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Identifying and Compiling Stressful Environmental Factors and Comparing Them in the Regions of Kohmareh and Tasht Bakhtegan

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ABSTRACT

Objective: In the present investigation, the discernment and aggregation of stress-inducing environmental variables within the geographical locales of Kohmareh and Tasht Bakhtegan have been meticulously examined.

Methods: To achieve this objective, data has been acquired through the utilization of structured interviews and comprehensive questionnaires. Consequently, through the application of interviews, the stress-inducing environmental variables were initially recognized in both Kohmareh and Tasht Bakhtegan, followed by an in-depth exploration of these variables via a questionnaire. The instrument employed for this research is grounded in the Likert scaling methodology. In this context, the questionnaire was disseminated among the designated statistical sample. Subsequent to the collection of the questionnaires, the resultant data was systematically inputted into SPSS23 software for analysis.

Results: The findings indicate that the p-value for the stress-inducing environmental variables in the regions of Kohmareh and Tasht Bakhtegan exceeds 5%, thereby suggesting the absence of a statistically significant disparity between the stress-inducing environmental variables in these two regions; however, based on the outcomes derived from the one sample T test, the significance of 18 stress-inducing environmental variables was substantiated.

Conclusions: Overall, the results substantiated the significance of these variables while delineating the stressful environmental determinants within the two geographic locales of Kohmareh and Tasht Bakhtegan.

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Introduction

Stress encompasses a collection of adverse emotional states, including tension, anxiety, anger, and restlessness (Abolghasemi, 2011). It serves as a significant determinant that, by altering the internal equilibrium of the organism, precipitates disruption and transformation in the body's order, thereby exerting both beneficial and deleterious effects on an individual's functional competence and overall health, both directly and indirectly. Concurrently, a variety of stressors have the capacity to induce stress and anxiety in individuals (Besharat, 2008). Conceptually, stress is a psychological phenomenon arising from the dynamic interaction between an individual and their environment, resulting in a disturbance in the equilibrium and harmony that one maintains with their surrounding conditions.

The manifestation of stress may precipitate adverse physical and behavioral ramifications for the individual. Among the grave health conditions associated with stress are cardiovascular diseases, immune system dysfunctions, and behavioral irregularities (Jazeni et al., 2009). From the perspective of the World Health Organization, factors such as age and gender, in addition to lifestyle, social structure, and environmental conditions, play a substantial role in influencing the health status of individuals. Furthermore, the World Health Organization indicates through various studies that there exists a correlation between environmental factors and stress levels, demonstrating that the environment can instigate stress both directly and indirectly.

Environmental stressors are often more pervasive and elude control. These stressors exhibit variability, oscillating continuously or periodically between low to moderate intensities (Asadi Fakhr & Asadi, 2017). Stress represents a coordinated physiological response of the entire organism in reaction to stressors. This response encompasses a comprehensive array of physiological, psychological, and behavioral modifications that are strategically orchestrated to assist the individual in navigating challenging circumstances. From a physiological standpoint, the activation of the sympathetic nervous system initiates the "fight or flight" response (Lupien et al., 2015). Hormones such as cortisol and adrenaline are secreted, which subsequently elevate heart rate, blood pressure, respiration, and perspiration. These physiological alterations equip the body to confront imminent dangers or threats. Psychologically, stress can engender a diverse spectrum of emotions, including anxiety, depression, irritability, concentration difficulties, and forgetfulness. It may also impair judgment and decision-making processes, leading to fluctuations

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in mood. Behaviorally, individuals experiencing stress may engage in maladaptive coping strategies such as overeating or under-eating, substance misuse, social withdrawal, avoidance of activities, and restlessness (Abolghasemi, 2011).

Each ecological context encompasses a distinct array of capacities that facilitate the emergence of various activities. However, individuals do not uniformly interpret these capacities; consequently, the behaviors exhibited by individuals vary significantly due to their divergent perceptions, thus enabling the environment to convey disparate significances to humans, including notions of unity, stress, tranquility, and others (Hõrak & Cohen, 2010). It is conceivable that behaviors are also molded in alignment with these elements. In more straightforward terms, functional behavior represents our cognitive frameworks concerning the environment. These cognitive frameworks are influenced by an array of urban determinants, among which one can enumerate environmental factors and stressors that exert a direct influence on individuals. This influence subsequently engenders the manifestation of behaviors that arise from the individual's comprehension of these determinants (Kazemi et al., 2010).

