Original Article

Policy Responses to the COVID-19 Pandemic: A Qualitative Case Study from Iran

Zhila Najafpour[1] , **Iman Keliddar[2*]** , **Kamran Shayanfard[3]**

[1]Department of Health Services Management, School of Public Health, Social Determinants of Health Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[2]Department of Health Services Management, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[3]Physics and Materials Science Research Unit, University of Luxembourg, Luxembourg, Luxembourg

*Corresponding Author: Iman Keliddar, Email: imn_keliddar@yahoo.com

Abstract
Background: The impact of the COVID-19 crisis is highly heterogeneous, with significant implications for crisis management. This study aimed to assess how policies to respond to COVID-19 were formulated, implemented, and evaluated.
Methods: This qualitative, in-depth study was conducted through semi-structured interviews with 31 experts from January to April 2021. The study focused on all relevant stakeholders responsible for the COVID-19 response in Khuzestan Province, Iran. Purposive sampling was employed to select participants, and data collection continued until data saturation was reached. Several related theories, frameworks, and concepts guided the data analysis process. Contextual factors, including structural, economic, situational, cultural, and climatic aspects, were emphasized. Actors were assessed based on their interests and power to influence the COVID-19 response. Kingdon's multiple streams framework and the Advocacy Coalition Framework (ACF) were utilized to analyze the policy process and implementation, respectively. Data were analyzed using content analysis.
Results: The findings provide significant insights into critical measures regarding contextual factors, policy content, and the roles of key actors and processes. Contextual factors played a dual role, acting as both facilitators and inhibitors of policy making against COVID-19. The main measures guiding the policy content in Khuzestan Province included increasing hospital bed capacity, establishing army hospitals, collaborating with private hospitals to utilize 10% of their capacity, repurposing hotel spaces for patients in recovery, leveraging charitable donation volunteers and medical students, deploying health workers on short-term contracts to work in 16-hour COVID-19 centers, conducting specialized training courses for nurses in intensive care units (ICUs), and launching COVID-19 diagnostic laboratories. The results showed that situational factors, governance structures, decision-making processes, and the influence and power of coalitions significantly affected the effectiveness of policy measures.
Conclusion: Investment in infrastructure and fostering integration among different health service providers are fundamental to managing pandemics effectively. Moreover, it is essential to identify understudied aspects of the policy sciences that warrant further attention in the aftermath of the pandemic.
Keywords: COVID-19, Policy analysis, Qualitative study, Pandemics

Introduction

Undoubtedly, one of the most significant global health challenges in recent years has been the outbreak of COVID-19. The World Health Organization (WHO) declared this acute respiratory syndrome a pandemic on March 11, 2020. Currently, more than 185 countries around the world are affected by this disease, with statistics indicating over 608 million confirmed cases and approximately 6.93 million deaths attributable to COVID-19 to date (1). Given the rapid spread of the coronavirus, it is necessary to conduct studies on this pandemic to reduce its adverse impacts. The emergence of COVID-19 in Iran was officially announced on February

19, 2020. After China, Iran was among the most affected countries, with over 80,000 confirmed cases and more than 5,000 deaths reported in less than two months (2).

Since the outbreak of COVID-19, various interventions have been implemented at different intervals across countries. Most of these recommended interventions have been non-pharmacological and based on public health measures. For instance, China's response included quarantine of affected individuals, detection of infected cases in public places and households, and strict restrictions on travel (3). In South Korea, key measures included school and higher education center closures, bans on gatherings, quarantine of patients and regions,

utilization of electronic maps for contact tracing, and increased alert levels (4). In the United States, social distancing was imposed by the federal government, and measures such as visa revocations, closures of schools and businesses, and lockdown orders were taken by the states(5). Iran, with a slight delay, adopted measures such as traffic restrictions, closure of schools and higher education centers, adjusting staff attendance, equipping the laboratories, and producing required supplies to combat the disease(6).

Due to the heterogeneity among countries concerning timing, severity, and approaches to managing the pandemic, it is necessary to analyze these policies comprehensively. Kovac et al emphasized the need for more coordinated public policy responses at the European Union level (7). Gabay et al examined public adaptation to social distancing policies during the COVID-19 pandemic in India, highlighting the necessity of strategies to enhance their effectiveness (8). Taghrir et al and Adolph et al underlined the importance and efficacy of collective quarantine and social distancing in controlling COVID-19, despite the economic challenges these measures impose(6, 9) . The policy-making cycle serves as a guiding tool, enabling policymakers to adopt a holistic approach. This cycle begins with stakeholder identification and participation, followed by policy formulation, where relevant studies are examined and policies are tailored, localized, and implemented based on specific national contexts. The final stages involve monitoring outcomes and evaluating policy implementation (2).

In Iran, the effectiveness of COVID-19 control policies has faced challenges due to restrictions stemming from international sanctions, unclear crisis management strategies, inadequate diagnostic and therapeutic infrastructures, and inefficient use of information technology. This highlights the need for further research into crisis management policies in the country. Khuzestan is one of the provinces of Iran with a high prevalence of COVID-19 cases (10, 11). The province also features unique economic, social, and situational conditions that can affect the policy-making process during the pandemic. Consequently, this study focused on analyzing the provincial policies in response to the COVID-19 crisis, considering the specific conditions of Khuzestan. The findings from this case report aim to provide insights into the policy-making cycle related to controlling COVID-19 in a specific geographical location. Such analyses can provide policy recommendations to improve the effectiveness of existing policies and support evidence-based decision-making in the future (2).

