Original Article

Designing the Minimum Data Set for National Scorpion Sting Registry in Iran

Mehraban Shahi[1], PhD; Mehran Shahi[2], PhD; Farid Khorrami[1], PhD; Nasrin Davaridolatabadi[1], PhD

[1]Department of Health Information Technology, School of Allied Medical Sciences, Hormozgan University of Medical Sciences, Bandar Abbas, Iran;
[2]Department of Environmental Health, School of Health, Infectious and Tropical Diseases Research Center, Hormozgan Health Institute, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

Correspondence:
Nasrin Davaridolatabadi, PhD;
School of Paramedicine, Hormozgan University of Medical Sciences, Imam Hossein Blvd., Postal code: 79196-92002, Bandar Abbas, Iran
Tel: +98 76 33317723
Email: davarinn@gmail.com

What's Known

•	Minimum Data Set is a standard tool for collecting health care data, which aims to access accurate and unambiguous health data. The design and implementation of the minimum data set is the first step in disease information management and integration.
•	There is no coherent registry of scorpion stings. The data elements on scorpion stings are disorganized and non-systematic.

What's New

•	In this study, the minimum data set for the registry of scorpion stings has been prepared.
•	The final minimum data set for scorpion stings comprised 124 items in eight sections, which were suggested by experts.

Abstract

Background: Scorpion stings are one of the major medical problems in tropical and subtropical regions of underdeveloped countries, causing several complications including severe local skin reactions, renal, neurological, cardiovascular, and respiratory complications, and sometimes death. The present study attempted to develop a minimum data set for a national registry of scorpion stings.

Methods: This study was conducted from 2022 to 2023 in two phases. First, information relevant to the data elements was extracted from scientific and medical databases such as PubMed Central/Medline, Embase, Web of Science, SID, and Cochrane Library. In the second step, a Delphi questionnaire was developed using the information obtained in the first step and given to five experts. Two Delphi steps were used to determine the minimum data set for scorpion stings. Data analysis in both steps was performed using descriptive statistics in SPSS software (version 22).

Results: The number of data elements was 124 items in eight sections, including demographic information, scorpion characteristics, time and place of sting data, patient history, clinical signs and symptoms, medicine, tests, admission, and discharge information.

Conclusion: The design of the minimum data set of scorpion stings can help in timely access to medical records, registration of information related to patient care, and patient follow-up. By ensuring continuous care for patients and recording their information in a valid database, communication among care providers can be enhanced. This approach also allows for analysis of care effectiveness for patient and the broader community affected by scorpion stings.

Introduction

Scorpion stings are frequently encountered in tropical and subtropical regions of the world[1, 2] and are an important medical emergency causing many problems globally.[2, 3] Scorpion stings represent a major medical problem in tropical and subtropical regions of underdeveloped countries, with the potential to cause extensive complications such as severe local skin reactions, neurological, renal, cardiovascular, and respiratory complications, and in some cases, even death. This imposes significant economic costs and mental health challenges on society. The regions with

