 15 years	Significant positive correlation was found between perception of family, socioeconomic status and health-related quality of life ($P<0.05$). Chronic illness, awareness of family, socioeconomic status, age and sex predicted the physical and mental health domain. Mean scores of health-related quality of life subscales follow as: General health: 60.41 (15.56) Mental health: 58.67 (19.70)	Raise awareness and improve socioeconomic status could be effect on quality of life improvement.

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Table 2: Contd...

Reference	Study design	Study Setting	Study Year	Sample size and sampling method	Sex	Age	Results and Conclusion	Suggestion
Reproductive Health Barak M, 2012 ^[25]	Case- control study	Ardabil	2010	134 Slums/ Random sampling	Both	0-12 months	The majority of mortalities among slum's neonates were occurred in neonatal period that most important causes of deaths were prematurity (57%). Remained death occurred in post-neonatal period. The most important causes of deaths in this period were congenital abnormality (35.4%). Birth weight, parents' age and education, family income, occupation and smoking of father were highly associated with mortalities. Percent of stunted 24-35 month-old decreased. Length of exclusive breast-feeding, age of starting weaning food, and proper order of introduction of supplementary foods increased. There was positive correlation between weight for height of children and mother's literacy. Protein-energy malnutrition was a major nutritional problem. Nutritional knowledge, attitude and practice of the mothers were low and related to their socio-economic status.	Modifiable risk factors would be considered through interventional programs.
Keyghobadi K. 2002 ^[26]	Interventional study (2 years education about nutrition)	Kerman	2002	84 Mothers who had 6-48 months children city of Kerman	Both	6-48 months	Only 46% of the eligible women were screened by the Pap smear test. The coverage rate of family planning programs for safe methods was 51.4% (95% CI: 48.86-53.9%). 34% of pregnant women had not received standard health care due to a lack of access to health services. 36% of the women had not received postpartum care because of limited accessibility and unawareness.	Consistent education of mothers about nutrition of children recommended.
Joulaei, H. 2014 ^[15]	cross-sectional study	Fars (Shiraz)	2010	372 Household of slum dwellers/ stratified random sampling	Female	Adult	Results and Conclusion	Comment
Communicable Diseases Asefzadeh S, 2001 ^[27]	Observational study	Qazvin (Abgilack)	1999	288 Household/ Random sampling	Both	Adult	Underground water reservoir was shallow and there was no sewage absorption system. 32% of their house hadn't sanitary toilet and sewage flow in Passages. Prevalent communicable diseases in this area, was hepatitis, skin diseases, pediculosis.	Community based interventions could improve slums' situations.

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Reference	Study design	Study Setting	Study Year	Participant	Sex	Age	Results and Conclusion	Comment
Hoseinpour, R. 2017 ⁽²⁸⁾	Screening	Ten slums area of Gorgan	2016	25,217 People screened for TB/ Non-random sampling	Both	All age	The incidence rate of tuberculosis was 17.5 in 100,000 people in slums population of Gorgan.	Active case finding could be effective strategy and led to early diagnosis and better treatment.
Saberifar R, 2017 ⁽²⁹⁾	Descriptive-analytic study on information in health centers	Mashhad	2013	813 Patients diagnosed with TB	Both	All age	Association between risk of developing TB and living near major traffic arteries, areas with livestock farms or without waste collection system was seen.	The city's outskirts are critical areas that need further considerations by health authorities.
Joulaei, H. 2014 ⁽¹⁵⁾	cross-sectional study	Fars (Shiraz)	2010	372 Household of slum dwellers/ stratified random sampling	Both	Adult	About 8.5% of the households' members had been exposed to leishmaniasis. 35.7% of Patients referred to public health sector. 28.6% had referred to private health centers. 1.1% respondents reported that they had one member infected by HIV. 18.6% of participants had poor knowledge about the definition of HIV/AIDS and its routes of transmission and prevention.	Active response of health system
Ghahremani, L. 2019 ⁽³⁰⁾	quasi-experimental study	Bandar-Abbas	2016	172 Housewives/ Random sampling and random allocation	Female	Adult	A significant difference was found between the intervention and control groups in interventional study by education about malaria. The difference between mean scores of two groups was significant. Predisposing factors (knowledge and attitude) ($P<0.001$), Improvement of preventive behaviors ($P<0.001$).	Health education was effective in increasing knowledge and attitude, enabling and reinforcing factors, and promoting malaria preventive behaviors
Reference	Study design	Study Setting	Study Year	Participant	Sex	Age	Results and Conclusion	Comment
Non-communicable Diseases and Their Risk Factors								
Khayat S, 2017 ⁽³¹⁾	cross-sectional study	Shirabad, Zahedan	2016	132 married women living in suburban area/ Single stage cluster sampling from health service centers	Female	15-49 years	Overweight prevalence was 24.2%. Obesity prevalence was 15.2%. This study demonstrated that suburban women have poor lifestyle and health status	Implementation interventional programs for promoting physical activity could be useful in promoting women's health.

