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REVIEW ARTICLE

CORRUPTION IN HEALTHCARE PROCUREMENT DURING THE COVID-19 PANDEMIC: IDENTIFYING DETERMINANTS AND PROPOSING COMPREHENSIVE ANTI-CORRUPTION STRATEGIES

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ABSTRACT

INTRODUCTION:

The COVID-19 pandemic has exposed and exacerbated existing vulnerabilities in global healthcare systems, particularly regarding corruption in supply chain management. This research aims to identify corruption's factors and effective counterstrategies.

METHODS:

In 2024, a comprehensive scoping review was conducted following Arksey and O'Malley's guidelines. The search involved major databases (Web of Science, PubMed and Scopus) as well as a manual search of literature and reports. A two-reviewer screening process applied inclusion and exclusion criteria to all citations. Data were extracted using a standardized form and presented in a tabular format before undergoing qualitative content analysis. This qualitative content analysis identified key factors contributing to corruption and proposed effective anti-corruption strategies

RESULTS:

Corruption in healthcare supply chains arises from various factors, including structural, political, governance, sociocultural, technological, and human resource factors. Suggested counterstrategies included Procurement and Supply Chain Measures, Transparency and Accountability Mechanisms, Regulatory and Legislative Measures, Capacity Building and Coordination, and Civic Engagement and Oversight.

CONCLUSION:

A multidimensional, comprehensive approach is needed across all health systems to fight corruption. Implementing suggested strategies will augment public trust in healthcare institutions and safeguard public health against future crises. Findings provide policymakers and managers with a roadmap.

KEYWORDS
supply chain management, transparency, public health, fraud, technology

INTRODUCTION

The COVID-19 pandemic is not only recognized as a global health crisis, but it has also led to deeper challenges related to economic and social aspects[1, 2]. One of these challenges is corruption in healthcare procurement, which has been clearly evident during this period [3]. While countries were striving to secure medical resources and equipment to combat this virus, misuse of this emergency situation and lack of transparency in procurement processes led to the formation of corruption in the healthcare supply chain[4].

Research indicates that the likelihood of corruption increases in crisis situations [5]. This is particularly observable in the procurement of medical equipment and drugs, which were rapidly changing and under intense demand pressure. From indirect contracts to inadequate allocation of resources, corruption not only affected the efficiency of the healthcare system but also led to a decrease in public trust in healthcare and governmental institutions [6, 7].

Furthermore, corruption in procurement and supplies has serious implications for public health. Delays in treating patients and increased mortality are consequences of improper allocation of medical resources and equipment [8-10]. Vulnerable groups are especially impacted[11]. Therefore, identifying and analyzing factors influencing corruption in healthcare procurement and strategies to combat it during a pandemic not only helps in better understanding the existing challenges but can also contribute to improving future policies and strengthening healthcare systems against similar crises[12, 13].

Various studies have provided evidence of multiple determinants of corruption in the health system, including embezzlement and theft of health budgets, corruption and collusion in reimbursement of service costs, illegal billing by insurance companies, fraud in the drug value chain, corruption in the provision of medical services, and bribery in decision-making[14, 15]. The United Nations Convention criminalizes instances of corruption, including embezzlement, bribery, collusion, abuse of public resources and position, and the creation of illegal monopolies [16, 17].

Despite numerous studies, there are still knowledge gaps regarding examining all the effective determinants and identifying strategies to combat corruption in the COVID-19 crisis, which further underscores the need for this research. Hence, the aim of this study is to identify effective factors of corruption and strategies to combat them. Despite numerous studies on health system corruption, significant knowledge gaps remain regarding: (1) the comprehensive identification of COVID-19-specific corruption determinants in healthcare procurement, and (2) evidence-based strategies to combat such corruption during pandemic emergencies. This study systematically addresses these gaps by analysing various aspects of corruption in the world. The findings will provide crucial empirical evidence to inform pandemic preparedness frameworks and health system governance models.

METHODOLOGY

This study has been designed as a comprehensive scoping review and was conducted following Arksey and O'Malley's guidelines [(18] to identify and analyze various factors of corruption in healthcare procurement and effective strategies to combat it during the COVID-19 era. In addition, a bibliometric analysis was conducted to create scientific maps and reveal thematic connections.

SCOPING REVIEW

1. Defining the research question

The main research question was "What factors have led to corruption in healthcare procurement during COVID-19, and what strategies exist to combat it?"