The risk factors associated with environmental health can be categorized into two primary groups: environmental factors (such as scarcity of water, elevated air temperatures, noise pollution, urban refuse, air contamination, and the presence of heavy metals, among others) and urban environmental factors (including traffic congestion and the substandard quality of the urban environment) (Hänninen et al., 2014).

Pasandideh et al. (2021) have undertaken a study entitled "Evaluation of the impact of indicators of the quality of the living environment on social health (case study: citizens of Mashhad)." The findings of this investigation revealed that the most significant components influencing social health in relation to the quality of the living environment were the physical and spatial quality of the neighborhood, security, aesthetic appeal, building amenities, structural safety, location within the building, and the facilities available in the residential unit. All variables within the framework of urban life quality and social health exhibited a significance level exceeding 0.01. Indicators pertaining to the quality of the residential environment were found to exert a more pronounced effect on social participation, social cohesion, and social acceptance among the sub-variables of social health. Gender, educational attainment, and wealth levels emerged as the most pivotal personal and identity predictors concerning respondents' perceptions of life quality in relation to

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social health, thereby influencing the residents' understanding of their living environment's quality. The research indicated that 38% of the variance in the social health variable could be accounted for by both living environment quality and individual variables.

Elrafie et al. (2023) conducted a study titled "Investigation of perceived psychological stress in connection with different perceived characters of urban spaces." This research, utilizing a theoretical framework through a review of pertinent theories and studies, as well as a practical approach through a structured questionnaire, examined the correlation between the characteristics of urban spaces and users' perception of stress. The findings underscored the contribution of individual personality traits to stress perception, identifying the social component as a critical influencing factor. Hu et al. (2023) executed a study titled "Perceived stress and life satisfaction during the COVID-19 pandemic: the mediating role of social adjustment and the moderating role of emotional resilience." The results indicated that social adjustment during the COVID-19 pandemic partially mediated the relationship between perceived stress and life satisfaction.

The two distinct regions of Kohmareh and Tasht Bakhtegan exhibit varying geographical, climatic, economic, and cultural characteristics. The Kohmareh region is characterized by its mountainous terrain and inaccessibility, situated in the northeast of Nairiz city. The prevalent cold climate, scarcity of amenities, and a subsistence economy reliant on traditional agriculture and animal husbandry delineate the features of this region. Such conditions may serve as a foundation for numerous environmental stressors impacting the inhabitants of Kohmareh. Conversely, Tasht Bakhtegan represents a fertile plain adjacent to Nairiz city, endowed with a more temperate climate. The advancement of modern agricultural practices, the presence of small-scale industries, and relatively improved access to amenities likely contribute to a diminished level of environmental stress experienced by the populace of this area. By selecting these two disparate regions concerning environmental and socio-economic contexts, a comparative analysis can be conducted to elucidate the influence of environmental factors on the psychological stress levels of residents.

The researchers endeavored to ascertain the implications of these diverse factors on the psychological stress levels of the inhabitants in each region through a comparative study of these two locales. The primary objective of this investigation is to examine the stressful environmental factors present in the regions of Kohmareh and Tasht Bakhtegan.

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Material and Methods

In the present study, for the purpose of implementing acquired knowledge and insights, a descriptive-analytical methodology has been employed, executed through survey techniques and a synthesis of qualitative and quantitative methods. Within the qualitative segment, which is conducted utilizing a phenomenological framework, semi-structured interviews are utilized as the principal instrument for data collection. The semi-structured interview format facilitates adaptability and the exploration of emergent themes and experiences throughout the interview process.

The demographic cohort examined in this study encompasses all inhabitants residing within the two distinct geographical areas of Kohmareh and Tasht Bakhtegan, situated in Fars province. Sampling for the qualitative component was conducted via a purposive sampling technique, incorporating access strategy, and involved a total of 16 participants, with data collection persisting until the attainment of theoretical saturation and data adequacy.

In the quantitative segment, the requisite sample size was established by employing Cochran's formula (designed for infinite populations), ultimately resulting in a selection of 384 individuals as the statistical sample. Given that the optimal implementation of an independent t-test necessitates two samples of equivalent size, and considering that this research employs two distinct geographical locales for data collection, cluster random sampling emerges as the most effective sampling strategy for the quantitative component. Consequently, each area was designated as a sampling unit, from which statistical data was collected randomly from individuals expressing a willingness to engage in the research.