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Reference	Study design	Study Setting	Study Year	Participant	Sex	Age	Results and Conclusion	Comment
Esmailnasab N, 2016 ^[32]	cross-sectional study	Tehran	2015	464/systematic random sampling	Female	30 to 60	Prevalence of Overweight was 40±2.6% Prevalence of Obesity was 33.1±1.6% Inadequate intake of fruit, vegetables, physical activity in marginal area was more than urban and rural area. Prevalence of Inadequate intake of fruit was 17.8±0.5% Prevalence of Inadequate intake of vegetables was 29.7±5.4% Prevalence of Inadequate physical activity was 47.6±8.2% Prevalence of tobacco use or passive smoking was 7.44±1.6%	Women require effective interventional programs.
Yazdanpanah B, 2012 ^[33]	Community based intervention	Yasouj, Kohgiluyeh and Boyerahmad	2007	2569 western suburb residence screened/405 of them took part in intervention	Both	30-65	Diabetes was identified as the first priority health problem in this area. 13-week Nutrition education and physical exercise intervention included group walking, gentle exercise and slow running led to decrease the mean FBS, HbA1C, TG and cholesterol significantly. Systolic and diastolic blood pressure and body mass index were decreased but not statistically significant. water-pipe prevalence was 15.1% 6.3% of respondents didn't know smoking water-pipe lead to cardiovascular problems 92.7% of respondents consulted on the dangers of water-pipe consumption	Participatory community-based care could be a feasible model for control of diabetes and its risk factors.
Faghir Ganji, M. 2019 ^[34]	cross-sectional study	Bandar Abbas	2019	205 women in suburb area	Female	over 18		Community health interventions to improve education, and policies proposed.
Mental Health Ghadrrian, L. 2019 ^[35]	cross-sectional study	Tehran	2017	60 people in suburb area	Both	18- to 68-year-old	30% of suburb peoples had Correct knowledge about recognition of depression Regarding depression literacy, 33.3% intended actions to seek help if having experience of depression. 60% of respondents preferred receiving help from Friend 50% perceived Related cost as barrier of help seeking	

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Reference	Study design	Study Setting	Study Year	Participant	Sex	Age	Results and Conclusion	Comment
Taghadosinejad F, Referral 2010 ^[36]		Tehran	2006	374 suicide by self-burning	Both	15-64	18% considered access to services as a barrier for help seeking 15% have Concern about developing negative attitude towards person 67.1% of Self-burning suicide cases were residents in suburban areas. Suburban areas people had easy access to kerosene and gasoline as a fire accelerant. Social factors are the main drive leading to high rate of suicide in suburban areas. Self-burning was more frequent in females than in males and was noted mainly in young age groups' residents of suburban areas with low level of education.	Intervention for increase the depression literacy suggested. Socioeconomic interventions could be benefit in mental health promotion.
							Results and Conclusion	Comment
Social Health Mahdi A, 2014 ^[37]	Descriptive-analytic study	Shadqolikhah, Qom	2011	380 household/ Random sampling	Both	25-90 years	The most slums were immigrants from rural area. More than half of them were illiterate or had elementary education. Health indicator was lower in illiterate slums than educated people. Identified Social harm were as follow; Addiction 91/7% Stolen 83/4% Family dispute 70/8% Divorce 68/7% Homicide 68/7% Spouse abuse 60/4% Child Abuse 27/1% Beggary 17/1% Suicide 8/4%	Educational programs could be helpful in health promotion. Poverty elimination
Darvishi Y. 2014 ^[38]	Cross-sectional study	Mir Ashraf, Ardabil	2013	90 households/ Random sampling	Both	All age		
Nourbakhsh Y, 2017 ^[39]	Cross-sectional study	Kermanshah	2017	384/Two-stage cluster sampling	Both	15-29 years	There is correlation between four type of social support and social health Emotional $r=0.26$ Informational $r=0.31$ Instrumental $r=0.41$ Appraisal $r=0.2$	Establishment counseling centers in slum area and raising governmental and non-governmental commitment to social health promotion in slum area

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Table 2: Contd...