the highest incidence of scorpion stings in tropical areas are Mexico, South America, North Africa, South Africa, the Middle East, and India.[4, 5] Although there are no accurate statistics on the number of scorpion stings in the world, reports show that there are some effective factors in this field, including geographical conditions and health facilities.[6] The mortality rate associated with scorpion envenomation is estimated to be approximately 2,600 deaths per year.[7] However, some epidemiological studies also show that about 1.23 million cases of scorpion stings and about 3250 deaths occur globally every year.[2, 4] In the southern regions of Iran, scorpion sting is one of the most important medical problems that annually threatens the health of many people, especially the residents of tropical regions. The provinces of Khuzestan and Hormozgan represent a significant endemic focus for scorpion stings in the country, with thousands of cases and dozens of deaths reported annually. According to the Iranian Non-Communicable Diseases Committee, it is estimated that 50,000 cases of scorpion stings occur in Iran each year.[7, 8] Studies have shown that the main type of poisoning in Iran is scorpion sting.[9, 10] Additionally, approximately 75% of deaths resulting from scorpion stings occur in the provinces of Khuzestan, Hormozgan, Kerman, and Sistan and Baluchistan.[7, 11] To date, four families, 20 genera, and 84 species of scorpions have been documented in Iran.[12-18] Research findings indicate that it is imperative to develop strategies to prevent scorpion stings and reduce their incidence.[19] Accurate, timely, and accessible information is important for healthcare providers in planning, developing, and supporting healthcare services. In other words, healthcare providers require accurate and timely information to perform their activities and expertise. Developing a registration and reporting system, and optimizing data collection, are necessary to investigate the prevalence of diseases and the rate of complications in high-risk areas and to design preventive measures to reduce deaths.[20] The Minimum Data Set (MDS) is a standard tool for collecting healthcare data and attempting to access accurate and unambiguous health data. In other words, the MDS is necessary to collect high-quality data and achieve an integrated information system.[21, 22] The design and implementation of MDS in healthcare centers represent the initial phase of disease information management, which has the potential to enhance the quality of care and disease control.[23-25] The MDS encompasses two categories of general data (demographic data and data related to referral and follow-up) and disease-specific data (disease evaluation data, including staging of the disease course, risk factors and disease complications, and outcome data care).[26, 27]

At present, there is a lack of consistent statistical datasets on scorpion stings in Iran. Furthermore, the physical, financial, and psychological damage caused to patients and their families, as well as the risks and complications caused by inappropriate treatment, emphasizes the significant importance of this issue. It is thus necessary to collect, organize and analyze data in problem areas, including the provinces of Khuzestan, Hormozgan, Kerman, Sistan and Baluchistan, as well as other regions with high rates of scorpion stings. The objective of this study was to design a MDS for national scorpion sting registration, to facilitate the collection, organization, and analysis of related data, thereby enabling the management of scorpion sting prevention and treatment in Iran.

Materials and Methods

This study was conducted from 2022 to 2023. The study was approved by the Ethics Committee of Hormozgan University of Medical Sciences, Hormozgan, Iran (IR.HUMS.REC.1396.62). To create the MDS, two phases were conducted: the first involved identifying the data items, while the second phase focused on the construction of the MDS. The first phase of the study involved collecting data items from articles and other resources associated with scorpion stings. To identify relevant sources, scientific and medical databases, including PubMed Central/Medline, Embase, Web of Science, Cochrane, and SID, were searched. In this process, the combination of two major keywords was employed: "Scorpion stings" (and all relevant synonyms) and "registry" (and all relevant equivalents, such as "registration," "database," and "information system"). The data items were extracted according to a predesigned form created by the researchers to review the articles, registries, and other resources. The inclusion criteria were as follows: full-text articles and related forms that discuss data elements of scorpion sting registration. Additionally, letters to the editor and conference abstracts were excluded from the study. In the second phase, the MDS data set was extracted from the articles and forms obtained in the first phase.[28] A focus group meeting was held with five specialists, including emergency and internal medicine, entomology, health information management, and medical informatics. The extracted data elements were then categorized. Two Delphi steps were used to evaluate the MDS after the data elements were categorized.