2. Determining selection criteria

Studies were included if they met the following criteria: (1) published between 2019 and 2024, (2) corruption within healthcare procurement during the COVID-19 pandemic, and (3) provided empirical data on the factors involved. There was also no specific geographical focus, and grey literature was also peer reviewed.

Studies were excluded based on the following criteria: (1) not relevant to the context of the pandemic, (2) conference proceedings, and (3) lack of sufficient details about the factors of corruption and strategies to deal with it.

3. Systematic search

A systematic search was conducted of reputable databases including PubMed, Scopus, Web of Science. The search strategy was developed and revised through studying the relevant articles and reports on factors influencing corruption and proposed strategies to identify and cross-check the keywords, MeSH terms, and databases searched. Both peer-reviewed and grey literature studies were searched using certain keywords, synonyms, and their variations including "Corruption" AND "Emergency procurement" AND "Pharmaceutical products" AND "Medical equipment". The references in the selected studies were reviewed, and snowballing was conducted to identify other relevant studies. The search terms were structured in a way that included a combination of keywords and relevant phrases related to the study topic: "falsification" OR "kickbacks" OR "embezzlement" OR "misuse" OR "fraud8" Or "theft" OR "corruption" AND "emergency procurement" OR "purchasing" OR "procurement processes" OR "purchasing goods" OR "purchasing services" OR "procurement" AND "pharmaceutical products" OR "products pharmaceutical" OR " drug*" OR "pharmaceutical" OR "pharmaceutic" OR "pharmacological" OR "medicine*" OR "medication" OR "medicament" AND "medical equipment" OR "medical supplies" OR "device*" OR "supplies and equipment" OR "apparatus and instruments" OR "instruments and apparatus" OR "medical devices" OR "device medical", OR "equipment"

The Search Query in PubMed was: "Corruption"[Mesh] OR "corruption"[Title/Abstract] OR "falsification"[Title/Abstract] OR "kickbacks"[Title/Abstract] OR "embezzlement"[Title/Abstract] OR "fraud"[Title/Abstract] OR "theft"[Title/Abstract] AND ("Emergency Procurement"[Mesh] OR "emergency procurement"[Title/Abstract] OR "purchasing"[Title/Abstract] OR "procurement processes"[Title/Abstract] AND "Pharmaceutical Preparations"[Mesh] OR "pharmaceutical products"[Title/Abstract] OR "drug*"[Title/Abstract] OR "medicine*"[Title/Abstract] AND "Equipment and Supplies"[Mesh] OR "medical equipment"[Title/Abstract] OR "medical devices"[Title/Abstract] AND "COVID-19"[Mesh] OR "COVID-19"[Title/Abstract] OR "pandemic"[Title/Abstract].

4. Article selection

The research studies that seemed relevant to the research question were chosen for review through a screening process involving evaluation based on title and abstract before delving into the full text content and subsequent elimination of irrelevant articles. After compiling the articles and eliminating duplicates, then from the selection pool two researchers conducted a review of the remaining articles by assessing their titles and abstracts to ensure alignment with the inclusion criteria. Articles that did not meet the specified criteria were excluded from consideration. A third researcher intervening in case of disagreements. The researchers then gathered the findings from the articles. We utilized EndNote X4 software to arrange the articles and review their titles and summaries while checking for any duplicated content. The outcomes of the selection and screening process were illustrated using the PRISMA flowchart (Figure 1).

5. Data collection and analysis

Extracted data included study characteristics, factors influencing corruption, and proposed strategies to reduce corruption. Data was extracted using a standard form and presented in a structured table. Data analysis was conducted using descriptive methods and qualitative content analysis. This analysis helped in identifying and categorizing corruption factors and effective strategies. The data analysis and coding were done through a series of steps including a) getting familiar with the article texts, b) identifying and extracting the primary themes, c) classifying the articles under the specified themes, d) reviewing the results of each study, and e) ensuring the reliability of the materials and the extracted results in each area. The findings through this procedure are presented in Tables 1 and 2.

