



Current state of surgery and trauma in Mauritania: a Scoping Review

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Abstract

Introduction: Nearly one-third of the global burden of disease can be addressed through surgical care. Trauma forms a significant part of this burden, resulting in higher mortality than HIV, tuberculosis, and malaria combined. Mauritania, one of the largest countries in West Africa, lags significantly behind the sustainable development goals set by the World Health Organization (WHO). In this study, we reviewed the available literature on surgery and trauma in Mauritania.

Methods: We conducted a literature review using the Embase database (from 1974) and Medline (from 1946) up to June 2024. All studies related to surgery and trauma in Mauritania were included. Studies focused solely on obstetrics, gynaecology and anaesthesia were excluded. Articles were screened for eligibility using Rayyan software.

Results: The search strategy returned 449 abstracts. After manual de-duplication, 25 were removed. Following further screening, 411 articles were excluded. The final analysis included nine eligible full length articles and 2 conference abstracts. The 9 full length articles addressed a range of topics: emergency general surgery – ileal perforations (1), endocrine surgery specific to the thyroid gland (1), surgical expenditures (1), surgical availability (1), a surgical experience account in Mauritania (1), youth violence (1), causes of mortality and the burden of trauma (2), and an analysis of terrorist attacks (1). Both conference abstracts were related to emergency general surgery, covering the management of cholecystitis and malignant large bowel obstruction.

Conclusion: The literature on surgery and trauma in Mauritania is extremely limited. More epidemiological data, as well as studies on interventions, are necessary to better inform the delivery of global surgical care in this country of approximately 5 million people.

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Introduction

In recent decades, global surgery has gained considerable prominence within the healthcare sector. This is largely due to the fact that nearly one-third of the global burden of disease can be mitigated through high-quality surgical care¹. Many facets of this field are closely aligned with the objectives of the World Health Organisation (WHO) and the Sustainable Development Goals (SDGs).

Trauma constitutes a significant portion of this disease burden, causing more deaths than HIV, tuberculosis, and malaria combined, all of which are major contributors to global mortality². Unfortunately, low- and middle-income countries bear the overwhelming majority of these deaths, accounting for 90%². Non-fatal trauma also contributes extensively to the global burden, with 1 billion people sustaining injuries each year that require medical

Methods

Literature Search and Database Selection

We conducted a comprehensive literature review focused on identifying all relevant articles pertaining to surgery and/or trauma care in Mauritania. The search was performed using two primary medical databases: Embase and Medline. The Embase database was searched for articles published from 1974 to June 2024, while Medline was searched from 1946 to June 2024. This broad timeframe ensured that the review captured the full scope of available literature on the topic. The initial search was conducted in June 2024 to develop and refine the search strategy. Following this, a final, systematic search was carried out in July 2024. The detailed search methodology, including the specific search terms and strategies employed, is outlined in Table 1.

Table 1: Search strategy

Embase		Medline	
1	exp injury/	1	exp "Wounds and Injuries"/
2	exp traffic accident/	2	Accidents, Traffic/
3	(injur* or traum* or accident* or road traffic or RTA or RTC).ti,ab,kf.	3	exp specialties, surgical/ or exp general surgery/
4	1 or 2 or 3	4	(injur* or traum* or accident* or road traffic or RTA or RTC or surg*).ti,ab,kf.
5	exp mauritania/ or north africa/ or exp mauritanian/	5	1 or 2 or 3 or 4
6	Mauritan*.ti,ab,kf.	6	africa, western/ or exp mauritania/
7	5 or 6	7	Mauritan*.ti,ab,kf.
8	4 and 7	8	6 or 7
		9	5 and 8

attention. This has far-reaching consequences on both individual and community levels³.

Mauritania, a country in northwestern Africa, has a population of approximately 5 million people⁴. Despite being rich in natural resources, a large segment of the population lives below the extreme poverty line. Among the many challenges the country faces, healthcare is a notable area of concern. Progress in improving healthcare infrastructure in Mauritania has been slow, despite it being one of the largest countries in the region.