Table 1: Suggested Minimum Data Set for scorpion stings

Subset	Minimum Data Set
Demographic information	Name, Surname, Father's Name, National Code, File Number, Sex (Male, Female), Date of Birth (Age), Residential address (Province, City, City/Village), Occupation, Education Level, Contact Number
Scorpion characteristics	Does th patient (victim) believe that the scorpion sting is dangerous? (Yes, No, Unknown), The local name of the scorpion, Do medical staff diagnose Gadim type of scorpion diagnosed by the medical staff? (Yes and No, Unknown), Did the patient (victim) have scorpion species? (Yes and No), If Yes, the image of the scorpion, Family (Buthidae, Hemiscorpiidae, Scorpionidae, Unknown), species, size of the scorpion (In Millimeters), Sex of the scorpion (Male and Female, Unknown), The identification route of sample (Observation, Symptoms, laboratory).
Time and place of the sting data	The time of the sting (Day, Night), The date and time of the sting (Based on 24 hours), How to find a health service center (Referral from affiliated centers, Referral from Emergency center 115, Personal referral), The time interval between the sting and the visit to the emergency department. The location of the sting (Village, City), The place of the sting (Inside the house [Room, Yard], Outside the house [Alley and Neighborhood, Farm and Garden, Mountain or Plain]), If the place of the sting was inside the house, The type of material of the residence (Mud, Capri, Block, Brick, Stone and Cement)
Patient history	History of previous disease (Immune System Deficiency Disease, Blood Diseases, Kidney Disease, other Diseases), History of allergy (Yes or No), If Yes, Allergen (Allergenic agent), History of previous sting (Yes or No), If Yes, how many times, If Yes, did he receive antivenom?
Clinical signs and symptoms	The number of stings, The spot of the sting (Schematics of different parts of the body, Trunk, Head and Neck, Thigh and Leg, Toes, Fingers, Hand and Arm), Interventions performed before admitting the patient (Razoring, Opium) (If yes, Rubbing or Oral), (Local medicine, Heating, Other cases), Initial symptoms immediately after the sting (Pain, Burning, Itching, Redness, Swelling, Nausea, Vomiting, Headache, Low Blood Pressure, Shortness of breath, Shock), (Sweating, Dizziness, Tendency, Numbness, Warmth, Stiffness, Lethargy, Restlessness, Others), Initial symptoms at the time of visit (Pain, Burning, Itching, Redness, Swelling, Necrosis, If yes, Size of necrosis (mm), Nausea, Vomiting), Pain intensity when the initial symptoms appear (based on one to ten), Pain intensity when visiting (based on one to ten), Without any initial symptoms
Medicine	Anti-scorpion serum (Yes and No), If yes, Number of vials, Time of receipt, Route of administration (Intramuscular, Intravenous), If antivenom Yes, was the sensitivity test done before the serum injection? If Yes, the time of the sensitivity test (Before or After the administration of antihistamine), The time interval between the sting and the serum injection (Less than 1 hour, 1 to 3 hours, 3 to 6 hours, 6 to 12 hours, 12 to 24 hours) Drugs taken (Antihistamine, Pain reliever, Antibiotic, Serum therapy, other drugs), Antihistamine If Yes, Time of injection, Antibiotic If Yes, Drug name, If Other Yes, Drug name
Tests	Blood test (Complete Blood Count [CBC], Prothrombin Time [PT], Partial Thromboplastin Time [PTT]), Urine test (color and necessary items should be extracted from the laboratory report), Date and Time of sampling (Per each test), Date and Time of response (Per each test) the experiment
Admission and discharge information	The date and time of admission, the patient's treatment ward or wards, the date and time of discharge, the condition of the patient at the time of discharge, in the case of decease;report of the cause, If the patient is discharged with personal consent, the warning signs have been taught or else? Yes No

The initial phase of the study involved the identification of data items and the classification of information elements, as suggested by experts in the relevant field, the first phase of the Delphi questionnaire included categories of demographic and identity information, communication information, basic information, and clinical categories. The first part of the questionnaire included the characteristics of the participants, and the second part questioned opinions regarding the importance of the MDS. At the end of each category, a blank space was included for the proposed items by experts that was not associated with the category in question. The questionnaire was designed based on the 5-point Likert scale, whereby 1 represents the lowest score, 5 is the highest, and 3 is the average score, and threshold for retaining each data element in the final MDS. The data analysis in both stages was performed using descriptive statistics in the SPSS software (version 22). The items with a median of 4 or 5 were accepted, while those with a median of 2.5 or less were eliminated. Items with a mean of 3 or 3.5 proceeded to the second stage of Delphi. The items accepted in the second stage of Delphi, and in the first stage, were selected as the MDS of scorpion stings.