The primary instrument utilized in the qualitative segment was a semi-structured interview format. Accordingly, the researcher posed general inquiries to specialists within the relevant field of study, aligned with the overarching objectives of the research, subsequently categorizing the verbal data into primary and secondary themes. The reliability and validity of this instrument were affirmed in the current investigation. To assess the reliability of the in-depth interviews, the feedback method was employed, wherein the outcomes of the interviews were returned to the participants for their assessment of accuracy. Should the feedback from the interviewees align with the outcomes of the interviews, it can be concluded that the in-depth interview possesses satisfactory reliability.

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The instrument employed in the quantitative segment of this study was an 18-item questionnaire specifically developed by the researcher. This instrument was constructed utilizing the thematic elements derived from the qualitative component of the research. Respondents were instructed to provide answers to the questionnaire items based on a 5-point Likert scale (1: very little, 2: little, 3: medium, 4: a lot, and 5: very much). The individual scores were computed by aggregating the scores from all items and subsequently dividing the total by 18. Consequently, the resultant score for the current scale is positioned within a continuum ranging from 1 to 5. In this inquiry, the Cronbach's alpha coefficient for the questionnaire was determined to be 0.87, signifying a high level of reliability. The correlation coefficient of the two halves serves as an additional metric that reflects the degree of congruence between the two segments of the questionnaire and the reproducibility of their outcomes. This index typically varies between zero and one, with higher values indicating enhanced reliability of the instrument. In this study, the two-half correlation coefficient for the administered questionnaire was calculated to be 0.81, thereby evidencing its considerable reliability. To assess the content validity of this instrument, Lawshe's consensus coefficient was employed, and the results indicated that the consensus percentage for none of the questionnaire items fell below 0.70.

The methodology for data analysis in the qualitative segment: The initial phase of data analysis in this research (subsequent to the conduct of interviews) was executed through the open coding technique. In this approach, the data is conceptualized into discrete units. To facilitate this, the data were first delineated according to their distinctions (intersection), followed by the categorization of phrases (individual words or small clusters of words) based on semantic units, thus allowing for the assignment of comments and concepts (codes) to them. In the subsequent phase, these codes were organized according to the phenomena identified within the data that are directly pertinent to the research inquiries. The resultant categories were then reconceptualized in relation to codes that exhibit greater abstraction than those identified in the preceding phase. At this juncture, the codes distinctly encapsulate the essence of the category, thereby aiding in the recollection of the category's reference. In the process of formulating titles and nomenclature for the codes, an effort was made to select titles that are both representative and suitably aligned with their corresponding categories. The concluding stage involves the refinement and differentiation of the categories generated from the open coding process (Axial Coding). In the axial coding phase,

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sub-categories are interconnected with the principal categories. This stage embodies a complex process of inductive and analogical reasoning that is conducted over multiple iterations. Similar to the open coding phase, this process was executed through scaling and inquiry; however, in axial coding, the application of these methods is more concentrated, with an emphasis on the creation and discovery of categories rooted in the paradigm model. Below, the data analysis procedure is succinctly summarized and distilled:

1 -Conducting interviews 2- Implementing and editing interviews 3- Coding opinions 4- Classifying opinions in the same conceptual groups 5- Interpreting concepts arising from research 6- Combining concepts and conclusions.

The methodology employed for data analysis in the quantitative segment: Within the quantitative segment of this study, the data acquired from the questionnaires pertaining to stressful environmental factors have been subjected to analysis employing statistical methods such as the t-test within the SPSS-23 software.

Results

Qualitative findings

In order to thoroughly examine the primary objective of the study, semi-structured interviews were administered, during which the experts' provided responses to the questions posed. Following the execution of these interviews, the results underwent meticulous line-by-line analysis, involving conceptualization, categorization, and subsequently, through a process of identifying similarities, the conceptual interconnections and shared characteristics among open codes, concepts, and categories (a class of concepts) were established. In this study, the data was rigorously scrutinized, leading to the identification of both main and sub-categories associated with the findings, as well as the determination and examination of their dimensions and characteristics; indeed, the responses provided by the interviewees were deconstructed into smaller units, and through a recursive process, they were compared against one another, resulting in the formulation of necessary concepts based on their common occurrences. Table 1 delineates the phases involved in identifying stressful environmental factors in the two regions of Kohmareh and Tasht Bakhtegan as perceived by the participants in the qualitative segment.

