'Poverty flames burns': deficiencies of burn care financing in Iran's healthcare system

Mostafa Amini-Rarani

Isfahan University of Medical Sciences

Farzaneh Mohammadi

Isfahan University of Medical Sciences

Nasrin Shaarbafchi Zadeh

Isfahan University of Medical Sciences

Vahid Yazdi-Feyzabadi (✉ va.yazdi@gmail.com)

Kerman University of Medical Sciences <https://orcid.org/0000-0002-8009-470X>

Research article

Keywords: Burns, Burn Units, Healthcare Financing, Qualitative Research

Posted Date: October 14th, 2019

DOI: <https://doi.org/10.21203/rs.2.15991/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Abstract

Background: Due special characteristics of burn patients, such as vulnerability, high treatment costs, and expensiveness of burn services, financing of burn services has a crucial importance. The current study aims to identify challenges of financing of burn services in Iranian healthcare system.

Methods: The current qualitative study employed purposeful sampling with maximum variation. In total, 21 interviews were carried out to the saturated point, with interviewees from national, provincial, and local (hospital) levels. Kutzin's descriptive framework on analyze of financing programs for healthcare services at national level was used to develop interview guide. A thematic analysis with hybrid approach of inductive and deductive coding and theme development was employed to analyze the transcribed documents by using MAXQDA Version 12.0 (VERBI GmbH Berlin) Release 12.3.0.

Results: Three themes and nine (sub-themes) were identified, as follow: collection of funds (revenue generation), pooling of funds (cost-sharing and fees, and uninsured people) and purchasing of services (inappropriate payment mechanism, incomplete content of service benefit package, inappropriate financial resource allocation, ineffective medical tariffs, top-down budgeting approach and lobbying in resource allocation).

Conclusions: According to the results of the current study financing burn services can be improved through reviewing and reforming burn financing policies (with ultimate goal of universal health coverage), increasing affordability of burn services, allocating sufficient budgets and using evidence-based purchasing that is based on objective indicators of demand and supply, and also creating new financial resources (through advocacy from related stakeholders and imposing sin taxes), so that other institutions such as Ministry of Oil, Ministry of Energy and municipalities be engaged in financing burn services to address financial deficiencies.

Background

Every health system has four main functions: stewardship, financing, service provision, and resource generation. Financing contains the process of collecting funds from primary and secondary sources, pooling, and then allocating funds to healthcare providers in return for specific activities. Collecting funds refers to both primary (households and firms) and secondary (governments and donors) sources [1]. Pooling, the second sub-function of financing, is defined as grouping together the resources for a defined population, so that financial risk be shared and spread among the whole population. Purchasing services is allocating collected and pooled funds to healthcare providers [2]. Financing is crucial for enabling health systems to maintain and promote societies welfare. Without adequate funds, other necessary inputs of an effective health system such as health human resources, medicines, equipment and medical devices, would not be available. As well, without adequate resources, health promotion or prevention will stop [3]. Due to its irreversible impacts and special status of burn patients, financing burn services is of paramount importance. Burn injuries are a major cause of mortality around the world. An estimated 300000 deaths occur annually from fires alone. Meanwhile, if deaths due to boiled water, burns caused by electric shocks, and other types of burn be added, it will increase significantly. Nearly 95% of all burn-related death occurs in low-and-middle-income countries [4, 5]. In addition, millions of people suffer from permanent disabilities and deformities resulted from burns, which have significant psychological, social and economic consequences for both patients and their families, and/or may results in social exclusion [6]. Results of a systematic review on incidence of burnings and resulted mortalities has found a different pattern between various countries, so that burn admission or burn incidences are increasing in some countries, including Australia, Bulgaria, China, Czech Republic, Finland, and Iran, while simultaneously is declining in countries such as Chile, Germany, India, japan, Canada and Mexico [7]. Although deaths due to fire, heat, and hot substances have declined by 7.9% globally [8], but burn related mortalities has increased or is constant at least [7].

Burn-related mortality is higher among people with lower socioeconomic status. Moreover, it results in impoverishing healthcare expenditures or may exacerbate the poverty trap among families of victims. Epidemiological studies show that most of patients with burn or fire related injuries belong to lower socioeconomic groups of the societies that cannot afford healthcare costs [9, 10]. Evidence also indicates a positive association between poverty and burn-related mortality [11]. Low-and-middle-income countries suffer from double burden of higher burn and fire related admission, and soaring healthcare costs of treating burn patients [12]. A variety of studies in different countries show that treatment costs of burn patients is high [13–15]. A study in Iran has found that total treatment costs associated with 1721 burn patients was about US\$ 4835000 over two years –an average of US\$ 2810 per each patient. As well, curative costs of 1% total body surface area burn is equal to US\$ 162 [16]. Another study on patients age 55 and higher in Iran has found that treating a burn patient requires around US\$ 7540 [17]. Therefore, it contains a significant share of health expenditures, which creates significant challenges for its financing. In the United States of America (USA), direct costs of treating burned children equals to more than US\$ 211 million, Norway spends more than €10.5 million on inpatient services for patients with burn injuries and South Africa spends about US\$ 26 million on patients with burn injuries, mainly due to unsafe stoves [18]. Meanwhile, indirect costs such as lost income, social pensions for deformities, emotional problems, and unfilled family commitments have significant economic and social impacts [18]. In addition, studies revealed that regional hospitals suffer from problems

such as obsolete equipment, insufficient intensive beds, and transportation equipment for patients with major burn [19]. Regarding soaring healthcare expenditures in Iran and expensiveness of providing services to burn patients at different levels of the health system [16], investigating challenges of financing these services and providing up-to-date evidences for budgeting are of paramount importance to improve delivery of burn services. Therefore, the current study aimed to investigate challenges of financing burn services at Iran's healthcare system.