The present case study was conducted to analyze the COVID-19 response policies in Khuzestan Province, Iran. Accordingly, the study offers an overview of the policies implemented and factors influencing the spread of the virus and resilience against its negative consequences in this province.

Methods
This case study was conducted using a qualitative approach to analyze the local policy responses to COVID-19 in Khuzestan Province, Iran, from January to April 2021.

Setting and Sampling
The study focused on all involved stakeholders who met the following inclusion criteria: holding formal responsibility in the COVID-19 response within the province and possessing more than four years of relevant experience. Purposive sampling was employed to select participants, and data collection continued until saturation was achieved. An initial list of key informants was developed by identifying individuals across various levels, including policymakers, executive managers, academics, and frontline staff. Snowball sampling was also used to identify additional participants. Finally, 31 key informants participated in the interviews, comprising representatives from the public health deputy (13 participants), the treatment deputy (12 participants), and academic experts (6 participants). Recruitment continued until no new code emerged. All participants provided informed consent and were assured of their anonymity.

Conceptual Framework
Walt and Gilson's policy triangle model(12) was used as the analytical framework. The policy analysis triangle has three dimensions, including process, content, and context, and considers actors (players) at its core. Several related theories, frameworks, and concepts guided data analysis. The context focused on structural, economic, situational, cultural, and climatic factors that could affect the local policy-making process in response to COVID-19. Due to the complexity of identified issues concerning structural aspects, the WHO building blocks framework was used to categorize the factors (13). Subsequently, stakeholders (actors) were identified and systematically assessed based on their interests and power to respond to the COVID-19 crisis. For the analysis of the local policy process, Kingdon's multiple streams framework (problem, policy, and political streams) was applied to elucidate agenda-setting components (14). Regarding policy implementation, the Advocacy Coalition Framework (ACF) was utilized to describe the local policy implementation process (15). Finally, formative and summative evaluations were conducted to assess policy effectiveness (Figure 1).

Data Collection
Data were collected from January to April 2021. Two principal researchers (ZN and IK) conducted face-to-face, semi-structured interviews. Each interview lasted approximately 45 to 60 minutes and was conducted at the participant's workplace. All interviews were recorded
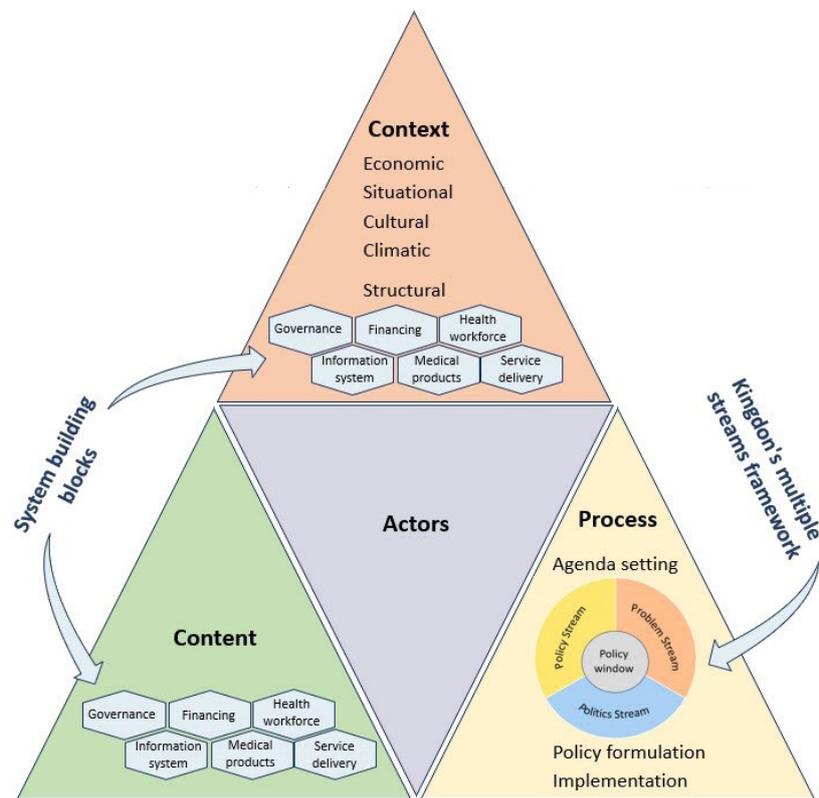
Figure 1. Proposed policy analysis based on policy triangle model, WHO building blocks, and Kingdon's multiple streams framework

(n = 31) after obtaining participants' consent, then transcribed verbatim. An interview guide was developed based on a literature review and aligned with the research questions. The guide included open-ended questions covering four main areas: (1) contextual factors, (2) policy content, (3) actors, and (4) policy-making processes.

Data Analysis

All interviews were audio-recorded and transcribed verbatim. The analysis was performed manually. The coding process involved three phases: First, two researchers (ZN and IK) independently reviewed the transcripts line-by-line to generate initial codes. Second, the codes were organized into categories and subcategories relevant to each part of the conceptual framework. During this stage, a model was selected to facilitate interpretation. Third, the researchers convened to review and discuss the codes; initial codes were refined, duplicates removed, and the codes were finally grouped under themes related to the selected models. In cases where disagreements arose, a third researcher (KS) was consulted to make the final decision.

Ethical Considerations

Written informed consent was obtained from all participants before data collection. The study protocol was approved by the Ethical Review Committee (IR. AJUMS.REC.1399.819). Besides, this study was conducted according to the principles of the Helsinki Declaration.