Results

After searching the databases, 12 articles and one related form to snake and scorpion bites supervised by the Ministry of Health, Treatment, and Medical Education were obtained.[28] Given the analysis of the aforementioned sources, 150 data elements were selected and categorized in a focused group meeting. These elements were categorized into eight subcategories, including 1) Demographic information; 2) Scorpion characteristics; 3) Time and place of sting data; 4) Patient history; 5) Clinical signs and symptoms; 6) Medicine; 7) Tests; and 8) Admission and discharge information. In the initial phase of the Delphi study, the items with a median score of 4 or 5 were deemed acceptable, whereas those with a median score of 2 or below were excluded. In this phase, 135 of the 150 items that can be scored

were collectively agreed upon, while 15 items were removed. The latter included items about language, race, income level, and service history, among others. The items that achieved a mean score of 3 or 3.5 proceeded to the second stage of the Delphi process. In the second phase of the Delphi study, 135 items were surveyed. Following the survey, 11 additional items were removed, including religion, citizenship, patient work phone number, insurance type, insurance number, and so on. Ultimately, 124 items were identified as the final MDS for scorpion stings across the two stages. Table 1 lists the selected items.

Discussion

The findings revealed that most data in the MDS is comprised of two sections: demographic and clinical. Collecting demographic data is undertaken to identify and communicate with patients, which is considered to be necessary for the process of identifying, contacting, and following up with patients. In addition to forming the basis of direct patient care, clinical data obtained during the diagnosis and treatment process plays a role in the reimbursement process, planning, and research in the field of healthcare.[26]

The majority of studies related to the epidemiology of scorpion stings indicate that demographic characteristics, time and place of stings, and even clinical symptoms are of significant importance.[5, 29] However, this is contrary to our findings, in which the scorpion sting season was removed in the second Delphi round. This discrepancy may be attributed to the prolonged summer season in Hormozgan province, which accounts for the majority of stings. In the second round of the present study, the item on pregnancy was removed and not collected. However, in the Vaucel's study, the data element of pregnancy is considered important.[30]

In Iran, due to the lack of racial diversity, this data was considered unimportant in the focus group meeting before the design of the Delphi questionnaire and was thus excluded from the questionnaire for scoring. It is also noteworthy that this issue has not been included in similar epidemiological studies conducted in several countries.[8, 30] Similar to our study, most studies have collected data on symptoms and signs, including blood pressure, headache, tachycardia, shortness of breath, sweating, redness, lethargy, and so forth.[29-32] The study of this type of research demonstrates that the information obtained through the determination of the MDS set can provide valuable insights for evaluation, treatment planning, and continuous evaluation of the patient's progress and performance.[33, 34]

The data elements of the form approved by the Ministry of Health, Treatment, and Medical Education, which is now completed in hospitals and healthcare facilities, include the following: name, surname, gender, age, and residential address.[28] However, in this study, the additional fields were included: father's name, national code, file number, occupation, and educational level. Furthermore, the section on scorpion characteristics only mentioned the type of sting, geographic location, area of the sting, time of the sting, and history of the previous sting.[28] In this study, however, additional information was provided regarding the scorpion sample, size, gender, and family of the scorpion, image of the scorpion, place, and the type of materials of its residence.

The sections entitled "Patient history", "Clinical signs and symptoms", and "Tests" are new to the present study and were not included in the previous form. In the section on medicine, in addition to the data elements included in the previous form, the following were added: number of vials of anti-serum, time of receipt, route of administration, and drug taken.

Furthermore, the "Admission and Discharge Information" section of this study incorporates additional data elements, including the patient's treatment ward or wards, the date and time of discharge, and the patient's condition at the time of discharge.

Before this study, no detailed information was collected about scorpion stings.[28] However, the MDS obtained in this study has detailed information about the patient's information, scorpion characteristics, tests and medicine performed, and admission and discharge information.

The advantages of designing and implementing the MDS for scorpion stings in the country include the following: 1) Allowing timely access to medical records, which is beneficial for patient care and follow-up. 2) Providing standardized information forms and elements, which facilitates data management. 3) Contributing to the establishment of an integrated information system at the country level. In the expert panel conducted as a part of this study, the participating experts emphasized the importance of accurately collecting data elements. Based on their experience, the experts concurred that the collection of complete and accurate data on scorpion stings would be beneficial for physicians and treatment staff in making appropriate treatment decisions. Currently, anti-venom is used to treat

scorpion stings, with dosage and administration depending on the type of scorpion. Therefore, by accurately collecting the required data, the appropriate anti-venom can be selected and a suitable dose and type prescribed.