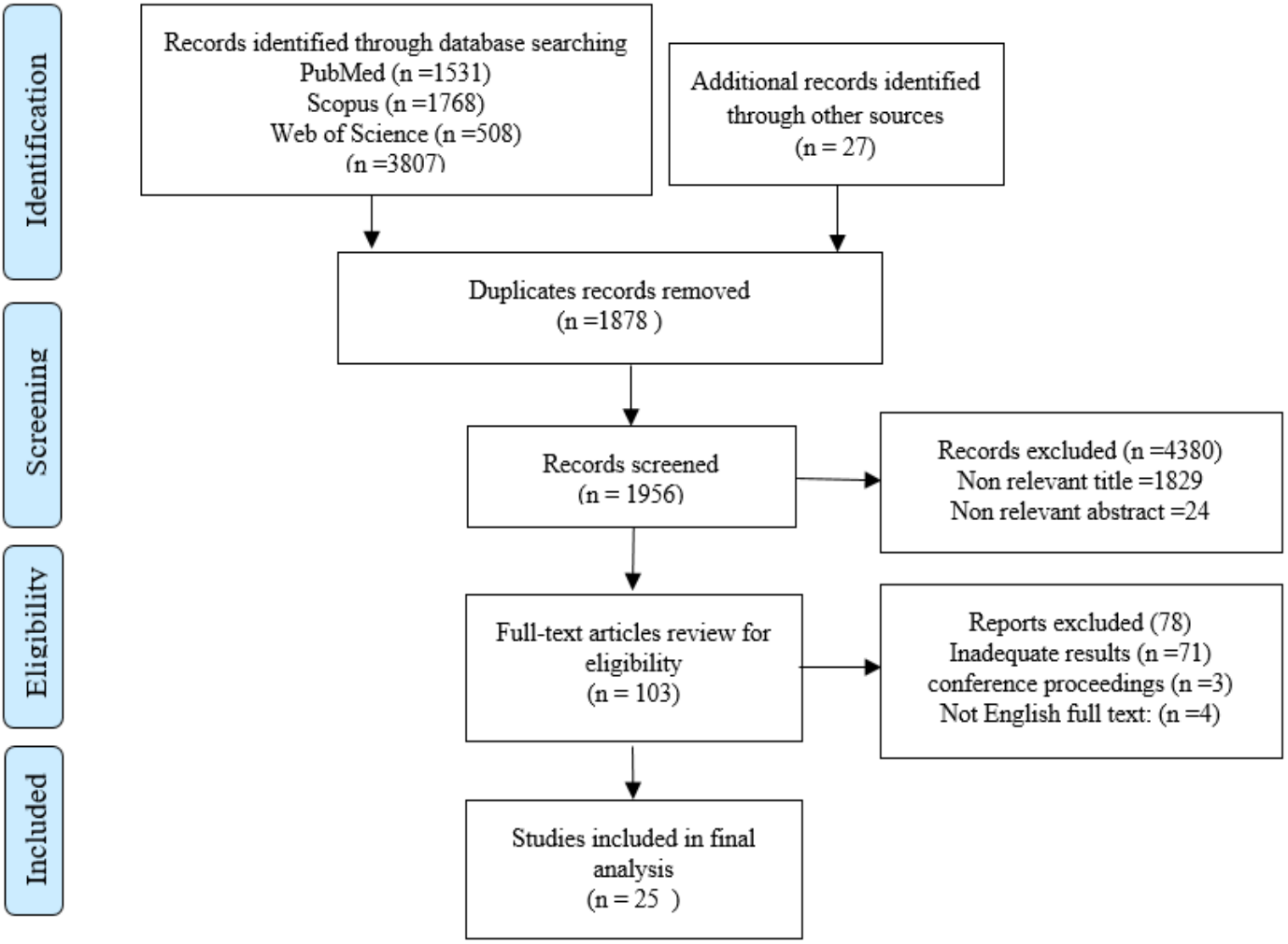
BIBLIOMETRIC ANALYSIS WITH VOS VIEWER

The data analysis utilized VOS viewer software to create scientific maps and reveal thematic connections. A total of 30 keywords were chosen based on a minimum repetition threshold of 4, and following the normalization process, 20 keywords were analyzed the key themes in the literature on corruption in public procurement during the COVID-19 crisis.

ETHICS APPROVAL

This study has been approved by the ethics committee of Kerman University of Medical Sciences. The ethical code of this study is IR.KMU.REC.1402.033.

FIGURE 1 PRISMA FLOW CHART OF THE STUDIES



RESULTS

Based on the key points and themes identified in the articles, the main factors and drivers of corruption in healthcare procurement during the COVID-19 pandemic were categorized into six general groups: Structural Factors, Political Factors, Procurement and Supply Chain Factors, Sociocultural Factors, Technological Factors, and Human Resources Factors (Table 1).