Methods

Setting and context of the study

In Iran, the financing of a main share of the public sector's expenditure occurs via the state's general budget. The budget process is initially bottom up with district and provincial levels estimates sent to the central state. The central state, represented by the Management and Planning Organization, reviews and determines final budgets. The healthcare financing is pluralistic and it is organized through public and private insurance schemes. Access to healthcare services, choosing providers and reimbursements are discerned mainly by the insurance coverage. There are several insurers (including Social Security Organization, Iran Health Insurance Organization, Armed Forces Medical Services Organization, Imam Khomeini Foundation, and private and complementary insurances) with a variety of benefit packages. As well, about half of health expenditure in Iran's health system is financed by out-of-pocket (OOP) [20]. In the public system, i.e. healthcare facilities affiliated with the Ministry of Health and Medical Education (MoHME), primary healthcare services are mostly free of charge and are financed through budget transfers to the health centres. Secondary and tertiary levels services are mainly financed by the social security organizations and insurers. Moreover, financial protection and equity in health financing aimed to decrease OOP and catastrophic health expenditure have been emphasized in the fifth, and sixth 5-year development national plans [21, 22], and also in a recently programme named health transformation plan [23]. Nevertheless, health financing in Iran still suffers from inequitable financial protection against health expenditures and evidence showed that the goals of the national plans did not succeed much in dropping OOP and catastrophic health expenditure [24].

To provide burn care in Iran, there are 12 single-specialized burn hospitals and more than 45 burn units that are located in the general hospitals affiliated with the MoHME [16]. There are about 1100 burn beds and 200 burn intensive care unit beds. However, the number of burn bed per capita is low (about 1.55 beds per 100000) [25], and the distribution of burn beds suffers from inequality across Iran's provinces.

Data gathering

To investigate the challenges in financing burn services and its sub-functions in Iran a qualitative study using content analysis approach was designed. The study period was February 2017 to April 2018. Using purposive sampling interviewees were selected, with emphasize on maximum variation. Selection criterion was being informant about financing of burn services. The informants were recruited from three levels: national, provincial, and local (hospitals). During the interviews, snowball sampling was used to identify all informants. In total, 21 interviews were conducted, respectively, 2, 6 and 13 interviews at national, provincial and local levels. The informants were representatives of the MoHME, Medical Universities (as the proxy of the MoHME at provincial level), and health facilities that only provide inpatient burn care at Tehran, Isfahan, Khuzestan, Fars, Bushehr, Khorasan Razavi, West Azerbaijan, and Yazd. In terms of organization position, informants were head nurse, chief executive officers, head of hospital departments, and specialized physicians at Specialized Burn Hospitals (SBHs). Most of them have direct experience (at least five years) in policy-making for burn services and/or providing such services.

Written informed consent of all participants was acquired, and they were assured that anonymity and confidentiality of any information would be observed. All interviews were recorded. To ensure that all relevant challenges would be identified, based on Kutzin's descriptive framework to analyze financing programs for healthcare services at national level [26], an interview guide was developed. The framework describes financing function and its sub-functions, including collecting, pooling and strategic purchasing and resources allocation (setting tariffs, payment system, and payment mechanism) and how these sub-functions are linked with the target population [26], it is mainly adapted from the World Health Organization (WHO) framework for health systems [27]. To check the validity of interview guide, initially three pilot interviews were conducted. Based on the results, minor changes were made.

Interviews took place in 2017- between May and December. Initially we contacted the interviewees via phone or email and informed them about the research topic, its objectives and reasons for doing the current research. If they accepted the interview meeting, interviews took place in the interviewee's office or any places where the interviewee suggested. Interviews were conducted by one experienced qualitative member of the study team (MAR) using interview guide. Academic position, field of interest and the interviewer's subject area of expertise were reported to participants. Most interviews were digitally recorded (with written informed consent of interviewees), anonymized and then transcribed verbatim –one of the interviewees did not allow to record, so that interviewer was take note. The Interviewer also took filed notes which shared with research team to discuss initial findings, complications and any modifications needed in the interview guide. Interviews were continued until a saturation point was reached. After the saturation point that no additional data was necessary, two extra interviews were also

conducted. In total, 21 face-to-face semi-structured interviews were carried out. Average interview time was 40 minutes, and each interview time lasted between 30–90 minutes.

Analysis

A thematic analysis with hybrid approach of inductive and deductive coding and theme development was employed to analyze the transcribed documents [28]. Each interview was reviewed for several times to identify a list of inductive themes, based on financial sub-functions of the WHO's framework [27], to assess performance of health systems. Simultaneously, deductive themes were directly identified. To conduct the thematic analysis following steps were done: initially four of the authors (MAR, VYF, NSZ, and FM) coded gathered data independently, and immersed themselves in data by reading and re-reading the transcribed documents as well as listening to recorded interviews. Then, initial themes were produced from the data, with emphasize on financing function and reviewed by the team members. For reaching agreement on emerging themes, team members met in Isfahan city to discuss controversies in January 2018. The meeting was continued to the point that all of the controversies were addressed. In this step, themes and sub-themes were identified and primary framework was developed. Finally, coded statements were reviewed, refined and collated. MAXQDA Plus Version 12 (VERBI GmbH Release 12.3.0 Berlin) was used to manage and analyze transcribed documents.

Quality assurance

Criteria suggested by Lincoln and Guba [29, 30], were used to ensure Trustworthiness. To ensure the credibility, data gathering, coding and analysis were prolonged for about 15 months. Moreover, a documented guide was developed to ensure credibility of sampling, interviews, and analysis of transcribed documents. Also, during interviews important notes were taken and reviewed for several times simultaneous with coding process. To ensure transferability (which directly depends on external validity), a series of quotations are embedded in the text. As well, a description on overall financing of the Iranian health system, epidemiology profile, and delivery of burn services are provided, these descriptions facilitate transferability of the findings of the current study to other contexts. Further, to improve transferability, data were collected and analysed at the same time. Dependability of the study was assured by an auditing approach in which the authors accompanied with external auditors engaged in complementary comments, cross-checked, investigated inconsistencies and addressed them to achieve consensus. To improve confirmability (which parallels objectivity), research team not overtly allowed their values or theoretical inclinations to conduct the research and the findings deriving from it.