The challenges and limitations of the current study included the large volume of primary data and the time-consuming nature of the responses in the first stage of Delphi, where the participants should have spent a lot of time answering the items in the questionnaire. It affected the full participation of all the experts to a certain extent, although the explanation of the goals and the benefits of setting up the registration system could contribute to the elimination of the problem to a considerable extent.

Conclusion

The implementation of a registration system in this field by researchers and the justification of the necessity thereof has proved instrumental in resolving this problem. The provision of continuous patients' care and recording their information in a valid database can facilitate enhanced communication between care providers and enable the analysis of the efficacy of patient care and the impact of scorpion stings on patient populations. Furthermore, the availability of precise and current data enables the preparation and estimation of essential services, the monitoring and prevention of occurrences, and the reduction of morbidity and mortality rates, as well as associated costs.

Acknowledgment

Authors' Contribution

All authors were involved in all the stages of the research process, including the development of the initial hypothesis, collection of data, drafting of the first version, reviewing, and editing of the final version. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of Interest: None declared.

References

1 Mabunda IG, Zinyemba NK, Pillay S, Offor BC, Muller B, Piater LA. The geographical distribution of scorpions, implication of venom toxins, envenomation, and potential therapeutics in Southern and Northern Africa. Toxicol Res (Camb). 2024;13:tfae118. doi: 10.1093/toxres/tfae118. PubMed PMID: 39100857; PubMed Central PMCID: PMCPMC11298049.

2 Frezgi O, Berhane A, Gebreyohannes A, Ghebrewelde G, Tekie H, Kiflezgi T, et al. Clinical features and outcomes of scorpion sting in western lowland of Eritrea: a prospective descriptive study. medRxiv. 2024:2024.01.02.24300701. doi: 10.1101/2024.01.02.24300701.

3 Alhelail M, Albelali A, Alkanhal R, Salam M. Severity of scorpion envenomation in Saudi Arabia: A systematic review. Toxicol Rep. 2024;13:101749. doi: 10.1016/j.toxrep.2024.101749. PubMed PMID: 39391710; PubMed Central PMCID: PMCPMC11466650.

4 Allah Adawi SHA, Allah Adawi SHA, Allah Adawi DHA. The Scorpion Sting: Epidemiology, Clinical Symptoms, Treatment, Surveillance and Reporting Obstacles in the Salfit District (West Bank) (2014-2015). International Journal of Tropical Disease & Health. 2016;14:1-10. doi: 10.9734/IJTDH/2016/23351.

5 Azizi K, Ebrahimi M, Amin M, Soltani A, Vahedi M, Kalantari M. Taxonomy and new pictorial key of Iranian scorpions (Arachnida: Scorpionida). International Journal of Tropical Insect Science. 2024;44:939-67. doi: 10.1007/s42690-024-01194-9.

6 Bahloul M, Chaari A, Ammar R, Allala R, Dammak H, Turki O, et al. Severe scorpion envenomation among children: does hydrocortisone improve outcome? A case-control study. Trans R Soc Trop Med Hyg. 2013;107:349-55. doi: 10.1093/trstmh/trt028. PubMed PMID: 23610162.

7 Bardaran M, Mohajer S, Kazemi SM. Distribution mapping of deadly scorpions in Iran. Toxicon. 2024;250:108109. doi: 10.1016/j.toxicon.2024.108109. PubMed PMID: 39332503.

8 Mousavi SA, Rashidi H, Faramarzi A, Feyzi R, Kaidkhordeh M, Fard PF. Epidemiology of Scorpion Sting in Southwestern Iran Over Five Years. Trends in Medical Sciences. 2023;3. doi: 10.5812/tms-133418.

9 Sadeghi M, Amari A, Asadirad A, Nemati M, Khodadadi A. F1 fraction isolated from

Mesobuthus eupeus scorpion venom induces macrophage polarization toward M1 phenotype and exerts anti-tumoral effects on the CT26 tumor cell line. Int Immunopharmacol. 2024;132:111960. doi: 10.1016/j.intimp.2024.111960. PubMed PMID: 38554440.