TABLE 1 FACTORS AND DRIVERS OF CORRUPTION IN HEALTHCARE PROCUREMENT DURING THE COVID-19 PANDEMIC

Number	Themes	Subthemes
1	Structural Factors	Decentralized structure healthcare system (19, 20)
		Insufficient government support, and accountability mechanisms (19)
		the absence of an effective regulatory framework (19) (21)
		lack of control over capital , Increased financing and limited absorption capacity (22-24)
		Structural Corruption and Lack of Transparency (19, 25, 26)
		Discretion, decision-making power (27)
		The pressure to spend donations quickly (28)
2	Political Factors	Corruption of politicians (partisanship, political interference (24, 29)
		Opportunities for rent-seeking due to administrative delays (30)
		lack of political freedom (23, 30)
		Underreporting of corruption due to fear of retaliation from corrupt government or individuals (31)
		small friendship networks in the political field (32)
		Inadequate protection for whistleblowers (29)
		Government Indifference in PPE Price Increases (19)
3	Procurement and Supply Chain Factors	Lack of transparency in procurement processes (20, 24)
		Use of non-open procedures (e.g. call for tender document not published) (23)
		Poor procurement practices for fast procurement (e.g. retrospective awarding of contracts) (33)
		Rapid procurement and Lack of competition (34) (35)
		Unequal treatment of suppliers (23, 33)
		Lack of documentation on how to identify particular suppliers (33) (23)
		lack manage conflict of interest (33) (24)
		Lack of integrity in contracts (29)
		Asymmetric distribution of information (32)
		Supplier without experience (23)
		Gross cost overruns (paying more than market prices for goods and services (34)
		Lack of competition in procurement (23)
		Size and location of contract (28)
		Higher complexity in technology or processes (28)
4	Sociocultural Factors	Greed and loss of ethical values (22, 24, 26)
		inadequate legal mechanisms and lack of a legal culture (24)
		Excessive Respect of Younger Healthcare Workers for Senior Staff (19)
		lack of personal protective equipment (PPE) and other vital supplies (34)
		Increased demand and limited supply (24)
5	Technological Factors	Increased cyber-attacks (21)
		Lack of information security and privacy (20, 24)
6	Human resources factors	Government Neglect of Employee Safety (19)
		Inappropriate Hiring Practices (19)
		Insufficient wages for individuals involved in the pandemic response (31)
		Diversion of relevant staff away from addressing medical product crime (21)
		Personal connections with officials in procurement (23, 34)

We also present a comprehensive categorization and grouping of various anti-corruption strategies and recommendations tailored to enhance transparency and accountability in healthcare procurement (Table 2).

TABLE 2 VARIOUS ANTI-CORRUPTION STRATEGIES AND RECOMMENDATIONS

Number	Themes	Subthemes
1	Procurement and Supply Chain Measures	Using block chain for controlling and managing the supply chain of PPE and vaccines (20, 36) (24)
		Reforming the system and processes of public procurement (29, 35)
		Strengthening the capacity of public procurement officials (29, 33)
		Enhancing transparency in the bidding process (27, 35)
		Publicizing tender criteria (35)
		Putting in place integrity pacts (35)
		Ensuring transparent and open bidding process through mechanisms such as electronic bidding (27, 37-39)
		Ensuring national public procurement agency monitors the implementation of procurement rules (35)
		Publicizing information about chosen bids and the rationale (35)
		Disclosing bids that did not win (35)
		Evaluating company performance (35)
		Conducting formal audits (35)
		Training procurement officers on policies, procedures, and detecting potential corruption (29)
		Giving all eligible bidders the opportunity to participate (35)
		Leveraging e-procurement platforms to record transactions and create easily accessible tools for public oversight (32)
2	Transparency and Accountability Mechanisms	Sharing data with the public to raise awareness about fraudulent activities (31) (34) (24)
		Promoting a free press (22)
		Ensuring transparency and accountability of the government and determining clear punishments for the corrupt (13, 22, 32, 40, 41) (27)
		Identifying or managing perceived or actual conflicts of interest and creating conflict of interest policies (33, 35)
3	Regulatory and Legislative Measures	Institutionalizing the rule of law to combat corruption (24, 29)
		Enhancing regulatory and legislative measures (29, 35, 42)
		Implementing punitive sanctions for those that sell or distribute falsified products (27)
		Creating legislation and systems in place prior to health emergencies (35)
		Identifying areas within the government susceptible to corruption (22)
		Establishing effective judicial systems with independent institutions (such as watchdog agencies) (32)
4	Capacity Building and Coordination	Implementing World Bank strategies to guide governments towards greater focus on institutional reforms and capacity-building initiatives (29)
		Promoting international cooperation (22)
		Providing clear policies and procedures for the national procurement regulatory agency (35)
		Establishing regular checks on procurement processes and outcomes by an outside watchdog agency (35)
		Coordinating between medical product regulatory authorities, police, customs, judicial authorities, and other stakeholders (35)
		Increasing expected costs and reducing motivation to engage in corrupt activities by raising public sector salaries compared to the private sector (29)