Results

Characteristics of participants are described in table 1. In terms of organizational position, interviewees were from SBHs, academics, and the MoHME experts. Hospital professionals and scientists were working at SBHs, with average experience of 14.8 years (standard deviation = 5.59).

Table 1 placed here

Three themes and nine subthemes on challenges of financing burn services were extracted. Themes and (subthemes) are as follow: Collection (revenue generation), pooling (cost-sharing and fees, and uninsured people), and purchasing (inappropriate payment mechanism, incomplete benefit package, inappropriate resource allocation, ineffectiveness of tariffs, top-down budgeting approach and lobbying) (Table 2).

Table 2 placed here

Frequency of themes is described in figure 1. As it shows, about 90, 84 and 74% of participants referred to purchasing, pooling and collection as the main challenges of financing burn services, respectively.

Figure1 placed here

Frequency of coded segments in terms of each subtheme is described in figure 2. As the figure shows, revenue generation (36.8%) and lobbying in resource allocation (1.5%) had the highest and lowest frequencies, respectively.

Figure 2 placed here

1- Collection of funds

1-1- Revenue generation

Inability of hospitals to generate surplus is one of the main challenges to finance burn services, as many interviewees noted. Lack of revenue generation has resulted in low investment return in hospitals, therefore medical universities do not have any incentive to establish burn specialized hospitals. The interviews have mentioned to a series of reasons: firstly, lack of financial ability of patients. It is believed that burn injuries and accidents are significantly higher among the poor and those from lower socioeconomic groups –those with permanent economic problems. They cannot afford hospital bills. Even in some cases, burn patients and their families do not have enough money to buy food and fruit/vegetable. Hospital staff or the hospital itself provide in-kind support for those with severe economic problems. Addicted persons whom are burned are an interesting example, they don't want to be discharged, and the hospital doesn't have any option except to cancel the bills. One of the interviewees noted that:

"We admitted an addicted person whom was homeless. There are many of them in other hospitals. That person was admitted as a patient. The morphine was injecting on time and three hot meals and two snacks were also available for him –foods that are protein rich, not zero-calories foods. Living in hospital is much better than streets. Supportive services are available. They are not willing to be discharged. We discharge many of our patients without any compensation, even sometimes health staffs use their own vehicles to transfer discharged patients to their families, because their families are not willing to discharge them. Even there are patients that one of their family members stays in the hospital to use available accommodations and when it's time to discharge the patient, s/he suddenly disappears. It is common in burn departments/hospitals, and because of such issues burn departments cannot generate surplus" (interviewee number 11).

The interviewees believed that single specialized nature of SBHs has a significant impact upon their ability to generate surplus. For example, when specialized physicians are working in SBHs, the hospital cannot compensate them without external assistance, while if the burn department be attached to a general hospital, physicians can work in other departments, which reduces the overhead costs. For example, internists can provide service at both burn department and general departments. The same is true for infectious disease specialist. In other words, economic of scope should be emphasized to increase efficiency of using available capacities (human resources, and even laboratory and diagnostic equipment). Even if burn department does not generate revenue surplus, its loss can be compensated by revenues generated by other departments. Another main challenge is high costs of providing burn services and hoteling services, which is mainly due to prolonged hospitalization, continuity of medical services, repetitive bandage changing, washing wounds, taking bath, high calorie and protein rich meals and snacks. And the last challenge, but not the least, that according to interviewees can address the problem of revenue generation of SBHs is intra-sectoral financing. SBHs should be authorized for intra-sectoral advocacy and financing, so that other departments or institutions such as municipalities, Ministry of Oil, Ministry of Energy and governors be engaged in financing burn services to address financial deficiencies.

2- Pooling of funds

- Cost-sharing and fees

Insurance companies usually have long delays in reimbursing hospital bills, and usually apply high deductions, which together create problems for financial flow of SBHs. One of the interviewees noted that:

"Reimbursement of single-specialized hospitals usually contains long delays, usually more than general hospitals. Sometimes it takes more than one-year. As well, each bill usually contains a deduction, which it increases the loss of SBHs" (interviewee number 4).

- Uninsured people

Lack of insurance coverage for foreign migrants, particularly those from Afghanistan, is another important challenge for financing burn services. Most of them are not able to health care costs, which for burn services is more prevalent. SBHs admit foreign migrants, but neither can charge them nor discharge:

"Many of burn patients are not Iranian. Many of them are from Afghanistan ... Donors do not help them. Foreign burn patients cannot afford treatment costs, and hospitals also cannot prolong their hospitalization period. They are illegal migrants, and therefore do not have any health insurance coverage. Hence, SBHs do not receive any money" (interviewee number 11).

3- Purchasing of services

3-1- Inappropriate payment mechanism

Payment system of burn services follows the overall Iranian healthcare payment system; therefore most of its challenges are similar to the general payment system of the country. Long delays, inappropriateness of payment methods, and unequal payments are among the most important challenges. In-time payment is an important part of any health payment system, but similar to other hospitals, reimbursement of SBHs contains a long delay, that generates negative incentives for physicians to go to private sector or refusing to accept burn patients. Since reimbursement of SBHs is similar to general hospitals, but treating burn patients requires more time and resource, current payment method has resulted in dissatisfaction of health staff of the SBHs. One of the interviewees noted that:

"Payment system of SBHs has severe problems. The current Fee-For-Service payment method is basically wrong. SBHs usually do not generate income surplus, and the payment system is pushing physicians toward inducing demand, and due too high working burden of treating burn patients, payment to nurses is not proportionate to their workload ... they should do something about the payment system of burn services. For example, per capita method or Disease Related Groups can be employed. Price cost should be calculated by other methods" (interviewee number 19).