10 Kassiri H. Incidence and epidemiological profile of snakebites and scorpion stings in Northern Khuzestan Province, Southwestern Iran: A descriptive, analytical study. Asian Journal of Pharmaceutics (AJP). 2018;12. doi: 10.22377/ajp.v12i03.2624.

11 Rostampour F, Heidari M, Rashidi H, Faramarzi A, Shojaei S, Barati B, et al. Modeling the time series of scorpion stings in Southwestern Iran. Arch Razi Inst. 2024;79:651-8. doi: 10.32592/ARI.2024.79.3.651. PubMed PMID: 39736950; PubMed Central PMCID: PMCPMC11682501.

12 Barahoei H. Fauna of sistan scorpions (Arachnida: scorpiones), southeast Iran. Taxonomy and Biosystematics. 2022;14:23-62. doi: 10.22108/tbj.2022.135356.1216.

13 Barahoei H, Navidpour S, Aliabadian M, Siahsarvie R, Mirshamsi O. Scorpions of Iran (Arachnida: Scorpiones): Annotated checklist, DELTA database and identification key. Journal of Insect Biodiversity and Systematics. 2020;6:375-474. doi: 10.52547/jibs.6.4.375.

14 Yağmur EA, Moradi M, Tabatabaei M, Jafari N. Contributions to the scorpion fauna of Iran. Part II. Hottentotta akbarii sp. nov. from the Fars Province (Scorpiones: Buthidae). Serket. 2022;18.252.

15 Kovařík F, Fet V, Yağmur EA. Further review of Orthochirus Karsch, 1892 (Scorpiones: Buthidae) from Asia: taxonomic position of O. melanurus, O. persa, O. scrobiculosus, and description of six new species. Euscorpius. 2020;2020:1-73. doi: 10.18590/euscorpius.2019.vol2019.iss278.1.

16 Kovařík F, Fet V, Gantenbein B, Graham MR, Yağmur EA, Šťáhlavský F, et al. A revision of the genus Mesobuthus Vachon, 1950, with a description of 14 new species (Scorpiones: Buthidae). Euscorpius. 2022:1.

17 Navidpour S, Kovařík F, Soleglad M, Fet V. Scorpions of Iran (Arachnida, Scorpiones). Part X. Alborz, Markazi and Tehran provinces with a description of Orthochirus carinatus sp. n.(Buthidae). Euscorpius. 2019;2019:1-20. doi: 10.18590/euscorpius.2019.vol2019.iss276.1.

18 Cain S, Gefen E, Prendini L. Systematic revision of the sand scorpions, genus Buthacus Birula, 1908 (Buthidae CL Koch, 1837) of the Levant, with redescription of Buthacus arenicola (Simon, 1885) from Algeria and Tunisia. Bulletin of the American Museum of Natural History. 2021;450:3-133. doi: 10.1206/0003-0090.450.1.1.

19 Adeli-Sardou M, Shahi M, Dehghan H, Ahmadyousefi-Sarhadi M, Falah G, Barahoei H. Geographical distribution of scorpions (Arachnida: Scorpiones) in southern regions of Kerman province, Iran. Biology Bulletin. 2024;51:644-54. doi: 10.1134/S1062359023604834.

20 Ghaneie M, Rezaie A, Ghorbani NR, Heidari R, Arjomandi M, Zare M. Designing a minimum data set for breast cancer: a starting point for breast cancer registration in iran. Iran J Public Health. 2013;42:66-73. PubMed PMID: 23865019; PubMed Central PMCID: PMCPMC3712595.

21 Salehinejad S, Mehrolhassani MH, Nekouei-Moghadam M, Bahaadinbeigy K. Developing the minimum data set for a disaster mental health registry system. Frontiers in Health Informatics. 2024;13:190.

22 Alipour J. Development a National Minimum Data Set for Disability in Iran: A Prerequisite for Development and Implementation of Electronic Disability Records. Health Scope. 2020;9:e94338. doi: 10.5812/jhealthscope.94338.