Reference	Study Design	Study Setting	Study Year	Participant and Their Recruitment	Sex	Age	Results and Conclusion	Comment
Health System Joulaei, H. 2014 ^[15]	cross-sectional study	Fars (Shiraz)	2010	372 household of slum/Stratified random sampling	Both	All age	21.6% of the households had no physical access to health centers. Coverage of health care, and route of receiving health services 7.2% (95% CI: 6.4-8%) and 10% (95% CI: 9.08-10.91%) of the slums' residents. 18% of hypertensive individuals were not under health care coverage because of inaccessibility and 55% referred to private health centers. About 16.3% of the participants (95% CI: 14.91-17.68%) were smokers. The most prevalent health information source in the slums was the radio and the least prevalent one was health care centers' staff. Inadequate knowledge of slum residents about health care facilities was the main barrier to the utilization of the health care in the slums. Vaccination coverage among children under 5 years old was 98% (95% CI: 97-99%). 88% of children under 8 years of age were covered by public health services, and vaccination coverage for this age group was estimated to be 98% (95% CI: 97-99%). The vaccination coverage of men above 16 years old was 49%, while it was 78% for women of the same age.	Establishing new health care centers in slum areas, augmenting the quality of medical services in health care centers, and elevating health knowledge among slum dwellers constitute three major strategies that should be adopted in order to combat this challenge.
Zahraei M, 2015 ^[40]	Cross sectional	Kermanshah	2013	420 Children/systematic random sampling	Both	24-36 Months	At birth vaccination, coverage (BCG-polio-hepatitis) was 100%. At 18-month vaccination coverage was 95%. The most important reasons for delay in vaccination or omit it are lack of parents' awareness about the time of vaccination (50%) and necessity of vaccination (28%) There is correlation between educational level of parents and vaccination.	Develop vaccination registration system and following system and appropriate education

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Reference	Study Design	Study Setting	Study Year	Participant and Their Recruitment	Sex	Age	Results and Conclusion	Comment
Rejali, M. 2015 ⁽⁴¹⁾	Cross sectional Study	Tehran, Isfahan, Arak, Mashhad Zahedan	2013	3610 children, living in the suburbs of five metropolises of Iran/proportioned cluster sampling	Both	24-47 months	Cumulative delay >1 week were as follow; Tehran 27.2% Isfahan 32.1% Mashhad 39.8% Zahedan 53.2% Arak 25.4%	health policy makers should attempt for on-time vaccination beside of high immunization coverage, especially in slum areas with more concentrated immigrants due to low literature and crowded families
Jadidi, R., 2015 ⁽⁴²⁾	Historical cohort study	Tehran, Isfahan, Arak, Mashhad Zahedan	2013	3610 children/ stratified proportional sampling method	Both	24-47 months	There was significant association between mother's education and on time vaccination. Among all vaccines 56.6% to 93.2% were administered out of time. Delayed time more than a week varied from 5.5% to 74.9% of polio at birth and MMR2 at 18 months, respectively. Concentration Index of mother and father's education for timely MMR vaccination was 0.023. Relative Index of Inequity (RII) C index of mother and father's education for timely MMR vaccination was 0.029. 4 th child or above less than others had on time vaccination.	Increasing timeliness of vaccination for improving the protective effect of vaccines could be considered a health system.
Amiresmaili, M. 2019 ⁽⁴³⁾	Cross-sectional study	Kerman	2019	559 slums people/ random clustered sampling	Both	17-79 years	21% of people who required outpatient services were able to use them. 15% of people who needed outpatient services were able to use the services for at least once. 31% of people needed hospitalization were able to be hospitalized. There was a relationship between age (odds ratio [OR]=1.7, confidence interval [CI] 95% = 0.47-0.88), marital status (OR=2.78, CI 95% = 0.64-1.2), and the use of inpatient services.	proper planning and policy for this increasingly demand