Results

In this study, interviews were conducted with 31 participants, the majority of whom (80%, n = 25) worked as managers or employees in the public health and treatment sectors. About 65% of the participants were male, with an average of 19.06 years of work experience. Moreover, 19% (n = 6) held a Ph.D., and 19% (n = 6) were physicians. The remaining healthcare professionals held bachelor's or master's degrees.

Data analysis yielded 18 subthemes, which were categorized into six major themes. These themes and subthemes are presented in the following sections. The policy response to the COVID-19 pandemic in the studied province was classified and analyzed across several dimensions, including contextual factors, content factors, actors, policy process, policy implementation, and policy evaluation. The findings are as follows:

Context

The contextual factors affecting COVID-19 policies in the province were classified into five categories in the public health and treatment domains.

Structural Factors

Structural factors played a dual role, both as facilitators and inhibitors, in public health and treatment. In the public health domain, primary barriers were related to manpower quantity and quality, while facilitators included service delivery structures, technological capacity, and the

health infrastructure, such as primary health care (PHC) network, health ambassador, and electronic databases. In the treatment domain, structural challenges appeared as inhibitors mainly related to leadership, governance, manpower, technology, and service delivery, while financing, such as special payments and bonuses, served as the only facilitator, particularly for healthcare personnel involved in COVID-19 efforts (Table 1).

"The PHC network enabled us to manage this disease effectively" (Participant 1).

"We are facing shortages in labs and workforce, and our infrastructure does not meet the daily testing capacity" (Participant 4).

Economic Factors

Economic factors were found to exert inhibitory effects across both public health and treatment sectors. Iran experienced cost-push inflation, which reduced access to healthcare services for low-income households and negatively impacted adherence to COVID-19 prevention and control guidelines (Table 2).

"The Ministry of Industry, Mine, and Trade was expected to intervene with the closure of non-compliant businesses, but in most cities, the ministry did not participate" (Participant 5).

"Personal protective equipment (PPE) must be readily available and accessible. We found lower compliance with protocols in some rural and suburban areas" (Participant 6).

Situational Factors

The findings indicated a dual nature for situational factors in the province in the face of the pandemic. On one hand, the maritime boundaries with the Arab states of the Persian Gulf increased the probability of international and national traffic. Much of this traffic was due to the existence of various industries in the province (i.e., oil, gas, petrochemical, and steel industries), which led to a significant portion of their workforce being non-native. On the other hand, the province is on the path of the Hajj pilgrims. Previous experiences with the Middle Eastern Respiratory Syndrome (MERS) in Saudi Arabia heightened the province's readiness to face COVID-19 (Table 2).

Table 1. Structural Components of the Contextual Factors

Leadership/ Governance	Public Health	•	High coordination among different cities (+)
	Treatment	•	Lack of integrated governance in the private sector (-)
		•	Weaknesses in redistributive policies among different regions (logistic resources, like alcohol, masks, etc.) (-)
		•	Lack of rules to engage the private health sector during the pandemic (inpatient and outpatient services) (-)
		•	lack of incentives and coordination with the private sector (inpatient and outpatient services) (-)
		•	Poor alignment between provincial and national situations due to asynchronous pandemic peaks (-)
		•	Weaknesses in community-based medical education (-)
		•	Lack of supervision on outpatient performance (-)
Health information systems	Public Health	•	Availability of valid and reliable mortality data and death registration system in Iran (+)
		•	Existence of information and communication technology (ICT) infrastructures (e.g., electronic health records) (+)
	Treatment	•	Lack of infrastructure for web-based queuing systems in outpatient services (-)
Financing	Public Health	•	Special bonus payments to HCWs (+)
	Treatment	•	Failure to set tariffs for COVID-19-related services (-)
		•	Inadequate insurance coverage for COVID-19 services
		•	Special bonus payments to HCWs (+)
Health workforce	Public Health	•	Shortage of HCWs (-)
		•	Shortage of skilled HCWs (-)
		•	Shortage of HCWs in less privileged cities (-)
		•	HCWs quitting their jobs during COVID-19
		•	Use of health ambassadors in public education (+)
	Treatment	•	Reluctance of HCWs to work in ICUs during COVID-19 (-)
		•	Decreased resilience of HCWs due to the unknown nature of the disease (-)
		•	Poor resilience of HCWs facing the disease (-)
		•	Loss of HCWs due to underlying conditions (-)
Medical products and technologies	Public Health	•	Lack of personal protective equipment (PPE) (-)
		•	Insufficient physical and medical facilities (e.g., laboratory diagnostic kits, ICU beds, ventilators, oxygen generators) (-)
		•	Weakness and instability in ICT infrastructure (-)
	Treatment	•	Lack of resilience in system infrastructure during peaks (-)
		•	Absence of inter-provincial logistical support due to the epidemic (e.g., lack of ambulances) (-)
Service delivery	Public Health	•	Presence of a public health network (+)
	Treatment	•	Lack of resilience in pre-hospital infrastructure (-)
		•	Lack of resilience in hospital infrastructure (-)
		•	Inappropriate hospital and outpatient department locations (-)

+ indicates factors that have a facilitating role in managing COVID-19.
- indicates factors that have a deterrent role in managing COVID-19.

"Our province is an intended destination for immigrants with a lack of healthcare workforce. In addition, the wide cross-borders of this province could affect the entry of disease and result in more unbalanced peaks compared to other provinces of the country" (Participant 7).