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Table 1. Phases of identifying stressful environmental factors in the two regions of Kohmareh and Tasht Bakhtegan

Basic concepts (Instance code)	Sub themes	Main them
Gradual salting of water	Salt water intrusion	Stressful environmental factors
Disturbance of biological balance	Environmental disorders	
Reduction of potable water	lack of water	
Infrastructure problems in the environment	Infrastructure corrosion	
Cutting down trees and disrupting the oxygen cycle in the environment	destructive human activities	
Reduction of visual space in nature	Visual pollution	
Overcrowding of elements in the environment based on the activity of social institutions	A large amount of natural elements in the environment	
Increasing the amount of carbon dioxide in the air	air pollution	
Population increases and lack of green space	Existence of inappropriate human scale in the environment	
Absence of standard routing agents	The readability of the environment and the possibility of easily identifying the path	
Bad smell of agricultural fertilizers	The presence of an unpleasant smell in the environment	
Not paying attention to the details of environmental elements	Lack of quality elements in the environment	
Darkness and lack of light in the paths	Absence of night light in the environment	
Lack of order between visual elements	lack of visual continuity of the environment (non-continuity of environmental elements)	
Lack of order between visual elements	Weak color of the elements in the environment	
Partial subsidence in roads and agricultural lands	Earth subsidence phenomenon	
Pollution of drinking water sources	Reduction of drinking water	
Lack of complete supply of food	Agricultural process and production of food products	

The eighteen sub-themes derived from the aforementioned table were utilized as the eighteen items of the questionnaire pertinent to this research. By employing the following sentence structure, the sub-themes were effectively transmuted into items of the questionnaire pertaining to stressful environmental factors: To what extent does it exacerbate your stress?

Quantitative research findings

Table 2. Demographic information of the quantitative part of the research

Variable	Level	F	%
Gender	Female	198	51.60
	Male	186	48.40
Age	< 30 years	128	33.30
	30-40 years	220	57.30
	> 40 years	36	9.40
Education	Diploma	26	6.80
	Bachelor	311	81
	Master	43	11.20
	Ph.D.	4	1
Region	Kohmareh	192	50
	Tasht Bakhtegan	192	50

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In the subsequent statistical metrics, the mean, standard deviation, and margin of error are delineated. Indeed, these metrics serve to enhance the comprehension of the variable under scrutiny.

Table 3. Characterization of research variables

Variable	Mon.	Max.	Mean	SD	Variance	Kurtosis	Skewness
Stressful environmental factors	1	5	3.984	0.667	0.445	0.800	0.502

Per the data presented in Table 3, it is observable that the mean value of the variable pertaining to stress-inducing factors surpasses the theoretical mean established by the scale (3). Furthermore, the skewness statistic falls within the interval of (-2 and +2), thereby indicating that the data adheres to a normal distribution pattern. In the current investigation, the Kolmogorov-Smirnov test was employed to assess the normality of the dataset. The statistic derived from this test for the variable associated with stressful environmental factors was 0.092, with a significance level of 0.107. Consequently, the distribution of the data was affirmed as normal.

Subsequently, to underscore the significance of stressful environmental factors from the perspective of the statistical sample, a one-sample t-test was administered. Should the t-test reveal a substantial difference between the mean difference and the theoretical limit (test value), accompanied by a positive t-value, one may conclude that the identified factors hold considerable importance within the statistical population.

Table 4. Outcomes of the one-sample t-test to evaluate the disparity between the mean and the theoretical mean

Variable	Theoretical mean value = 3					
	T value	DF	P	Mean differences	95 % confidence interval	
					Low limit	High limit
Stressful environmental factors	28.913	383	0.001	0.984	0.917	1.051

The findings encapsulated in the aforementioned table indicate that the t-value for the variable concerning stressful environmental factors in the regions of Kohmareh and Tasht Bakhtegan is recorded at a significance level of less than 0.05. Thus, it can be asserted that the stressful

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environmental factors in both Kohmareh and Tasht Bakhtegan possess substantial significance and influence.

Table 5. Findings from the independent samples t-test

Variable	Levene's test		T test						
	F	P	T value	DF	P	Mean difference	SD	95 % confidence interval	
								Low limit	Low limit
Stressful environmental factors	3.276	0.071	0.855	382	0.393	0.0582	0.068	-0.075	0.192

The outcomes presented in the table 5 illustrate that the significance level for the stressful environmental factors in the regions of Kohmareh and Tasht Bakhtegan exceeds 0.05. Therefore, it can be concluded that there exists no statistically significant difference in the stressful environmental factors across the regions of Kohmareh and Tasht Bakhtegan.