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Reference	Study Design	Study Setting	Study Year	Participant and Their Recruitment	Sex	Age	Results and Conclusion	Comment
Farid M, 2017 ^[44]	cross sectional study	Karaj	2015	514 married women of three slums/two-stage cluster sampling	Female	19-74	62.4% of participants stated the need for nutritional consultation, but only 26.2% of them had received proper consultation than 47.3% of them referred to private centers 78.5% of participants interested in more nutritional health literacy 58.4% of participants stated the need for psychological consultation, but only 24.1% of them had received proper consultation than 45.8% of them referred to private centers 77.3% of participants interested in more mental health literacy 71.7% of pregnant woman refer to public health centers for prenatal care. 43.8% of elder women (over 60 years) didn't refer to health centers for screening or treatment.	providing necessary infrastructure to improve these people's access to the health care system

other study on women demonstrated one fifth of participants were not satisfied from their leisure time. Unavailability of facilities and their economic situation led to unpleasant leisure time for them.^[22,23]

The studies on both sexes shown the slum residence have not been satisfied with physical environment. Also, the slums had concern about their social and environmental situation. They need to socio-environmental promotion, socioeconomic status improvement, and their awareness increment related to quality of life. Comparison the mean scores of health-related quality of life subscales revealed the mean score in mental health was lower than general health (58.67 vs. 60.41).^[22,24]

Reproductive health

From three studies categorized in reproductive health subject, two cases related to child health and the other one was about women health. A case-control study in slum area of Ardabil revealed that the important cause of death among neonates was prematurity and congenital abnormality. There was association between neonatal mortality and parents' education, income, and smoking of father.^[25]

A study showed beneficial impact of improving health literacy on intervention regards health-promoting behaviors.^[45]

A study in Shiraz demonstrated about 5% of the eligible women use contraceptive method, and about 50% of slums women screened by pap smear test. About one third of pregnant women had not receive prenatal and postpartum care. The most important reason of this situation was low awareness of women, and low access of them to health services in slum area.^[15]

Communicable diseases

Three studies in slums area of Gorgan and Mashad, and Shiraz performed through a screening data analysis, a descriptive study on health centers information, and a cross sectional study, respectively. These studies showed tuberculosis (TB) incidence rate in slums of Gorgan was 17.5 per 100000. In addition, they revealed living area situation such as living near major traffic arteries correlate with risk of TB in Mashad.^[28,29]

The other study in Shiraz showed the prevalence of leishmaniosis in slum area was 8.5% witch one third of them referred to public health sector. Also, HIV infection was important issue in this area, but 18.6% of slum residential had poor knowledge about prevention of HIV/AIDS.^[15]

Non-communicable diseases and their risk factors

Three cross-sectional studies by participation women of slum area address the risk factors of NCDs. These studies showed unhealthy life style and unsuitable health status of slum dwellers women. Among them, inadequate

intake of fruits and vegetables, low physical activity, and smoking were considerable health problems in slums of Bandar-abbas, Zahedan, and Tehran.^[31,32,34]

A community based intervention in suburb residence of Yasouj showed the effect of nutrition education and physical activity promotion on decreasing FBS, HbA1C, TG and cholesterol significantly.^[33]

Mental health

A cross sectional study in suburb area of Tehran showed the inhabitants preferred receiving help from friends. In addition, most of them had concern about cost of mental health services. The other study in Tehran demonstrates 67.1% of Self-burning suicide cases were residents in suburban areas. Self-burning suicide was frequent in females, youth, and who had low level education. Socioeconomic factors could be determinants of mental health status.^[35,36]

Social health

A cross sectional study in households living in suburb of Ardabil demonstrates the most prevalent social harms in this area was addiction, and stealing.^[38] Another study in Qom showed health indicators measure was lower in illiterate slums than educated people. There is correlation between social support and social health.^[37]

Health system

A comprehensive study in Fars province on 372 household slums showed one fifth of them has not access to health centers. Health care coverage among them was about 10%. The essential source of health information in slums was radio. Although, health workers had inconspicuous role in informing slums peoples. Inadequate awareness of slums' inhabitants about health care facilities was the main barrier of their utilization. But, vaccination coverage among children of this area was 98%.^[15]