Cultural Factors

Cultural factors had paradoxical aspects during the pandemic. On one side, collectivism and low health literacy hindered efforts to enforce social distancing as well as religious and family gathering restrictions, leading to multiple peaks in COVID-19 cases, higher than national averages. Conversely, the same collectivist spirit fostered community cooperation, especially in volunteer mobilization, donations, and support for health initiatives (Table 2).

"There was remarkable cooperation in the treatment and public health deputies affiliated with the medical university. Their staff worked long hours" (Participant 9).

Climatic Factors

Climatic conditions impeded the province's pandemic response by affecting workforce recruitment, retention, and well-being. The province experienced considerable rates of health workforce migration attributable to adverse climatic conditions, resulting in a human resource for health (HRH) profile that was notably below the national average in both size and composition. On the other hand, healthcare workers faced mental and physical exhaustion as they endeavored to manage health challenges arising

from recent natural disasters, such as floods and river overflows. Moreover, the presence of endemic diseases, including cholera, hepatitis A, and dysentery, exacerbated the province's capacity to respond effectively to the pandemic (Table 2).

"Our province has always experienced disease outbreaks. For example, we have tuberculosis, cholera, dysentery, etc. This necessitates that the health system be prepared to respond to pandemics" (Participant 10).

Content Factors

The content of the province's response to COVID-19 was organized into six main categories (building blocks) across public health and treatment domains (Table 3).

Leadership

Many regulations against COVID-19 were implemented by ad-hoc national and provincial committees. The most important preventive measures included mandatory mask-wearing in government offices, closure of markets, bans on gatherings, increased field surveillance, and initiatives to motivate and support healthcare workers. Besides, working groups were formed for the early detection of patients.

"Several internal decisions, such as closing public markets, increasing the number of sampling centers, and follow-up with positive cases, were made by the provincial committees" (Participant 4).

"Management teams increased work shifts in all cities, and morning reporting sessions of the management

Table 2. Other Components of the Contextual Factors

Economic factors	Public Health	• High inflation rate affecting the implementation of preventive measures (-) • Economic sanctions against Iran (-) • Willingness to pay for PPE (masks, shields, disinfectants, etc.) (-) • Accumulation of less privileged populations on city outskirts (-)
	Treatment	• Economic sanctions against Iran (-) • Decreased revenues of public hospitals (-)
Situational factors	Public Health	• Preparation due to coronavirus exposure experience in Saudi Arabia (+) • Existence of international borders (-) • Poor data quality due to the geographical location of the province (-) • Presence of non-native labor force due to the industrial nature of the province, increasing inter-regional traffic (-)
	Treatment	• Lack of manpower due to high immigration and border proximity (-) • High immigration due to industrial and border zones (-)
Cultural factors	Public Health	• Altruistic culture (support and livelihood packages for vulnerable and affected families) (+) • Poor health literacy (-) • Fear of stigmatization (External image concerns) (-) • Community indifference to COVID-19 prevention protocols due to prolonged exposure (-) • Multiple ethnicity, collectivism, and extended family structure (-)
	Treatment	• Poor health literacy (-) • Distrust of preventive measures among the population (-)
Climatic factors	Public Health	• Occurrence of floods in previous years and environmental infrastructure challenges (-) • HCWs' burnout due to facing consecutive crises over two years before COVID-19 (-) • Prevalence of endemic diseases (dysentery, cholera, hepatitis A) complicating technical assistance (-) • High immigration of skilled HCWs due to climatic conditions (-) • Disruption of disease transmission efforts caused by traffic and high migration (-)
	Treatment	• Prevalence of endemic diseases (dysentery, cholera, hepatitis A), hindering technical assistance (-) • High immigration of skilled HCWs due to climatic conditions (-)

+ indicates factors that have a facilitating role in managing COVID-19
- indicates factors that have a deterrent role in managing COVID-19

Table 3. Content factors

Leadership/ Governance	Public Health	• Mandatory use of masks in government offices • Reduced traffic by closing central markets • Establishment of an integrated care system (active and inactive) for COVID-19, including recording previous exposures • Designing protocols for the implementation and monitoring of hospital waste disposal, ventilation of hospital spaces, and burial procedures • Developing a morning reporting system at the level of senior managers in the public health deputy • Adjusting reporting intervals for mortality rates • Implementing managerial interventions for continuous environmental supervision in the public health sector • Increase in management shifts • Increase in daily supervision
	Treatment	• Cancelling gatherings for religious events, national holidays, cultural celebrations, and ceremonies • Designation of a special hospital for COVID-19 cases • Development of triage guidelines based on clinical signs • Development of disease management guidelines considering different COVID-19 peak predictions • Formation of working groups (NGOs) for the early identification of patients • Launching the Shahid Soleimani plan to complete the active care system
Health information systems	Public Health	• Sending daily statistics on positive and suspected cases, performed tests, hospitalizations, outpatient visits, and deaths, with daily analysis submitted to the committee • Designing the MASK application to communicate pandemic status • Defining new death codes for COVID-19 patient registration • Changing environmental data recording methods by increasing frequency and reducing reporting intervals of COVID-19 cases
	Treatment	• Sending daily statistics on positive and suspected cases, performed tests, hospitalizations, outpatient visits, and deaths, with daily analysis submitted to the committee
Financing	Public Health	• Providing special bonus payments to HCWs
	Treatment	• Providing special bonus payments to HCWs
Health workforce (Quality, Quantity, Retention)	Public Health	• Deploying HCWs on short-term contracts to work in designated 16-hour COVID-19 centers
	Treatment	• Conducting training programs for nurses working in ICUs
Medical products and technologies	Public Health	• Increasing the number of COVID-19 screening tests, especially during peaks
	Treatment	• Expanding hospital bed capacity • Converting general wards into ICUs for critically ill patients with COVID-19 • Improving access to PPE, medical oxygen, and laboratory equipment
Service delivery	Public Health	• Setting up designated 16-hour COVID-19 sampling centers • Establishing sampling centers at maritime borders • Implementing the "Each House A Health Base" plan by health ambassadors • Launching bilingual (Persian-Arabic) public training stations in government offices • Setting up training and screening stations at the entry points of the province • Erecting educational billboards throughout the city • Increasing dedicated phone lines to address public concerns about COVID-19
	Treatment	• Conducting telephone-based screening and triage during the COVID-19 outbreak • Implementing national preventive measures • Preparing educational audio materials for public places, mosques, and villages in Persian and Arabic • Creating posters, infographics, video clips, and motion graphics on COVID-19 prevention • Automatically dispatching messages via Bluetooth to mobile devices • Providing education through the SHAD application for school students • Increasing public awareness via mass media to address mental health stressors associated with COVID-19 • Designing and implementing grief counseling services • Offering consulting sessions for pregnant women • Follow-up with COVID-19 patients by health workers and unpaid caregivers