		Addressing the drivers of functional corruption, as well as petty corruption engendered by social norms (29)
		Implementing stringent procedures and regulations in the recruitment process (28)
5	Civic Engagement and Oversight	Leveraging the implicit power of civil society in fostering trust, satisfaction, transparency, and participation (40) (24, 34)
		Implementing citizen monitoring of contract execution and reporting mechanisms for corruption (41) (35)
		Conducting public awareness campaigns on the identification of substandard and falsified medical products (42)
		Protecting, encouraging, and caring for healthcare personnel (19)

For bibliometric analysis we used VOS viewer software to create a network diagram visualizing the relationships between keywords. The keywords are represented as nodes, with connections between them shown as lines or edges (Figure 2). The thickness and color of the connections indicate the strength and nature of the relationships between the concepts. The central concept is "corruption," which is connected to several other key terms such as "human," "fraud," "embezzlement," "public procurement," "organization and management," and "crime." This visual representation effectively illustrates the interconnected nature of the various themes related to corruption in healthcare procurement during the COVID-19 pandemic.

FIGURE 2 NETWORK DIAGRAM OF THE BETWEEN VARIOUS KEYWORDS RELATED TO CORRUPTION IN HEALTHCARE DURING THE COVID-19 PANDEMIC

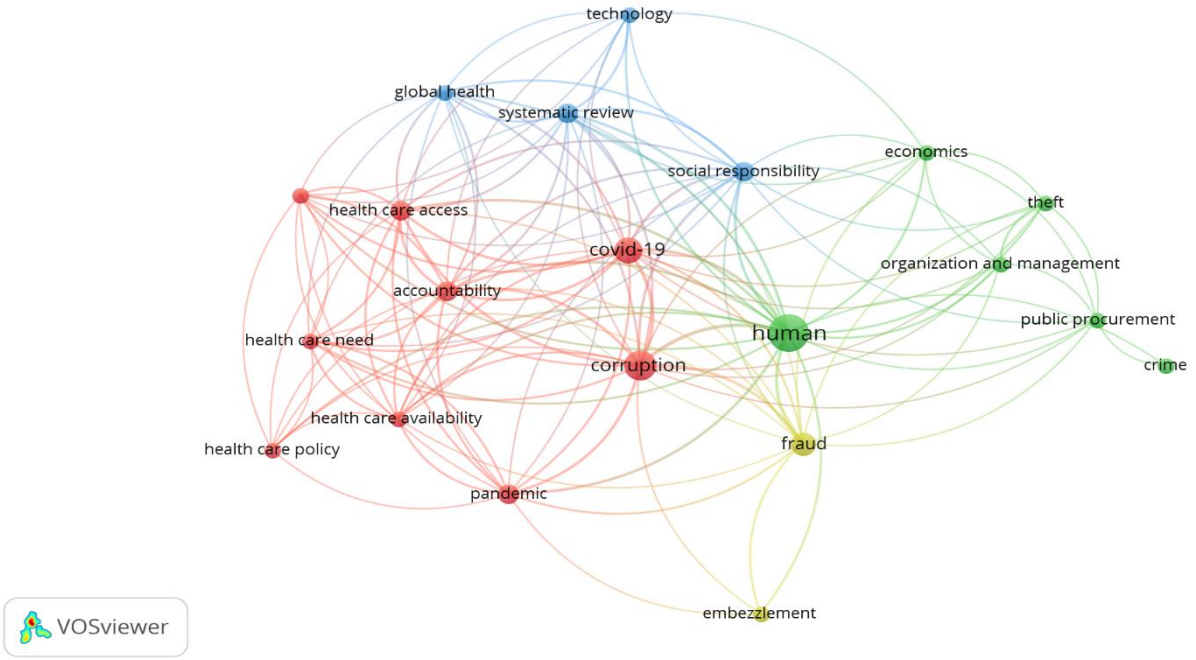


Table 3 outlines the identification of 20 common keywords associated with corruption in public procurement of medicines, medical supplies, and equipment during the COVID-19 crisis. The table is divided into three clusters, each highlighting different dimensions of the issue.