23 Ahmadi M, Alipour J, Mohammadi A, Khorami F. Development a minimum data set of the information management system for burns. Burns. 2015;41:1092-9. doi: 10.1016/j.burns.2014.12.009. PubMed PMID: 25561018.

24 Zarei J, Badavi M, Karandish M, Haddadzadeh Shoushtari M, Dastoorpoor M, Yousefi F, et al. A study to design minimum data set of COVID-19 registry system. BMC Infect Dis. 2021;21:773. doi: 10.1186/s12879-021-06507-8. PubMed PMID: 34372790; PubMed Central PMCID: PMCPMC8350262.

25 Baghoveh M, Arian M, Kimiafar K, ShojaeiBaghini M. Minimum data set of mucormycosis. Frontiers in Health Informatics. 2023;12. doi: 10.30699/fhi.v12i0.492.

26 Hosseini A, Moghaddasi H, Jahanbakhsh M. Designing minimum data sets of diabetes mellitus: Basis of effectiveness indicators of diabetes management. Health Information Management. 2010;7.

27 Shahmoradi L, Izadi N, Shirbeigi L, Kandi MJ, Barzegari S, Rezayi S. Minimum data set as a necessity for designing a mobile-based self-care application for skin and hair diseases. Australian Journal of Herbal and Naturopathic Medicine. 2021;33:72-80. doi: 10.33235/ajhnm.33.2.72-80.

28 The Ministry of Health TaME [Internet]. Snake and scorpion stings form 2024 [Updated 29 September 2024]. Available from: https://shemiranat.sbmu.ac.ir/uploads/204/2023/Apr/05/%D9%81%D8%B1%D9%85%20%DA%AF%D8%B2%D8%A7%D8%B1%D8%B4%20%D9%85%D8%A7%D8%B1%20%D9%88%20%D8%B9%D9%82%D8%B1%D8%A8%20%DA%AF%D8%B2%DB%8C%D8%AF%DA%AF%DB%8C.pdf. [Persian].

29 Boubekeur K, L'Hadj M, Selmane S. Demographic and epidemiological characteristics of scorpion envenomation and daily forecasting of scorpion sting counts in Touggourt, Algeria. Epidemiol Health. 2020;42:e2020050. doi: 10.4178/epih.e2020050. PubMed PMID: 32660217; PubMed Central PMCID: PMCPMC7871152.

30 Vaucel JA, Gil-Jardine C, Labadie M, Larreche S, Paradis C, Nardon A, et al. Epidemiology of scorpionism in France: nationwide scorpion exposure. Clin Toxicol (Phila). 2021;59:888-95. doi: 10.1080/15563650.2021.1884692. PubMed PMID: 33605806.

31 Vazirianzadeh B, Hossienzadeh M, Moravvej S, Vazirianzadeh M, Mosavi S. An epidemiological study on scorpion stings in Lordegan County, south-west of Iran. Archives of Razi Institute. 2013;68:71-6.

32 Yuvaraja K, Chidambaram N, Umarani R, Bhargav KM, Kumar SP, Prabhu T, et al. A study on clinical features, complications and management of scorpion sting envenomation at a tertiary care hospital, in rural South India. Journal of Clinical and Scientific Research. 2019;8:140-4. doi: 10.4103/JCSR.JCSR_71_19.

33 Bernardi FA, Mello de Oliveira B, Bettiol Yamada D, Artifon M, Schmidt AM, Machado Scheibe V, et al. The Minimum Data Set for Rare Diseases: Systematic Review. J Med Internet Res. 2023;25:e44641. doi: 10.2196/44641. PubMed PMID: 37498666; PubMed Central PMCID: PMCPMC10415943.

34 Svensson-Ranallo PA, Adam TJ, Sainfort F. A framework and standardized methodology for developing minimum clinical datasets. AMIA Jt Summits Transl Sci Proc. 2011;2011:54-8. PubMed PMID: 22211180; PubMed Central PMCID: PMCPMC3248746.