team on the performance of the cities were set up in the health deputy" (Participant 10).

Health Information Systems
The main measures to strengthen information systems involved developing a COVID-19 registry database to track PCR-positive cases and updating death registration systems with new COVID-19-specific codes.

"Designing a COVID-19 mortality database was the most important action, and the Ministry of Health issued a series of codes for suspected and confirmed cases of COVID-19" (Participant 11).

Financing
Participants pointed out that special financial recognition payments were granted to eligible frontline healthcare providers.

"The COVID-19 special payments motivated staff and reinforced their commitment" (Participant 12).

Health Workforce
Shortages of the health workforce (HW) emerged as a result of exposure to COVID-19, illness, or the need to

care for family members at home during the pandemic. These factors contributed to the already limited number of HW in the province. To mitigate these challenges, several measures were implemented in both the public health and treatment sectors. In the public health domain, health workers on short-term contracts were deployed to work in designated 16-hour centers. In the treatment sector, targeted training programs for nurses working in intensive care units (ICUs) were designed and implemented. In addition, medical students assumed frontline roles in both preventive and therapeutic activities during the pandemic.

"We recruited skilled health workers in the field of health environment, and sampling staff on short-term contracts to work in selected 16-hour COVID-19 centers" (Participant 4).

"Increasing ICU capacity was one of our measures. In this regard, we designed and implemented an educational program in collaboration with [interdisciplinary] university professors in nursing, anesthesia, internal medicine, and cardiology" (Participant 14).

Medical Products

A major limitation identified in the province's initial response to COVID-19 was its low capacity for laboratory diagnostics. To address this challenge, measures such as establishing new laboratories and accessing rapid diagnostic tests (RDTs) were implemented three months after the onset of the epidemic in the province, thereby accelerating the process of identifying patients. In the treatment domain, several interventions were introduced to alleviate operational pressures, including increasing ICU capacity, expanding bed capacity, and enhancing oxygen infrastructure, such as establishing oxygen plants, liquefied medical oxygen systems, oxygen concentrators, and pulse oximeters.

"We converted hospital beds into specialty ICU beds" (Participant 15).

Service Delivery

Preparedness capacity was increased through the enhancement of the PHC structure and the establishment of selected 16-hour COVID-19 centers. These measures significantly improved public access to diagnostic and treatment facilities in the PHC network. The findings indicated that the general preparedness was elevated by increasing the speed of public access to diagnostic and treatment facilities through the establishment of designated 16-hour screening centers. To raise public awareness, some measures were taken, including launching bilingual (Persian and Arabic) public training stations in government offices, erecting educational billboards in different parts of cities, increasing dedicated phone lines to answer public concerns about COVID-19, setting up training and screening stations at the entry points of the province, using local media for health education, and answering public questions regarding mental health and COVID-19 health principles. In terms of treatment, some interventions, such as designating a specific hospital for COVID-19 patient admissions and increasing the coverage of specialized care units, were implemented in response to the initial peaks of COVID-19.

"We implemented the 'Each House A Health Base' plan and used the capacity of health ambassadors" (Participant 16).

"Hospitals were separated; COVID-19 cases were admitted to a private hospital. During the peak, hospitals affiliated with the army and social security were also added to our capacity. We also used the capacity of midwives and medical students" (Participant 14).

Actors

The stakeholder's landscape was categorized into six main groups based on their roles. An analysis of their power and interests in policy formulation and implementation in response to COVID-19 was conducted. The actors encompassed a wide range of governmental and non-governmental organizations, interest groups, media outlets, and religious groups that exerted significant influence on policy-making processes (Figure 2).

Process
Agenda Setting

The recognition of COVID-19 as a critical issue became evident following the WHO's declaration of it as a pandemic on September 19, 2019, with the first confirmed cases in Iran reported on February 18, 2020. An ad-hoc provincial committee was established simultaneously with the national committee. However, the interventions for managing the COVID-19 pandemic were initially delayed and less effective due to the asynchronous trajectory of the outbreak in the province compared to the rest of the country. The province had higher rates of COVID-19 infections, deaths, and hospitalizations due to its particular situation. Furthermore, as an industrial region, the province faced additional issues related to international communication and continuous employee transit that increased transmission risks. These factors hindered the feasibility of preventive measures against COVID-19, like lockdowns, and delayed the convergence of the *three* streams (problem, policies, and politics) that are necessary to open policy windows.