This study aims to review and assess the state of surgery and trauma care in Mauritania, serving as an initial step toward directing resources and funding to help achieve the targets set by WHO.

Inclusion and Exclusion Criteria

For this review, we included studies involving both adult and paediatric populations that discussed surgery, surgical care, trauma, or trauma care, specifically mentioning Mauritania as a separate country. Our goal was to ensure that the review covered all aspects of surgery and trauma within the Mauritanian context. Articles were included regardless of study design, provided they fit within these parameters.

Articles that focused solely on anaesthesia, obstetrics, or gynaecology were excluded from the review to maintain the focus on surgery and trauma care. This decision was made to ensure that the results remained specific to the fields of interest.

Screening Process and Article Selection



All abstracts retrieved from the search were uploaded into Rayyan, a systematic review management software, to facilitate the screening and selection process. Duplicate articles were manually identified and removed by the reviewer. The initial screening of titles and abstracts was conducted by a single reviewer (IS), who assessed each article based on the predefined inclusion and exclusion criteria.

Following the initial screening, full-text versions of the shortlisted articles were reviewed independently by two reviewers (IS and FS). Articles that were not available in English were translated using Google Translate, ensuring that non-English articles were not excluded based solely on language barriers. This step was essential for capturing the full spectrum of global literature on surgery and trauma care in Mauritania.

Outcome Measures

The primary objective of the review was to evaluate studies conducted in Mauritania related to surgery and trauma, in order to assess the quantity and quality of published information. The primary outcome measure was the total number of studies meeting the inclusion criteria. Additionally, the secondary outcome measure was the overall number of patients for whom data had been published in these studies, offering insights into the scope of patient populations covered in the literature.

Data Extraction and Analysis

For each included study, data were extracted related to study design, patient demographics, types of surgeries or trauma care provided, and outcomes reported. This information was then compiled to provide a comprehensive overview of the literature on surgical and trauma care in Mauritania. The extracted data was further analysed to identify trends, gaps in the literature, and areas requiring further research.

Results

The search strategy yielded a total of 449 abstracts. Twenty-five were removed on manual de-duplication. On further screening, 449 were excluded as they did not meet the inclusion criteria. Eleven eligible articles were included: 9 full text articles and 2 conference abstracts (table 2, with five in English and four in French. Both conference abstracts were in English. There were no publications prior to 1990. There were 3 publications between 1990 and 1994 followed by a long gap of 12 years where there were no published data.

The conference abstracts were related to emergency general surgery (management of cholecystitis and malignant large bowel obstruction)^{5, 6}. Articles covered emergency general surgery – ileal perforations (1), endocrine surgery covering surgeries of the thyroid

gland (1), surgical expenditures as a general with examples being given for Caesarean section (1), surgical availability (1), a general account of surgical experience in Mauritania (1), youth violence (1), causes of mortality and burden of disease for trauma (2), and terrorist attacks analysis (1)⁷⁻¹⁵.

The initial two studies^{7, 8} and both the abstracts^{5, 6} described management of surgical conditions in different cohorts of a limited number of patients; 42 having ileal perforation, 116 having thyroid cancer, 150 having large bowel obstruction and 256 having cholecystitis giving a total of 564 patients with various surgical conditions. The rest of the studies were reviews (narrative and systematic) or morbidity and mortality data for regions in which Mauritania was mentioned as a country. All publications were retrospective with no randomised or non-randomised trials.

Discussion

Mauritania, one of the largest countries in Africa, remains sparsely populated, with a population density of just 5 inhabitants per square kilometre⁴. Our literature review reveals that there is limited information regarding the surgical and trauma aspects of healthcare in the country, whether related to epidemiology, services, or management.

Although Mauritania has greater political stability compared to some neighbouring countries, it continues to be one of the least developed nations globally, ranking 164 out of 193 countries on the United Nations Human Development Index¹⁶. Furthermore, the World Directory of Medical Schools lists only one registered medical university in Mauritania¹⁷.

Ensuring equitable access to surgical care globally could address up to one-third of the total global burden of disease. The Lancet Commission on Global Surgery has recommended that a minimum of 5,000 surgical procedures per 100,000 individuals is necessary to address the distribution of common surgical conditions¹. A low number of surgeries signifies that many treatable surgical conditions are not being managed, resulting in higher case fatality rates¹.