Although, nurses spend more time for treating burn patients and their workload is higher, but under the current payment system, bonus payment to physicians is several times higher than nurses. It indicates inequity in payment system of hospitals.

3-2- Incomplete benefit package

Challenges related to health insurance are often due to lack of sufficient and effective support of health insurance companies. Surgery for burn patients usually is expensive, and in some cases such as plastic surgery, medical procedures are not covered by health insurance schemes. Also, for those surgeries that are intended to treat deformities, health insurance schemes do not provide coverage. It is true for innovative methods and equipment such as wound dressing, and expensive antibiotics. Based on interviewees' perception, lack of sufficient insurance coverage has resulted into two main consequences: higher mortality rates, and more complications. Indeed, health insurance companies are failed in providing health insurance coverage for burn services.

Another important challenge is lack of insurance coverage for rehabilitative services and psychological consultations. Although rehabilitative services, occupational therapy, and psychological consultations (particularly for those who committed a suicide) compromise a substantial part of the treating burn patients, but health insurance coverage is only available for inpatient services. A general surgeon at a SBH said that:

"Treating a burn patient has two parts: (a) during hospitalization; and (b) after discharge, that needs rehabilitative services, psychological consultations, special clothes for burn patients, and so on. Then, hospital treatment is just about 15% of the treating a burn patient. It requires a plan for two or three years, and other important services should be included in health insurance schemes" (interviewee number 2).

3-3- Inappropriate financial resource allocation

Interviewees believe that current financial resources of burn services are not sufficient. It is mainly due to a misconception about burn services when deciding to allocate financial resources, so that treating a burn patient is considering as a surgery, while it constitute a small part of the treatment plan process. However, for example, cost of hoteling services for a burn patient is up to 12 times higher than other patients. Inappropriate budget allocation between burn departments and other hospital departments by medical universities is another important challenge. Burn departments are different than other hospital departments and are single-specialized. When allocating budgets, general hospitals are prioritized over SBHs, which results in problems such as insufficiency of resources and delayed allocation. One of interviewees noted that:

"We (SBHs) are separated from other hospitals! Then, when it comes to budget allocation, SBHs are the last priority. Burn departments should be treated like other hospitals. Currently SBHs are struggling with insufficient financial resources." (Interviewee number 1)

Although there is a special line-item for allocating budget to SBHs, but it is not continuous and managers of SBHs are not assuring of availability of resources. Indeed, even allocated budgets are partial. Another important challenge is spending budgets of SBHs for other sectors.

3-4- Ineffective medical tariffs

Based on the interviewees, setting medical tariffs for burn services is an important challenge that SBHs are face with. Low tariffs and inconsistency of tariffs with prime cost are the most important issues.

Low tariffs not only create problems for SBHs, but also motivate physicians to move toward specialities with higher incomes. Therefore, if policy-makers are intended to provide incentives for physicians to continue their education at specialties related to burn services, medical tariffs for such services should be increased. As well, tariffs approved by the MoHME are lower than prime costs of SBHs. Another interviewee noted that:

"Current tariffs are not consistent with cost structures of SBHs. Tariffs should change fundamentally ... I think a well-experienced team should plan for required changes." (Interviewee number 19)

3-5- Top-down budgeting approach

The MoHME allocates financial resources. In most of the cases, those in the ministry are not fully aware of requirements of SBHs as well as their priorities; hence current budget allocations are not realistic. The next challenge is declining trend of burn services' budget allocation, and not fully allocating the approved budget.

"When it comes to allocating budget for burn services, we all should accept that approved budgets will not be fully allocated. In addition, it has a declining trend. We hope that the MoHME do something to address this issue" (Interviewee number 5).

3-6- Lobbying in resource allocation

Interviewees noted that one of the biggest problems of SBHs is intervene of non-specialist but with high political influence individuals over allocating SBHs budgets. More precisely, instead of using technical and professional requirements, political influence and relations have the dominant role in financial decisions. As a result, some hospitals that have the political support of politicians and/or policy-makers are enjoying a good fiscal space, while the rest doesn't have access to sufficient resource to meet the basic requirements. So, as a result of such lobbying, some hospitals with less financial needs are using more resources that could otherwise be used by hospitals with more needs in disadvantaged areas. One of the interviewees noted that:

"One of the main problems of hospitals in deprived areas is lack of political support. You know, it's a long time that those with political influence are lobbying. Allocate needs, realistic cost estimation, and medical demands of hospitals are no more the main criteria to allocate scarce resources. Indeed, lobbyists are the dominant players." (Interviewee number 3).

Discussion

Burn injuries create a heavy financial burden in developing countries, to afford costs of such injuries developing countries are facing with severe challenges that are mainly related to factors such as number and availability of providers of burn services, burn facilities, financing, and socioeconomic characteristics of burn patients. According to the best knowledge of the authors, the current study is the first kind of its own that by taking a qualitative perspective has investigated current challenges of financing burn services at Iranian healthcare system. Findings of the current study show that different factors that affect financing burn services can be categorized into three: resource collection, pooling, and purchasing services. In the following each category is discussed.

For collecting and pooling resources to cover burn services four main challenges are identified: (a) poor economic status of patients; (b) single-specialty of the SBHs; (c) high costs of burn services; and (d) inadequate intra-sectoral collaboration. Low socioeconomic status of patients and high prevalence of problems such as addiction have paramount importance in financing burn services. A significant portion of burn patients are from lower socioeconomic parts of the society, and therefore cannot afford hospital bills which creates two main problems: (1) prolonged hospitalization; and (2) increasing overhead and hoteling costs without compensation. Studies in Peru [31], South Korea [32], and USA [33], have found that individuals with lower socioeconomic status are more prone to burn injuries and accidents, and lower infrastructures increase the probability of such injuries and accidents. In addition, evidence also show that low income and income inequality have a positive association with burn injuries and accidents [11]. Studies conducted in Iran, also, have found that lower socioeconomic status has a significant association with burn injuries and accidents [34]. The next important challenge is expensiveness of treating burn patients that can be due to using high-tech equipment, new generation of wound dressing, skin bank, rehabilitative services, necessity of using protein rich and high calorie foods, high-active antibacterial substances, long hospital stay due to prolonged treatment and post-treatment care. Therefore, providing burn services is costly and reduces the hospitals ability to generate income surplus. A study on SBHs of Iran found that hospitalized patients experience high rates of hospital infections [35], that may prolong hospitalization period [36–38], rise healthcare costs, increase hospitalization period in intensive care units and using ventilator [37].