Cluster 1: Accountability and Healthcare Access

In the first cluster, the focus is on accountability and healthcare-related terms. The keywords "Corruption" (7 occurrences) and "Covid-19" (5 occurrences) are prominent, indicating a direct link between corruption and the pandemic context. Other significant terms such as "Health care access" and "Health care availability" (3 occurrences each) suggest that corruption may directly impact the accessibility and availability of healthcare services during the crisis. The total link count

of 129 with 218 occurrences within this cluster underscores the importance of these themes in understanding corruption in healthcare procurement.

Cluster 2: Economic and Organizational Factors

The second cluster emphasizes economic and organizational aspects, with "Human" appearing as a key term with 11 occurrences, suggesting a strong human element in addressing corruption. The presence of terms like "Public procurement" (2 occurrences) and "Theft" (2 occurrences) highlights the systemic vulnerabilities in the procurement processes. The total link count remains consistent at 129, indicating that these organizational and economic factors are critical to addressing corruption in the healthcare sector during emergencies.

Cluster 3: Broader Implications

The third cluster includes broader implications such as "Global Health" and "Social responsibility," each with 2-3 occurrences. These terms reflect the wider impact of corruption beyond immediate procurement issues, suggesting that addressing corruption is essential for global health outcomes and societal trust.

ADDITIONAL KEYWORDS

Additional keywords like "Fraud" (4 occurrences) and "Embezzlement" (2 occurrences) point to specific unethical practices within the procurement process, emphasizing the need for vigilance in financial oversight.

TABLE 3 IDENTIFICATION OF 20 COMMON KEYWORD IN CORRUPTION IN PROCUREMENT DURING THE COVID-19 PANDEMIC

Items	Link	Total Link	Occurrence
Accountability and Healthcare Access	**129**	**218**	
Accountability	14	29	3
Corruption	19	42	7
Covid-19	18	38	5
Health care access	14	29	3
Health care availability	13	20	2
Health care need	12	20	2
Health care policy	9	10	2
Pandemic	14	24	3
transparency	13	18	2
Economic and Organizational Factors	**129**	**218**	
crime	2	2	2
Economic	10	11	2
Human	20	50	11
Organization and management	8	10	2
Public procurement	9	9	2
Theft	8	10	2
Broader Implications	**129**	**218**	
Global Health	13	20	2
Social responsibility	17	28	3
Technology	10	12	2
Additional Keywords	**129**	**218**	
Fraud	16	25	4
Embezzlement	4	6	2

DISCUSSION

The findings of the first section of this study, which examined various factors influencing corruption in procurement during the COVID-19 pandemic, indicate that diverse factors such as structural, political, procurement and supply chain, Sociocultural, Technological, and human resources factors were influential.

Based on the study results, a significant portion of the causes of corruption were structural factors. Decentralized structure of the healthcare system, insufficient government support, and weaknesses in auditing mechanisms have reduced transparency in decision-making processes. On the other hand, ineffective decision-making due to the absence of an effective supervisory framework, inadequate financial resource control, and pressure to quickly disburse financial aid have been observed[43-45]. The COVID-19 emergency, by limiting time and resources, has strained surveillance systems and exposed existing structural weaknesses. On the other hand, integrating surveillance systems with real-time tracking technologies (such as block chain) can improve transparency.

Political factors play a crucial role in the occurrence of corruption. Various opportunities for large-scale rents have arisen due to party interventions and political influence, which have been exacerbated by long-term administrative delays. Additionally, the lack of political freedom and fear of retaliation after reporting corruption, along with concerns of whistleblowers, have led to various forms of concealment. The government's neglect of the rising prices of Personal Protective Equipment (PPE) also indicates weaknesses in oversight and accountability[46-49]. These findings clearly demonstrate how political interventions and ineffective institutional structures can create an environment conducive to systemic corruption.

Factors related to procurement and the supply chain have significantly exacerbated corruption. Lack of transparency in procurement processes, use of non-transparent methods, and non-disclosure of documents related to tenders have created a breeding ground for corruption and misuse of resources. The decrease in service quality and increase in unnecessary costs due to inappropriate procurement methods to expedite purchases, such as awarding return contracts, and lack of competition have occurred. Major weaknesses in the procurement process, including insufficient documentation to identify specific suppliers and conflict of interest management, have been observed. Additionally, unequal distribution of information and the presence of inexperienced suppliers have led to disparities in competition and additional costs[50-52]. This section clearly demonstrates how weaknesses in tendering and procurement processes can lead to structural corruption. Critical supply chain issues urgently require reform of public procurement systems and the establishment of stronger oversight mechanisms.