Discussion

The findings of the current investigation indicated that, initially, 18 environmental stressors were identified through interviews conducted with experts within the qualitative research sector. In the statistical sample, the quantitative aspect holds significant importance, and subsequently, there exists no statistically significant disparity between the environmental stressors in the regions of Kohmareh and Tasht Bakhtegan. The outcomes of this study corroborate the findings reported by Yari kia et al. (2021), Pasandideh et al. (2021), and Gholamian Moghaddam and Saeidi Mofrad (2020).

Owing to its geographical positioning within the arid and semi-arid zones of the globe, Iran is categorized among the nations that experience constrained water resources. An analysis of the precipitation patterns in Iran over the past fifty years reveals a persistent decline in the long-term trend of rainfall, with a notable reduction in precipitation volumes observed in recent years compared to historical data. Furthermore, the quantity of surface water flows across all watersheds in the nation has diminished relative to long-term averages, with the most significant decline of 77% recorded in the Hamon watershed. In numerous instances wherein the extraction of groundwater has been intensified, irreparable harm has been inflicted upon the nation’s water resources. Iran, being situated in regions characterized by low precipitation levels globally, has consistently encountered water scarcity.

The escalation of population, alongside industrial and agricultural developments, has exacerbated this water deficiency, rendering it increasingly critical over time, thereby propelling the nation’s

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geographical landscape toward a state of crisis and engendering a plethora of intricate environmental challenges. In contrast to arid regions, the water resources in the nation's wet areas are comparatively limited and exhibit an asymmetrical distribution. Concurrently, the over-exploitation and excessive utilization of water have precipitated detrimental impacts on both surface and groundwater resources within the country's natural and ecological domains. The veracity of this assertion is evidenced by the statistical data relating to the desiccation of lakes, the emergence of critical wetland plains, and the degradation of forested areas, as well as the subsidence of land and climatic alterations in regions experiencing specific climate conditions.

The primary catalyst for these environmental catastrophes is predominantly attributed to the overconsumption of water from both surface and underground sources, coupled with the inadequate replenishment of these water sources due to insufficient rainfall and recurrent droughts. The substantial rise in water demand, juxtaposed with intermittent drought conditions, has resulted in a detrimental imbalance within water resources. In this context, the utilization of surface water and the degradation of these resources, facilitated by advancements in water extraction technology, has led to the depletion of underground aquifers to the point of exhaustion, ultimately culminating in the degradation of the subterranean water reserve. The prevailing water crisis, in conjunction with a myriad of both natural and anthropogenic factors, has subjected the Iranian populace to a spectrum of risks, notably including the potential for psychological harm. In this context, the phenomenon of stress emerges as a salient variable warranting thorough examination across the diverse regions of the nation.

Findings from the current investigation indicate that the overarching conditions influencing the country have adversely affected even those areas characterized by favorable climatic conditions (specifically, Tasht Bakhtegan), thereby illustrating that two distinct climatic regions are concurrently vulnerable to environmental stressors. It is noteworthy that the aforementioned regions are in close proximity to one another. As previously articulated, anthropogenic factors have also played a pivotal role in exacerbating the stress levels experienced by the inhabitants of the two regions under study. In this vein, Moghani Rahimi et al. (2022) elucidated that the attributes of the constructed or artificial environment are intricately linked to the dynamics of the natural environment, social context, and the processes of urban planning. For instance, air pollution may be attributable to the excessive concentration of vehicles within particular neighborhoods, while interpersonal conflicts may arise from high population density coupled with inadequate per capita provision of essential services. The modalities through which individuals access various destinations, their chosen modes of transportation,

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and their reliance on personal vehicles and associated infrastructures can significantly amplify the stress experienced by residents in a given locality. Conversely, natural factors are also instrumental in shaping the stress levels of individuals residing in a specific region; for example, Halpern (2014) posits that the intensity of light exposure, particularly sunlight, has a profound impact on mental health, with insufficient sunlight exposure being linked to seasonal affective disorder; thus, residing or working in proximity to areas that facilitate sunlight exposure may mitigate the severity and duration of psychological distress.

Professionals specializing in psychology and counseling may find utility in the 18 identified environmental stressors delineated in this research to refine their educational and therapeutic interventions aimed at alleviating pathological and acute stress, thereby enhancing their efficacy in fostering a healthy societal milieu. Furthermore, educators and school administrators are encouraged to tailor their curricular frameworks in accordance with the factors elucidated in this investigation, with the objective of cultivating an atmosphere imbued with vigor and dynamism conducive to students' well-being.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the ethics committee of Islamic Azad University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection, and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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