"Our province was affected later, and when it was involved, it experienced more than five peaks" (Participant 17).

Policy Formulation

The policy formulation process involved decision-making structures and data flow mechanisms.

Decision-Making Structures
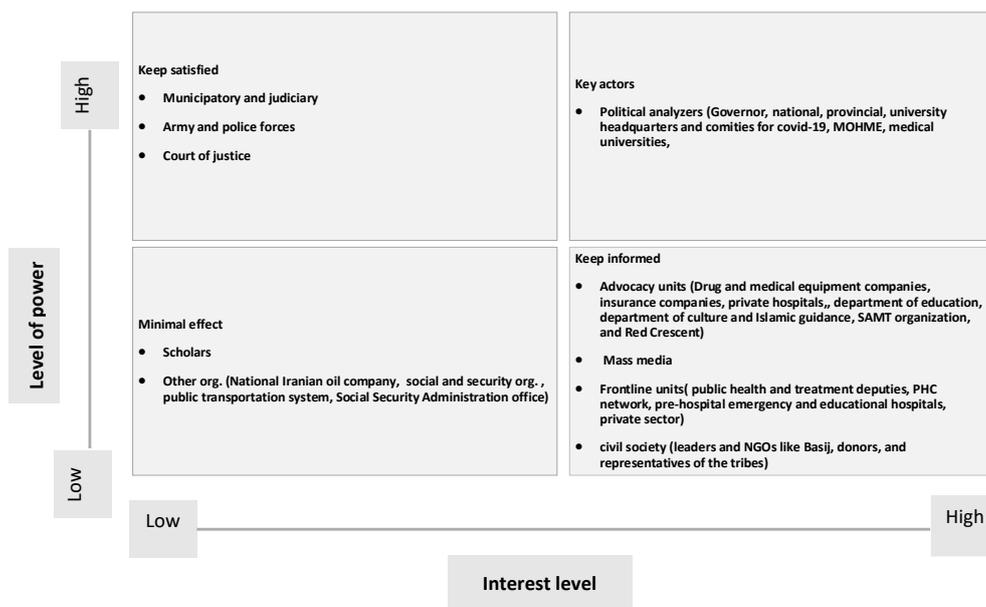
The highest decision-making bodies included two main

Figure 2. The Mendelow's matrix illustrating the position of stakeholders based on their power and interest

boards: an ad-hoc provincial committee and a university committee, along with four sub-committees. The provincial committee was designated as the main body to formulate local policies in response to COVID-19, operating under the guidance of the national COVID-19 committee. The provincial committee members included the governor, the medical university chancellor, heads of related deputies, such as the deputy for social and cultural affairs of the Khuzestan governor general, and public health and treatment deputies affiliated with the medical university. The university committee, as the secretariat of the national committee, consisted of the medical university chancellor, heads and staff of the treatment sector, public health and education deputies, as well as hospital directors. In addition, the sub-committees for public health, treatment, mortality, and epidemiology were formed as consulters working under the guidance of the university committee.

Challenges identified in the policy formulation process included instability in committee memberships and a lack of emphasis on professionalism within working groups. Besides, the centralization of policy-making at the national level affected provincial policy development, with some provincial policies contingent on national approval. Informal bargaining and power dynamics influenced policy decisions, sometimes undermining environmental reports and expert opinions.

"Now all agendas for provincial committee meetings are dictated by the university committee. I think the government office has lost its pivotal role as the main policymaker in the province". (Participant 19).

Data Flow and Evidence Generation
Most provincial policies in response to COVID-19 were formulated by the university committee, relying on environmental assessments conducted in public health and treatment deputies affiliated with the medical university. Checklists were designed to monitor changes in environmental conditions. Furthermore, environmental data were analyzed and communicated weekly to the COVID-19 committees for monitoring the situation of the province. Data quality and quantity were actively monitored by increased data collection frequency, daily analyses, and regular feedback to environmental units. However, the quality of data was compromised by problems such as asynchronous data entry, manual registration processes, misclassification of cases (false positives and negatives) due to ambiguity in clinical diagnosis, weak electronic infrastructure, and lack of an integrated health information database (Table 4).

"Data were incomplete or delayed. We had a lot of problems with treatment. A single, integrated COVID-19 database was required to collect information from all hospitals, laboratories, and imaging units, but this system was not established" (Participant 9).

Policy Implementation
According to the findings, coalitions were formed to implement policies in response to COVID-19 in the public health and treatment sectors. These coalitions included policy analysts, media activists, civil society, researchers, and support staff from various areas (i.e., government, semi-government, and private entities). These coalitions played a dual role, acting as supporters or opponents in policy implementation. Besides, brokers played a pivotal role in bridging these coalitions and mobilizing their involvement in policy implementation. Some of the

identified brokers belonged to official policy structures within the province (including the governor, medical university chancellor, mayors, and villagers), while others operated within informal structures (including NGOs, sheikhs, nomads, and religious leaders). Identified problems in ineffectiveness of the brokers' performance included poor resource management (human resources, equipment, information systems, and finances) and the impact of macroeconomic, legal, political, and cultural factors on the capacity of some heterogeneous coalitions to cooperate. Furthermore, cultural characteristics prevalent in the province (ethnicity and collectivism) disrupted the implementation of certain formulated policies. The misalignment between the peaks of COVID-19 cases in the province and those at the national level resulted in timing mismatches that hindered the implementation of national policies in the province.