A systematic review found that using cost-effective interventions to treat burn patients from primary care to effective treatment, follow-up, and rehabilitation can reduce medical costs, while the quality of care remains untouched. In this line programs for human resources development, adequate utilization of available resources, participative and multi-specialty approaches can be useful [39]. Another study has estimated that treating a burn patient on average costs about US\$ 2810 in Iran [16], which is different for various age groups [17]. Generally, treating a burn patient in Iran costs higher than those of Nigeria [37], and Malawi [12], and it costs less than India [40], European countries and the USA. Evidences indicate that rational utilization and close monitoring of opioid drugs, substituting less expensive drugs with the same impact, sufficient physical space in specialized hospitals for wound dressing, appropriate equipment, professional staff, optimizing duration of surgeries, and reducing post-surgery hospitalization [12], and using cost-effective curative methods and equipment [41, 42], as well as using

telemedicine may reduce costs of treating burn patients. Findings of studies conducted in Iran show that although SBHs provide crucial services to treat burn patients, but relative to burn departments that are a part of larger multi-specialized hospitals, SBHs have a more limited access to referral systems to use consultative services of other specialists, such as optometrists, heart specialist, neurologist, and so on [43]. The limited access may increase hospitalization period, curative costs, re-referrals, deformities, sticky wounds, and mortalities. A cohort study in central England and Wales has revealed that providing multi-speciality care and its intensity, can potentially improve outcomes of burn patients [44]. In addition, another study on a group of hospitals with different specialities at various levels of the health system in California, USA, found that burn services at second and third levels do not have economies of scale [45]. Available evidences show that multi-speciality hospitals are not preferred to single-speciality hospitals in terms of economic of scale. But it seems that in developing countries that human resources are not sufficient, medical professionals and equipment are scarce and per capita bed is low, providing burn services in single-speciality hospitals is less cost-effective than general hospitals, mainly because treating a burn patient requires collaboration of a team. SBHs require a team of medical professionals (e.g. surgeons, nurses, nutritionists, social workers, and psychologists [46], gathering all of these health staff at one hospital may decline economies of scale and economies of scope. Regarding the multi-speciality nature of treating burn patients and high comorbidity among these patients, delivering burn cares in SBHs can also create limitations in access to multi-specialities. In addition, through increased transportation costs and higher reimbursements for medical professionals, it may reduce hospitals revenue.

Collaboration of other sectors that directly or indirectly causes burn injuries and accidents (such as Ministry of Oil, Ministry of Energy and municipalities) may have a significant impact on creating new resources to cover such costs. In this line, the WHO also emphasizes on re-design of service provision strategies and reducing inequalities in provision of health care. Using available capacities through peers support and supporting burn patients to improve their health status also have been emphasized by WHO in developed countries [5]. Evidences shows that intra-sectoral collaboration mechanisms such as redistribution of state's available resources and/or reducing subsidies of some goods and allocating released resources to health, efficiency of tax system, expansion of formal sector, using opportunities of leveraging tax rate on, harmful services and behaviours, applying custom tariffs and earmarked taxes on stakeholders that influence incidence of burn injuries and accidents as well as voluntary income sources from private sector, can provide new resources to cover rising healthcare expenditures [47].

The results also revealed that incomplete benefit package for burn patients, insufficient health insurance coverage (particularly for foreigners), and inappropriate coverage of health expenditures by basic health insurance schemes, are the most important challenges related to sub-function of resource pooling in burn care in Iran. A study on reimbursing hospital bills in a profit SBH in the USA found a significant difference between bills and the amount that was reimbursed to the hospital by Medicaid. Health insurance schemes have a cap of maximum 20-day of hospital stay. As well, social workers announced that some patients are eligible for further subsidies, but insurance companies refused to pay because of insufficiency of documents [48], which indicates the necessity of revising admission and discharge criteria of SBHs and expansion of active and more comprehensive rehabilitative services to facilitate patient's discharge.

Health insurance funds have a determining role in achieving universal health insurance through need-based coverage of a range of health services, from preventive to curative and rehabilitative services. Findings of the current study show that basic health insurance do not provide an appropriate coverage for burn services in Iran, particularly for advanced plastic surgeries to remove deformities (as one of the most important determinants of social health of burn patients). For burn services, health insurance schemes are more focused on covering inpatient, curative and life-saving services to provide an acceptable cost coverage for such services (as a result of recent reforms in Iran, known as health transformation plan, OOP payments for hospitalization services declined to about 10% and less) [23]. Insufficient health insurance coverage may be due to lack of clear technical criteria to provide health insurance coverage and to update the benefit package [49, 50]. Revision of decision-making process to update the benefit package through systematic developing of health insurance services based on health technology assessments, such cost-effectiveness, along with policy-makers' efforts is proposed.