Another reason for the occurrence of corruption is related to social and cultural factors. Corrupt behaviors among some healthcare officials and staff have emerged due to work greed and a decrease in ethical values. Weak legal mechanisms and lack of legal culture in societies have led to inequality and exploitation of situations. The limited supply and shortage of Personal Protective Equipment (PPE) and other essential items, combined with increased demand, have created conditions that facilitate corruption and misuse of resources[53, 54]. Corruption is not only a structural problem, but also has its roots in socio-cultural factors. The decline in moral values, coupled with the weakness of legal mechanisms, creates an environment in which abuse of power and scarcity of resources become commonplace. This highlights the importance of strengthening organizational culture and ethical training alongside structural reforms.

The findings of this study indicate that technological factors have also influenced the occurrence of corruption. Some serious threats to healthcare systems have emerged due to increased cyber-attacks and weaknesses in information security and privacy. These vulnerabilities not only lead to the exposure of sensitive information but also contribute to the misuse of data and resources[55]. This finding emphasizes the need to invest in security infrastructure and train human resources to face cyber threats and highlights the importance of preventive approaches in the field of cybersecurity as an integral part of anti-corruption strategies.

The findings highlighted the role of human resource factors in the occurrence of corruption. Officials' disregard for employee safety, inappropriate recruitments, and inadequate wages have reduced their motivation and posed a serious challenge to workforce efficiency in crisis response. Inadequate handling of crimes and personal connections with procurement officials have also contributed to inequalities and corruption in aid procurement processes [56-58]. These findings point to ineffective human resource management as a catalyst for corruption and emphasize that there is a direct link between the quality of human resource management and organizational health.

The findings of the second part of this study have shown that actions such as procurement and supply chain measures, transparency and accountability mechanisms, regulatory and legislative measures, capacity building and coordination, civic engagement and oversight are among the most important steps to prevent corruption during health crises, especially during COVID-19.

Transparency and accountability in procurement processes can be enhanced through the implementation of effective measures, especially using blockchain to control, improve tracking, and validate processes, and enhance supply chain management. Additionally, key solutions include establishing a transparent and open bidding process through mechanisms such as electronic bidding to improve transparency in the bidding process and standardize tender criteria for the public. To create a responsive and transparent system in health procurement and provisioning systems, monitoring the enforcement of laws, disclosing information related to selected proposals, revealing unsuccessful proposals, evaluating company performance, and conducting formal audits can be utilized [59, 60]. Fighting corruption requires a comprehensive and multifaceted approach. Combining technological solutions and strengthening oversight mechanisms can create an effective framework for transparency and accountability. The key point here is that these solutions will be effective when implemented systematically and in a coordinated manner, and no single solution is sufficient on its own.

Key approaches to establishing strong mechanisms of transparency and accountability include active sharing of data with the public, promoting independent and free media for investigation and reporting, defining clear consequences for corrupt behaviors, and developing policies to identify and manage conflicts of interest. By doing so, governments can create clear frameworks for accountability and help enhance the coherence of healthcare systems [27, 57]. This section emphasizes the pivotal role of civil society and free media in creating effective accountability. Indeed, good governance requires constructive interaction between the three sides of government, the private sector, and civil society, and free media play a vital role in this ecosystem.

One of the key actions in combating corruption is to implement legal and regulatory measures, especially institutionalizing the rule of law, enforcing harsh penalties for the sale or distribution of counterfeit products, identifying corruption-prone areas within the government, and establishing effective judicial systems with independent institutions. These actions should be considered a priority to help reduce corrupt motivations and prevent corruption during these critical times [61]. An effective legal and judicial system is essential to creating an environment free from corruption, especially in times of crisis when normal oversight may be reduced. Identifying vulnerabilities in the government system and implementing fundamental, long-term reforms is also a proactive and smart approach.

Enhancing the capacity and coordination among institutions was a vital strategy. Implementing World Bank strategies, promoting international collaborations, and coordinating between responsible institutions overseeing medical products, the police, customs, and judicial authorities can assist governments in exchanging experiences, making informed decisions, and evidence-based performance [51, 62]. Given that corruption is a multidimensional challenge, its solutions also require multilateral cooperation at the national and international levels. Cooperation between regulatory, executive, and judicial institutions is useful to avoid duplication and regulatory gaps, and participation in international initiatives can help transfer knowledge and strengthen domestic capacities.