"In our province, alcohol was produced, making it abundantly available, yet masks were scarce. Conversely, in other provinces, masks were plentiful, but alcohol was not. This indicates a failure in resource reallocation management" (Participant 20).

Policy Evaluation

The findings showed that the effectiveness of policies in response to COVID-19 was assessed through both cumulative and formative evaluation methods. During the cumulative evaluation process, the required data were collected based on environmental supervision at various levels, including managerial, expertise, and public sectors, to ensure the implementation of policies. Informative evaluation involved ongoing monitoring of the performance of environmental units (cities) through regular daily meetings, notably via morning reports. The findings indicated that the policy evaluation process was continuous, emphasizing a bidirectional flow of information (bottom-up and top-down). However, challenges were noted in information transfer in the private sector, characterized by delays and inefficiencies (Table 5).

"Weekly reports are entered into a database, and these statistics are uploaded every Monday. We then analyze, index, and compare the data. The results are reviewed city by city during daily meetings called Morning Reports. Once approved, the interventions are communicated to the cities for implementation" (Participant 4).

Discussion

This study analyzed the policy processes involved in responding to the COVID-19 pandemic in a province of Iran. The results indicated that situational factors, governance structures, decision-making processes, and the power and influence of coalitions played significant roles in determining the effectiveness of policy measures.

Contextual factors played a critical role in the prevalence of COVID-19 in different parts of the world. Differences in governance structures and economic[16], situational[17], cultural[18], and climatic factors contributed to variations in the timing, intensity, and duration of exposure to pandemic surges as well as in morbidity and mortality

Table 4. Data flow in the process of formulating COVID-19 policies

Data collection	• Tool design: Health Literacy Assessment Questionnaire • Developing and implementing nursing supervision checklists • Defining and reporting indicators for the neighborhood-based monitoring plan titled "Shahid Soleimani" *
Data management	• Increasing the frequency of information retrieval from environmental units on a weekly and daily basis • Analyzing information daily • Conducting data quality control and providing feedback based on the information flow
Evidence generation	• Developing and implementing a protocol for tracking COVID-19 infections

*A national initiative named after Martyr Qasem Soleimani, launched in November 2020, successfully contributed to breaking the transmission chain of COVID-19 and enhancing interdisciplinary coordination. This plan operated on three core axes: support, care, and supervision. Volunteer teams were integrated with health bases to ensure the plan's effectiveness; they actively cared for positive cases at their homes, tested surrounding contacts, and supported those with chronic illnesses. Moreover, the Basij support group assisted those facing financial hardship or requiring other forms of assistance.

Table 5. Policy evaluation

Information flow	• Measuring the effectiveness of training programs • Using evidence from MASK application reports for decision-making • Incorporating evidence-based practices in policy formulation • Establishing a secretariat responsible for information collection
Reporting	• Daily morning reports analyzing the pandemic • Performing managerial supervision at the operational level • Performing managerial supervision at headquarters (monitoring public education performance indicators) • Monitoring the performance of designated centers • Holding national and provincial webinars • Increasing the frequency of information transfer to senior managers (daily) • Reporting to the national COVID-19 committee during peaks • Regular reporting on public compliance rates to the provincial COVID-19 committee (weekly) • Monitoring the performance of the Emergency Medical Services Organization
Dissemination	• Poor communication mechanisms with the private sector

rates. The results of the present study demonstrated that these contextual factors served both as facilitators and inhibitors in the province's response policy process. For instance, in structural factors, the presence of robust hardware and software infrastructure, such as the PHC network and health ambassadors in the public health sector, proved beneficial for implementing preventive policies. In contrast, the industrial location of the province, its maritime boundaries, internal and external transit routes, climatic conditions (notably hot weather and air pollution), and its unique cultural composition, characterized by ethnic diversity, collectivism, and extended family structures, posed challenges to the enforcement of certain preventive measures. Thus, the government adopted a cautious approach to implement some preventive measures, including closure of land, sea, and air borders, travel restrictions, lockdowns, and bans on religious and funeral ceremonies. It is noteworthy that, due to the pre-existing conditions and background of the Khuzestan province, shaped by conflict and war, the health worker-to-population ratio in this province is lower than the national average, representing a critical contextual challenge during the pandemic. Existing literature supports the idea that air pollution (18) facilitates pandemic spread, while high temperatures (19) may have inhibitory effects. Moreover, collectivist cultures (18) have been reported to influence the prevalence of pandemics positively.

The main policy content of responding to the pandemic in the province centered on expanding healthcare capacity, such as increasing hospital beds, opening army hospitals, engaging private hospitals to use ten percent of their capacity, using hotel capacities for patient recovery, mobilizing volunteers and medical students, deploying health workers on short-term contracts to designated 16-hour COVID-19 centers, providing intensive care training to nurses, and establishing diagnostic laboratories. The World Health Organization (WHO) recommends several preventive measures against pandemics, such as enhancing service centers, laboratory capacity, supply chains, provision of essential equipment, resource management, and working groups involving crisis management, community education, and procurement of isolation facilities (20-22). In China and parts of Europe, interventions like timely warning systems, traffic restrictions, and quarantine measures have been reported to be effective in controlling disease waves and reducing morbidity and mortality (23-25). In Ireland, in response to manpower shortages, campaigns such as "Be on call for Ireland" encouraged domestic and international healthcare workers to support public health services (26). Other measures included increasing working hours for part-time staff, hiring retirees, redeploying existing personnel, and encouraging early return of those on career breaks. Similar challenges, namely shortages of manpower,

hospital beds, ICU capacity, medical and laboratory equipment, and personal protective equipment, were encountered by other developing countries, especially at the early stages of COVID-19 (27).