Another challenge that is related to pooling is lack of comprehensive insurance coverage for burn patients, so that foreign migrants do not have access to basic health services. Although as a result of recent reforms uninsured population has declined [51], but still a considerable fraction of the population is not covered by a basic health insurance scheme, which both created a heavy financial burden for patients and their families, and imposes financial pressures to hospitals through unpaid medical bills [16]. In addition, delayed payments by health insurance funds, particularly to public hospitals, which is mainly due to state's hesitation in allocating approved budgets to health insurance funds, has resulted in weak fiscal space and unsustainability of financial flows of hospitals [51]. Because burn services have a significant higher costs are more prone to cost containment measures. Evidences show that the most important obstacles to achieve universal health insurance are fragmentation of the health insurance system, imbalance between coverage of health services that are more preventive than curative [50, 51] and unsustainability of financial flows regarding the recent changes in value-based mechanism that is using to set medical tariffs, and significant growth of medical tariffs of other services [23, 51]. Moreover, private health insurance has not expanded sufficiently, and only constitute 4% of total health expenditures in Iran and is more focused on copayments for basic benefit package [52]. Design and expansion of private health insurance should be based on economic development and coverage of basic services, and should emphasize on preventing catastrophic health expenditures. Therefore, expansion of health insurance coverage to fully include burn services by both public

and private health insurance schemes is crucial, particularly those related to psycho-social consequences and plastic surgeries of burn patients.

For purchasing services, negative political action and high-politicized budget allocation for burn services are among the most important challenges. Historical budgeting patterns are influenced by different pressure groups, and the top-down approach of budgeting organizations largely ignores different local needs, demand for health services, and demographic and health indicators such as mortality rates and prevalence. Yousefi et al. in 2010 also found that considering demographic characteristics, epidemiologic and socio-economic factors; current budgeting system is imbalance, so that some provinces receive budgets that are not enough to meet their health needs, while others receive extra funds relative to their health needs [53]. Another study on prioritizing and resource allocation process has shown that current top-down budgeting system is unsystematic, politicized, and centralized which ignores different contexts of various provinces, and is more reliant on pressure groups [54].

Limitations

One of the strengths of the current study is generalizability of its findings. Although, generalizability of qualitative studies is less important than quantitative studies, but since the current study is conducted at three levels (national, provincial, and local (hospital)) and interviews from various provinces were interviewed, it can be noted that generalizability of the current study is high. However, the study has its own limitations. Subjectivity of the findings is the first limitation (i.e. current study's findings are highly dependent on interviewee's mindset and experiences). Meanwhile, it should be noted that, to code and interpret the qualitative data, the study team cooperated for more than five months. After that, an external reviewer examined all the findings. Regarding the issue that the current study took a constructive approach, rather than positivism, the subjectivity is almost unavoidable. Social desirability error is the second important limitation of the current study. More precisely, instead of speaking the reality, the interviewee may note to what is desirable according to his/her mindset or speaks what interviewer likes to hear. As well, there is a possibility of justifying political position or manifesto of a political party. By asking probing questions, the interviewers tried to avoid such issue.

Implications for policy makers

- In addition to life-threatening risks, the lower socioeconomic groups are facing with more financial problems to afford hospital bills for treating burn patients. Therefore, regarding the socioeconomic status of burn patients as well as high costs of treating such health problems, allocating more financial resources is of paramount importance;
- Current financing mechanisms of burn services have severe shortcomings, which in turn affect the sufficient coverage, effective, and affordability of such services. Therefore, the authors propose revision of current financing mechanisms of burn services;
- Inappropriate budget allocation is another important challenge that deviates scarce resources and results in waste. Therefore, allocating available budgets according to objective supply and demand indicators while considering patients' needs and different contexts would be helpful;
- For revenue generation, focusing on finding new resources through advocacy from organizations and institutions that are related to incidence of burn and burn services and imposing sin taxes are proposed;
- Based on special conditions of burn patients and its time-consuming nature, the authors propose comprehensive expansion of burn services by basic health insurance schemes.

Implications for public

It is evident that people with low socioeconomic status are more prone to burn injuries and they are adversely affected by social and economic consequences of burn. As health systems are regularly faced with burn patients who require costly burn care services, they are beset by financing challenges in response to escalating health expenditures. Thus, all people firstly should respect preventive actions to protect them from the burn injuries and eventually from financial hardship. Secondly, people could participate in basic and supplementary health insurances and adhere to inpatient and outpatient services to reduce OOP payments for burn services and it would hinder them to imposition of catastrophic health expenditure.

Conclusions

By employing a qualitative approach, the current study has tried to identify financial challenges of burn services in Iran. The findings revealed different challenges. For resources collection, main challenges are high and rising costs of burn services and weak socioeconomic status of most of burn patients. Inability of burn patients to afford healthcare costs that can create equity-related challenges. In addition, incomplete

insurance coverage, unavailability of insurance coverage for foreign migrants, and deductions of insurance bills, and delayed payments, have resulted in difficulties in pooling resources. Moreover, for purchasing, following a politicized approach which is mainly reliant on bargaining power is the most important problem; particularly at hospital sector that to a lesser extent is reliant on demographic indicators, health needs, and diseases patterns. Results of the current study can be used by health policy-makers to make new policies for the arena of financing to facilitate country's path toward universal health coverage for burn services.

List Of Abbreviations

MoHME: Ministry of Health and Medical Education

OOP: Out-Of-Pocket

SBH: Specialized Burn Hospital

USA: United States of America

WHO: World Health Organization

Declarations

Ethics approval and consent to participate

This study received the required ethics approval from Isfahan University of Medical Science Research Ethics Committee, Isfahan, Iran with ethics code No.IR.MUI.REC.1395.2.292. Also, written informed consent of all participants was acquired, and they were assured that anonymity and confidentiality of any information would be observed

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests. Dr. Vahid Yazdi-Feyzabadi is an Associate Editor for BMC Health Services Research.

Funding

This study was funded by Isfahan University of Medical Sciences, Isfahan, Iran with research code No. 295292. The funder provided financial support for the conduct of the research, having no involvement in the analysis or in writing the article.

Authors' contributions

MAR conducted the interviews with participants, designed the study, supervised its implementation, assisted in analysing the data and contributed to final writing of the article. FM provided advice in the implementation of the study, assisted in analysing the data and revised manuscript draft. NSZ provided mentoring in the implementation of the study and assisted in analysing the data. VYF assisted in designing the study and analysing the data, made important comment that helped in the interpretation of result, wrote the manuscript draft and critically revised final version of the article. All authors read and approved the final version of the article.