Global surgery plays a crucial role in advancing more than a quarter of the Sustainable Development Goals (SDGs) outlined by the World Health Organisation (WHO), impacting 5 out of 17 SDGs¹⁸. Providing timely and quality surgical care promotes good health and well-being (SDG 3), while improving access to surgical services helps eliminate gender inequalities (SDG 5). This, in turn, enables individuals to participate in decent work (SDG 8), contributes to poverty reduction (SDG 1), and fosters both individual and communal economic growth, which improves the overall economy of the



Table 2: Details of eligible articles

Year of Publication	Article Name	Authors	Language
Conference Abstracts			
2016	Emergency surgical management of malignant large bowel obstruction	Ahmedou Moulaye Driss	English
2016	Management of cholecystitis national centre Nouakcote-Mauritania	Ahmedou Moulaye Idriss	English
Full Text Articles			
1990	[Infectious perforation of the terminal ileum. Apropos of 42 cases treated in the Islamic Republic of Mauritania]	G Versier, G Bechonnet, M Vergos	French
1991	[Surgery of the thyroid gland in the Islamic Republic of Mauritania]	M Vergos, G Versier, M H Messina, J Suis	French
1994	[Surgery in precarious situations. Mauritanian experience]	M Ould Ahmed Aïcha	French
2017	Retrospective review of Surgical Availability and Readiness in 8 African countries	D A Spiegel, B Droti, P Relan, S Hobson, et al	English
2019	Mortality in the Great Maghreb (1990-2015):Causes of death and trends	Sarra Melki, Zeineb Serhier, Nadir Boussof, et al	French
2020	Youth violence in Maghreb countries. a systematic review.	Imene Mlouki, Sarra Nouira, Houcem Elomma Mrabet, et al	English
2023	Terrorist Attacks in Sub-Saharan Africa from 1970 through 2020: Analysis and Impact from a Counter-Terrorism Medicine Perspective	Ryan Hata, Alexander Hart, Attila Hertelendy, et al	English
2023	Global, regional and national burden of traumatic brain injury and spinal cord injury, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019	Bin Guan, David B Anderson, Lingxiao Chen, Shiqing Feng, Hengxing Zhou	English
2024	Measurements of Impoverishing and Catastrophic Surgical Health Expenditures in Low- and Middle-Income Countries and Reduction Interventions in the Last 30 Years: A Systematic Review	Greg Klazura, Lye-Yeng Wong, Lucas Ribeiro, Theophilus Teddy Kojo Anyomih, et al.	English

country (SDG 8).

Furthermore, improved surgical care, along with economic growth, also contributes to reducing inequalities (SDG 10). These effects are in addition to contributions toward other development goals. Bjegovic-Mikanovic et al. extrapolated findings from various low-income countries to assess progress toward achieving these goals in the coming years. Their report indicated that Mauritania remains a problematic area, being the only country in the study unlikely to meet the mortality reduction targets set for 2030¹⁹.

As highlighted by our study, there is a significant lack of surgical data in Mauritania, making it difficult to prioritize

resources, funding, and investment to support growth and evaluate the success of interventions. In recent years, several countries have launched initiatives to help Mauritania overcome its healthcare challenges, including Qatar²⁰, Saudi Arabia²¹, Lebanon²², and Turkey²³.

Our study did not include obstetrics, gynecology, or anesthesia, despite obstetrics representing a substantial portion of surgical care and being a critical determinant of maternal mortality, a key health indicator. Although the review was not restricted by the language of the articles, all search terms were in English. While this does not affect MeSH keywords, it may limit the ability to search the content of non-English publications.



In conclusion, additional data and studies focused on Mauritania are necessary to enhance the global surgical focus in the region. With increased investment in hospitals and healthcare, there is an expectation of progress in improving health indicators, achieving SDGs, and enhancing the well-being of the population. This article aims to encourage researchers and healthcare workers in the region to publish more data in the years to come.

Conflicts of interest: None declared

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