The regional and local impacts of COVID-19 are highly heterogeneous, emphasizing the necessity of tailoring preventive policies to regional contexts. In the present study, due to the centralized nature of policy-making, the national COVID-19 committee primarily directed policy responses, limiting the provincial committees' roles, particularly concerning closure of land, sea, and air borders, travel restrictions, lockdowns, closure of a wide range of institutions (schools, universities, government offices), and traffic controls. The asynchronous timing of peaks between Khuzestan and other provinces created implementation challenges. Another challenge was the unequal distribution of required resources in response to COVID-19 by the central government. The government plays a pivotal role in resource allocation, especially due to the simultaneous exposure of all provinces to the pandemic. However, research findings on the preferred governance structure to deal with the pandemic are inconsistent. A review study examining the Mediterranean countries' interventions in responding to the pandemic noted that centralization initially enabled fast coordination. However, in the second and later COVID-19 waves, some of the studied countries launched a decentralized decision-making structure (27). Similarly, Sweden adopted a decentralization approach, granting high autonomy to local authorities in pandemic response (28).

While policy making in Khuzestan was partly based on evidence and expert opinions, it was heavily influenced by systematic issues like the centralized decision-making process, informal power dynamics, a focus on treatment rather than prevention, and low-quality environmental data. These factors hindered the timely and effective formulation and implementation of preventive policies in the province. During the pandemic, problem-based policy-making driven by expert opinions and information collection emerged as a dominant strategy in countries like Germany, Greece, and Ireland (28, 29). Information and evidence analysis is indispensable for informed decision-making during disasters and pandemics.

Due to the behavioral nature of this pandemic, the extent of community participation significantly influenced the effectiveness of preventive interventions. Numerous studies have reported several factors that may affect public compliance, such as awareness of restrictions, reporting of COVID-19-related deaths, the level of social support, the implementation of control measures by governments, and positive individual attitudes toward pandemic restrictions (30, 31). In contrast, non-compliance with public health measures during COVID-19 has been associated with public distrust in government, lack of awareness, and poverty (32). In the province, measures such as daily

reporting of the rates of infections, recoveries, and deaths, as well as the utilization of formal and informal power structures, were implemented to encourage public participation (33). Shirali et al reported that adherence to COVID-19 guidelines in some areas of their studied site was very low and inefficient (34).

The results of the present study indicated that fake news and false information about prevention and treatment methods circulated widely on social media, alongside public beliefs that COVID-19 and influenza are similar. These issues posed significant challenges to the implementation of preventive protocols, necessitating the adoption of strategies to combat misinformation. This finding aligns with other studies (35, 36), which showed that countries like Taiwan, Singapore, and Korea have implemented regular information dissemination programs to their citizens.

Proper and timely policy evaluation during the pandemic, despite its challenges, is essential for modifying and refining national action plans in response to crises(37). Haber et al emphasized that evidence on COVID-19 should be made accessible to policymakers while carefully considering biases, influential assumptions, and sources of uncertainty (38). Access to reliable and high-quality information remains a major challenge in policy evaluation. In the province, this challenge was compounded by poor data quality due to infrastructural weaknesses, limited technological capacity, and the lack of integration among existing databases. The use of big data technologies and artificial intelligence to accurately identify and trace positive cases and their contacts has been cited as a successful aspect of China's pandemic control efforts (39).

Like other qualitative studies, this study has several limitations. It was conducted in a single province, which may limit the generalizability of the results. Nonetheless, this study focused on key aspects of policy analysis to develop a comprehensive framework, components that are common to public policy analysis across countries. Moreover, conflicts were encountered among key informants from various involved organizations, reflecting different perspectives and experiences in responding to COVID-19. To address this, diverse opinions were collected to enrich the analysis.

Conclusion

The policy-making process in responding to the COVID-19 pandemic in Khuzestan, Iran, was classified and analyzed according to context, content, and process dimensions. Following Walt and Gilson's framework, the roles of various factors influencing COVID-19 preventive policies were examined. The analysis identified several challenges associated with the context, content, and process of policy development. The contextual factors affecting provincial COVID-19 policies were classified into five categories, including structural, economic, situational, cultural, and climatic factors in public health and treatment domains. The findings highlighted strengths and weaknesses in the policy content and process. The results of policy process analysis showed that situational factors, governance structure, decision-making elements, and the power and influence of coalitions significantly impacted the effectiveness of policy measures by shaping the appropriateness of policy responses and contextual conditions. Finally, the understudied aspects of policy science that warrant further attention in the post-pandemic period were identified.

Authors' Contribution
Conceptualization: Zhila Najfpour.
Data curation: Zhila Najfpour, Iman Keliddar.
Formal analysis: Zhila Najfpour, Iman Keliddar.
Methodology: Zhila Najfpour, Iman Keliddar.
Validation: Zhila Najfpour, Iman Keliddar.
Visualization: Kamran Shayanfard.
Writing–original draft: Iman Keliddar, Zhila Najfpour, Kamran Shayanfard.

Competing Interests
The authors declare that they have no conflicts of interest.

Ethical Approval
Written informed consent was obtained from all participants before data collection. The study protocol was approved by the Ethical Review Committee (IR.AJUMS.REC.1399.819). Besides, this study was conducted according to the principles of the Helsinki Declaration.

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