Acknowledgements:

We would like to thank all interviewees for their gentle contribution. Moreover, the authors exclusively appreciate Dr. Fereydoon Abedini for his generous help and guidance.

References

1. Murray, C. J., J. Frenk, and World Health Organization. A WHO framework for health system performance assessment. 1999.
2. World Health Organization. Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies. 2010: World Health Organization.
3. Guinness, L. and V. Wiseman, Introduction to health economics. 2011: McGraw-Hill Education (UK).
4. World Health Organization. Global health estimates 2016: disease burden by cause, age, sex, by country and by region, 2000–2016. Geneva: World Health Organization, 2018.
5. Peck, M., J. Molnar, and D. Swart, A global plan for burn prevention and care. *Bull World Health Organ.* 2009;87: 802–803.
6. Dissanaik, S. and M. Rahimi, Epidemiology of burn injuries: highlighting cultural and socio-demographic aspects. *Int Rev Psychiat.* 2009;21(6):505–511.
7. Smolle, C., et al., Recent trends in burn epidemiology worldwide: A systematic review. *Burns.* 2017;43(2):249–257.
8. Roth, G. A., et al., Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet.* 2018;392(10159):1736–1788.
9. Mistry, R., et al., Socioeconomic deprivation and burns. *Burns.* 2010;36(3): 403–408.
10. Zoni, A. C., et al., Socioeconomic inequalities in injuries treated in primary care in Madrid, Spain. *J Public Health.* 2016;39(1):45–51.
11. Peck, M. and M. A. Pressman, The correlation between burn mortality rates from fire and flame and economic status of countries. *Burns.* 2013;39(6): 1054–1059.
12. Gallaher, J. R., et al., Burn care delivery in a sub-Saharan African unit: a cost analysis study. *Int J Surg.* 2015;19:116–120.
13. Ahn, C. S. and P. K. Maitz, The true cost of burn. *Burns.* 2012; 38(7): 967–974.
14. Anami, E. H., et al., Treatment costs of burn victims in a university hospital. *Burns.* 2017;43(2):350–356.
15. Haikonen, K., P.M. Lillsunde, and J. Vuola, Inpatient costs of fire-related injuries in Finland. *Burns.* 2014;40(8):1754–1760.
16. Karimi, H., et al., Financial burden of burn injuries in Iran: a report from the burn registry program. *Ann Burns Fire Disasters.* 2015;28(4):310.
17. Emami, S.-A., et al., The epidemiology of geriatric burns in Iran: A national burn registry-based study. *Burns.* 2016;42(5):1128–1132.
18. World Health Organization. *Burns.* 2018. <https://www.who.int/news-room/fact-sheets/detail/burns>. Accessed 14 Aug 2019
19. Rode, H., et al., A review of primary and secondary burn services in the Western Cape, South Africa. *SAMJ: S Afr Med J.* 2015;105(10):853–857.
20. Zare, H., et al., Health inequalities and development plans in Iran; an analysis of the past three decades (1984–2010). *Int J Equity Health.* 2014;13(1): 42.
21. Islamic Parliament of Iran (IPI). Fifth Five-year National Development Plan of Iran 2005–2009. *Iranian Journal of Public Health* 2011. <https://rc.majlis.ir/fa/law/show/790196?keyword=%D8%A8%D8%B1%D9%86%D8%A7%D9%85%D9%87%20%D9%BE%D9%86%D8%AC%D9%85%20%D8%AA%D9%88%D8%B3%D8%B9%D9%87>. Accessed 14 Aug 2019
22. Islamic Parliament of Iran (IPI). Sixth Five-year National Development Plan of Iran 2017–2021. 2017 August 14, 2019]; Available from: <https://rc.majlis.ir/fa/law/show/1014547?keyword=%D8%A8%D8%B1%D9%86%D8%A7%D9%85%D9%87%20%D8%B4%D8%B4%D9%85>. Accessed 14 Aug 2019