The other studies about vaccination in slums settled in Kermanshah, Tehran, Esfahan, Arak, Mashhad, and Zahedan. These studies showed the most important reason for delay in vaccination was unawareness of parents about the time and necessity of vaccination. Delay in vaccination mostly occurred for MMR vaccination at 18 months. There is positive correlation between on-time vaccination and parents' educational level.^[40-42,46]

The other study in Kerman demonstrate, 21% of people who required outpatient services and 31% of people who needed hospitalization were able to use these services. In slums of Karaj, a cross sectional study by participation of married woman showed they need to nutritional and psychological consultation.^[43]

Discussion

The considerable growth of urbanization in Iran^[47] led to slums growth impulsively^[11] that has not been matched

by knowledge production in this area. In this systematic review, we tried to cover all relevant studies in Iran to summarize the evidence on different aspects of Iranian slums' health status. Our study verified the relationship between socioeconomic factors and health status based on included studies. Unfortunately, they fall to worse health situation because of poverty and unawareness.^[1]

In this regards, the other study reported that poverty, illiteracy, unemployment, low incomes, unfavorable living conditions, inappropriate housing, lack of security are the main characteristics of informal settlement in slum areas.^[48] So, implementation of interventions by socio-cultural approach, and raise their awareness about health could be promote their situation.^[49]

Reproductive health is one of the most important issues in slums health. This systematic review revealed the association between neonatal mortality and parents' education, income, and father's smoking.^[25] Also the correlation between child nutrition status and their mother's education status was shown.^[45] Unfortunately, low access to reproductive health services and low awareness of women about these services led to low utilization of them.^[15] Accordingly, improvement reproductive health services and develop appropriate interventions by considering cultural issues recommended in slum area.^[50]

Our study showed incidence rate of TB,^[28,29] prevalence of leishmaniasis, and the importance of HIV infection in slums.^[15] The other studies emphasized on mosquito-borne diseases and Ebola in poverty.^[51,52] A study indicate determined socioeconomic inequalities in infectious diseases.^[53] Now, by COVID-19 pandemic, we worried about this novel corona virus epidemic in slum area. Consequently, we should plan to control disease by train and set up community health workers in slum area and utilization previous experiences about communicable diseases.^[54]

In addition to infectious diseases, inadequate intake of fruits and vegetables, low physical activity, and smoking exposed slums to risk of NCDs.^[31,32,34] A study in Brazil demonstrated slum residents had higher prevalence of diabetes mellitus, overweight/obesity, and smoking compared to the general population.^[55] Another study Bangladesh showed all NCDs risk factors are high among the urban slum adults.^[56] Therefore, we need appropriate action plan for this population.^[57]

In addition to NCDs, mental health is an essential issue in this areas, especially in women and youth.^[35,36] A cross-sectional Study among teenage girls living in urban slums in India revealed more than half of them had high levels of anxiety, depression, or psychological distress.^[58] These situations could be modified through participatory community-based interventions.^[59] There is some people who needed inpatient or outpatient services, but they were not able to use the services.^[43] Multi-sectoral approach in

establishment new health care centers, augmentation the quality of health care, developing counseling centers, and elevating health literacy among slum dwellers constitute major strategies that should be adopted in order to combat this challenges.^[57,60,61]

In our knowledge, it was the first time that health status of slum dwellers in Iran has been reviewed systematically, but we faced to some limitations. The present study was dependent on validity and the applicability of its results to the quality of the initial included studies that considered by precise quality assessment. Because of data scarcity, variations in studied groups, differences in living areas, and inconsistency of the measures, we could not statistically compare and aggregate the results, but we summarize the information in different categories.

Conclusions

Our findings could provide practical evidence about health situations of slums in Iran for better policy making and more detailed studies in this area. This important health issue required special attention of the government and policymakers to implement community-based interventions by socioeconomic and cultural approach to improve slums situation,^[48,50] and we proposed health problem solving based on each community priorities.^[62]

List of abbreviations

- LMICs: Low and Middle-income Countries
- STD: Sexually Transmitted Diseases
- SDG: Sustainable Development Goal
- WHO: World Health Organization
- ISI: Institute of Scientific Information
- SID: Scientific Information Database
- MeSH: Medical Subject Headings
- CASP: Critical Appraisal Skills Program
- OR: Odds Ratio
- RII: Relative Index of Inequity
- TB: Tuberculosis

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

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