In the fight against corruption, a key element was civil participation and oversight. Harnessing the power of civil society can lead to strengthening trust, satisfaction, transparency, and public participation. Implementing citizen monitoring

systems on contract execution and creating reporting mechanisms for corruption, conducting public awareness campaigns to identify substandard and counterfeit medical products, as well as protecting, incentivizing, and attending to the needs of healthcare personnel, are of paramount importance. These measures can increase community awareness and protect public health. Overall, these actions can help create a transparent and accountable environment in healthcare financing, reduce corruption, and strengthen public trust in healthcare systems[63, 64]. Establishing grassroots reporting mechanisms and participatory monitoring systems not only increases transparency but also enables comprehensive monitoring of health system performance by strengthening a sense of social accountability. In other words, effectively combating corruption needs to become a "collective concern," not just a government responsibility.

Corruption in Africa appears to be often caused by poor governance, while in Europe, it is linked to non-transparent emergency contracts, so political intervention in low- and middle-income countries and cyber-fraud interventions in high-income settings seem necessary. Corruption in healthcare procurement has significantly increased during the COVID-19 pandemic, and identifying the factors influencing its occurrence is a fundamental necessity. To address this issue, it is essential to identify and implement diverse strategies. These strategies should be evidence-based[65, 66]. According to the framework of the United Nations Convention against Corruption, measures must be taken to protect whistleblowers. While anonymous reporting platforms can reduce risks of retaliation, they require legal safeguards to be effective.

The VOS viewer analysis elucidates critical relationships between corruption and healthcare during the pandemic. The centrality of "COVID-19" in the network visualization underscores its catalytic role in exacerbating corruption risks within healthcare systems. Notably, strong thematic connections emerge between "corruption" and healthcare delivery indicators ("health care access," "health care need," "health care availability," and "health care policy"), demonstrating how corrupt practices directly compromise essential health services. The analysis further reveals systemic vulnerabilities through the clustering of organizational terms ("organization and management," "public procurement") with core corruption nodes, reflecting institutional weaknesses in procurement governance. Economic dimensions are equally prominent, with "economics" and "theft" forming robust linkages to corruption, highlighting the financial motivations and consequences of these practices. While present in the network, broader concepts like "global health," "social responsibility," and "technology" occupy peripheral positions, suggesting their role as contextual or mediating factors rather than direct determinants. This structural mapping provides valuable insights for targeting anti-corruption interventions, emphasizing the need to address both immediate procurement vulnerabilities and underlying systemic failures exposed by the pandemic.

Our research, like other scoping reviews, faced certain limitations. One of these limitations was the diversity in the quality and credibility of the data that our research team encountered. In scoping reviews, data may vary in terms of quality and credibility, which can impact the final study results. Furthermore, the focus of this study was on the latest global health crisis, namely COVID-19, which did not allow us to investigate corruption in previous health crises. This is another constraint that may affect the comprehensiveness and generalizability of our findings, highlighting the need for further research in past crisis areas. We were not geographically restricted and reviewed a variety of reports and articles, however, the United Nations Office, the International Monetary Fund, Bangladesh, Indonesia, and Nigeria were among the countries and organizations that published these studies.

CONCLUSION

This study delves into a deep examination of corruption in healthcare procurement during the COVID-19 pandemic and demonstrates that this global issue stems from complex and multifaceted factors, often linked to structural, political, and social challenges. These challenges can lead to instability in procurement processes, necessitating a corruption-free healthcare system that requires a comprehensive and coordinated approach to ensure public health. To address corruption in health procurement, a combination of approaches is needed. These approaches should be implemented simultaneously and evidence-based to maintain the effectiveness of health systems in crises. Strategies such as transparency and technology, strengthening oversight, structural reforms, education and culture building, and

international coordination emphasize the need for a systematic, technological, and participatory approach that targets both the root causes and the aggravating factors of corruption. Not only does this study emphasize the need for structural reforms, but it also serves as a practical guide for policymakers and oversight bodies to improve healthcare systems. Future research should delve into similar experiences in past crises and develop effective approaches to prevent and manage corruption in emergency healthcare conditions.

JOURNALISM ETHICS CONSIDERATIONS

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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