23. Moradi-Lakeh, M. and A. Vosoogh-Moghaddam, Health sector evolution plan in Iran; equity and sustainability concerns. *Int J Health Policy manag.* 2015;4(10): 637.
24. Yazdi-Feyzabadi, V., M. H. Mehrolohasani, and A. Darvishi, *Measuring Catastrophic Health Expenditures and its Inequality: Evidence from Iran's Health Transformation Program.* Health policy Plan. 2019.
25. Geravandi, S., et al., The Assessment of Inequality in the Geographical Distribution of Burn Beds in Iran. *Electronic physician.* 2015;7(6):1407.
26. Kutzin, J., A descriptive framework for country-level analysis of health care financing arrangements. *Health Policy.* 2001;56(3):171–204.
27. Murray, C. J. and J. Frenk, A framework for assessing the performance of health systems. *Bull World Health Organ.* 2000;78:717–731.
28. Fereday, J. and E. Muir-Cochrane, Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *Int J Qual Methods.* 2006;5(1): 80–92.
29. Lincoln, Y. S. and E. G. Guba, *Naturalistic inquiry.* Newberry Park. 1985, CA: Sage.
30. Baxter, J. and J. Eyles, Evaluating qualitative research in social geography: establishing 'rigour' in interview analysis. *Transactions of the Institute of British geographers.* 1997. 22(4):505–525.
31. Delgado, J., et al., Risk factors for burns in children: crowding, poverty, and poor maternal education. *Inj Prev.* 2002;8(1):38–41.
32. Park, J. O., et al., Association between socioeconomic status and burn injury severity. *Burns.* 2009;35(4):482–490.
33. Mullins, R. F., et al., Burns in mobile home fires—descriptive study at a regional burn center. *J Burn Care Res.* 2009;30(4):694–699.
34. Aghaei, A., et al., Factors related to pediatric Burn in Iran: A Case-Control Study. *Int J Pediatr.* 2018;6(6):7823–7832.
35. Azimi, L., et al., Nosocomial infections in burned patients in motahari hospital, tehran, Iran. *Dermatol Res Pract.* 2011;2011.
36. Guo, H.-L., et al., Using competing risk and multistate model to estimate the impact of nosocomial infection on length of stay and mortality in burn patients in Southeast China. *BMJ open.* 2018;8(11):e020527.
37. Shupp, J. W., et al., Epidemiology of bloodstream infections in burn-injured patients: a review of the national burn repository. *J Burn Care Res.* 2010;31(4): 521–528.
38. Rajabian, M. H., S. Aghaei, and V. Fouladi, Analysis of survival and hospitalization time for 2057 burn patients in Shiraz, southwestern Iran. *Medical science monitor.* 2007;13(8):CR353-CR355.
39. Mandal, A., Quality and cost-effectiveness—effects in burn care. *Burns.* 2007;33(4):414–417.
40. Ahuja, R. B. and P. Goswami, Cost of providing inpatient burn care in a tertiary, teaching, hospital of North India. *Burns.* 2013;39(4):558–564.
41. Haik, J., et al., The use of video capture virtual reality in burn rehabilitation: the possibilities. *J Burn Care Res.* 2006;27(2):195–197.
42. Gee Kee, E., et al., Cost-effectiveness of silver dressings for paediatric partial thickness burns: An economic evaluation from a randomized controlled trial. *Burns.* 2017;43(4):724–732.
43. Zadeh, N. S., et al., How the service delivery works in the Iranian specialised burns hospitals? A qualitative approach. *PloS One.* 2019;14(5):e0216489.
44. Win, T. S., et al., Relationship between multidisciplinary critical care and burn patients survival: A propensity-matched national cohort analysis. *Burns.* 2018;44(1): 57–64.
45. Gaynor, M. S., S. A. Kleiner, and W. B. Vogt, Analysis of hospital production: An output index approach. *J Appl Econ.* 2015;30(3):398–421.
46. Warden, G. D. and D. Heimbach, *Regionalization of burn care—a concept whose time has come.* 2003, Oxford University Press.
47. Elovainio, R. and D. B. Evans, Raising more domestic money for health: prospects for low-and middle-income countries. *Health Econ Policy Law.* 2017;12(2):139–157.
48. Maxwell, G. and P. Silverstein, Burn center reimbursement analysis. *The J Burn Care Rehabil.* 1992;13(5):597–599.

49. Dehnavieh, R. and H. Rahimi, Basic health insurance package in Iran: revision challenges. *Iran J public health*. 2017;46(5): 719.
50. Ibrahimipour, H., et al., A qualitative study of the difficulties in reaching sustainable universal health insurance coverage in Iran. *Health Policy plan*. 2011;26(6):485–495.
51. Olyaeemanesh, A., et al., Iran's Health System Transformation Plan: A SWOT analysis. *Med J Islam Rep Iran*. 2018;32:39–39.
52. Lankarani, K. B., et al., Lessons learned from national health accounts in Iran: highlighted evidence for policymakers. *Shiraz E Med J*. 2015;16(4).
53. Yousefi, M., et al., Methods of resource allocation based on needs in health systems, and exploring the current Iranian resource allocation system. *Hakim Health System Res J*. 2010;13(2): 80–90.
54. Khayatzadeh-Mahani, A., M. Fotaki, and G. Harvey, Priority setting and implementation in a centralized health system: a case study of Kerman province in Iran. *Health policy Plan*. 2012;28(5):480–494.

Tables

Table 1. Characteristics of participants

participant	Organization	City	Experience
1	Burn specialized hospital	Isfahan	26
2	Burn specialized hospital	Isfahan	15
3	MoHME	Tehran	18
4	Medical University	Isfahan	17
5	Burn specialized hospital	Khuzestan	10
6	Medical University	Isfahan	9
7	Burn specialized hospital	Fars	12
8	Burn specialized hospital	Fars	22
9	Burn specialized hospital	Bushehr	13
10	Burn specialized hospital	Tehran	17
11	Medical University	Tehran	23
12	Burn specialized hospital	Khorasan Razavi	19
13	Medical University	Khorasan Razavi	8
14	Burn specialized hospital	Khorasan Razavi	15
15	Medical University	Khuzestan	16
16	Burn specialized hospital	West Azerbaijan	11
17	Burn specialized hospital	West Azerbaijan	8
18	Medical University	West Azerbaijan	6
19	Burn specialized hospital	Yazd	10
20	Burn specialized hospital	Yazd	14
21	MoHME	Tehran	23

Table 2. Themes, subthemes and codes related to challenges in financing burn services

Themes	Subthemes	Codes
Collection of funds	Revenue generation	- Higher incidence among the poor
		- Single specialized
		- High costs
Pooling of funds	Cost-sharing and fees	- Insufficient intra-collaboration
		- Deduction of insurance bills
	Uninsured people	- Insurance deferral
Purchasing of services	Inappropriate payment mechanism	- Unavailability of health insurance coverage for foreign migrants
		- Delayed payments
		- Inappropriate payment method
	Incomplete content of service benefit package	- Inequitable payment
		- Plastic surgery for burn patients is not included in the basic benefit package
		- Innovative treatment methods are not covered by insurance schemes
		- Rehabilitation and consultative services are not covered by insurance schemes
	Inappropriate financial resource allocation	- Insufficient budget allocation
		- Inappropriate intra-sectoral budget allocation
	Ineffective medical tariffs	- Unsustainable budget allocation
		- Tariffs are not sufficiently high
	Top-down budgeting approach	- Incompatibility between cost price and tariffs
- Non-technical budget allocation		
Lobbying in resource allocation	- Allocated budget to burn services has declined	
	- Defined budget is not fully allocated	
	- Different bargaining power	
	- Intervene of those with political influence	

Figures

Figure 1

Frequency of themes stated by interviewees

Figure 2

Frequency of subthemes of all interviews

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [COREQ.docx](#)