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Research Article

The Impact of the Sudan War on Pediatric Health and Child Diseases

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Introduction

This essay will examine the extremely grave situation of children's health in Sudan, a country in North Africa that has been at war. Putting it simply, we have very sick children in camp communities, shutter. The numbers are huge, but they are disturbing, particularly when we consider the relatively low risk of mortality for children living in a camp. The degree of malnutrition and the very high mortality rate among children is not an accident. This situation arises directly from a combination of insecurity, forced migration, and patterns of slaughter, which expose pregnant women and their babies to much higher risks, including ill health and death.

The combination of high acute malnutrition and high mortality, which signals particularly high disease when associated with this much malnutrition, would be striking in sub-Saharan Africa. Indeed, much of our understanding of the relationship between war and famine comes from the 20th century and the darkest episodes of that continent's violence.

The scope of this essay is limited to the analysis of pediatric health during the war in Sudan. A discussion of the main concepts will come from the field of war amongst the people, and it will be overall less theoretical and much more fact-driven. Most of what we know about children and the effect of war on them emerges from empirical studies or single cases, so the approach seems via media. This essay argues that the situation is dire – that the Sudan War has led to a sustained public health crisis in the last 17 years and that, as always and everywhere there is poverty, war deaths have been visited most heavily on children. In Sudan, the war followed a policy of forcing mothers into camps, where they and their children are subject to intentional exposure to death – they are being left to die. during the periods of enforced movements from homes to camps, and among the 4.5 million internally displaced persons acute malnutrition and mortality among the very young is strikingly high. Security and poverty prevent saving children. Healthcare provision is spread so thin as to be meaningless regarding the depth of need.

Healthcare Infrastructure in Sudan Donabedian divides the infrastructure into three parts: professionals, information systems, and facilities and equipment. Health infrastructure in many developing countries usually focuses on auxiliary nurses, midwives, laboratory technicians, pharmacy technicians, dental therapists, occupational health technicians, and environmental health technicians. An unbalanced distribution of professional health service providers exists in the institutions of the health system; for instance, specialists, nurses, and midwives. A lack of record-keeping systems in many sectors leads to policy designs or decisions that do not capture the basic evidence.

Facilities and equipment, most significantly, nearly all health infrastructures in developing countries depend mostly on urban settings. Sudan's healthcare delivery system is a public-private-people mix system. The majority of funding comes from collaboration societies committee . Sudan is assessed as one of the lowest quartile health resources in the world, and less than 80% of service facilities can access healthcare structures.

Overview of Healthcare System

Sudan has been experiencing several war crises in the past few decades. The most severe one was the latest war that occurred in april 2023, and it lasted for one year and 3 months . The situation as a whole was overwhelming for many sectors, one of which is the health care system. Hospitals and most healthcare facilities were fully occupied by injured people and critical cases. It is challenging to do proper triage for injured and very sick people who require help. Priority was given to injured people, while many other patients with severe and life-threatening conditions were received by people who had no experience or knowledge in the matter, therefore being too slow to manage these pediatric cases, let alone sometimes making the wrong decisions which led to more critical situations or reaching them too late. This has led to many unnecessary potential deaths during that period. The number of receiving patients by general practitioners, even among pediatric cases, during this crisis period was variable according to the city size and location toward the war, from several to tens of cases daily. The variety of pediatric cases among clashes was the picture of the most severe conditions in the hospital.

In most cases, there were severe or critical cases such as respiratory distress and wheezing sounds for many respiratory infections and status asthmaticus, with few cases of chest pain related to untreated acute respiratory infections. Many cases of life- threatening acute metabolic derangement in the form of diabetic ketoacidosis or liver coma with an acute hepatitis infection were very serious. High febrile children for more than seven days without an obvious focus were mostly due to untreated sepsis cases or malaria and diseases causing long-term fever. Central nervous system-related cases presented in the form of unwitnessed falls or loss of consciousness, abnormal head size, and chronic subdural hematoma as the most common diagnosis. Gastrointestinal obstruction, abdominal distension, vomiting, and an acute abdomen requiring an emergency laparotomy were diagnosed. In addition, there were congenital and hematologic cases such as hypothyroidism and congenital adrenal hyperplasia that tragically led to several neonatal deaths.

These were also observed in non-infectious diseases such as sickle cell anemia exacerbations and diabetic cases. These deaths raise the importance of improving community awareness and hospital accessibility.

However, the number of calls for experienced physicians was very limited compared to the number for treating infectious and pediatric cases. The treatment was completely different among cities according to the qualifications of the doctors involved. This experience showed the gaps in competencies and trained physicians. It was considered a beneficial and precious experience, although the situation was tough, especially for the small pediatrics.

Child Diseases in Conflict Zones

Children in conflict zones are struck by a range of preventable and non-preventable diseases, and childhood diseases can emerge as a consequence of war or can be exacerbated by war. The health services necessary for preventive activities, such as vaccines, are often difficult or impossible to provide; consequently, disease outbreaks are common, especially during the rainy season in some conflict zones. Some examples of exacerbated or emergent pediatric diseases in conflicts include , measles, dengue, malaria, cholera, and diarrhea. Infectious disease is an important cause of both morbidity and emergency pediatric admissions in the wartime population. Of the non-communicable diseases, malnutrition is an important cause of admissions. Pediatric TB diagnoses in conflict zones are higher than in the pre-war periods, mainly due to the decline or absence of vaccination campaigns. War also causes or exacerbates other health problems, such as fear, anxiety, depression, headache, irregular sleep, nightmares, regressive behavior, and bedwetting in the pediatric population.

In Sudan, children are the most vulnerable group, with conflict-driven morbidity and mortality. Measles can cause a high number of complications and deaths in the conflict situation due to overcrowding and lack of emergency monitoring and backup drugs. Malaria also remains very common due to the suspension of the indoor spraying of houses and the suspension of malaria programs. War can lead to a higher mortality-to-incidence ratio due to the absence of anti-malarial drugs and vaccines. Cholera has been found to cause high morbidity and mortality, especially in the displacement situation, and the absence of vaccines and water and foodborne infections remain persistent.

Children are more susceptible to acute watery diarrhea in a displacement situation. A typical pattern of increasing prevalence of acute watery diarrhea in females and children in displacement camps is reported. Retrofitting WASH facilities and working on or around mass graves have increased the risk of cholera in seven countries and increased the risk of morbidity in children under five compared to places with health care and water supply systems. The pattern of death increased in malaria transmission in the rainy season. War causes a significant increase in the incidence of infectious diseases and a high number of hospitalizations. The number

of mental health diagnoses is highest in the civilian population, especially in children. War also exacerbates pre-existing diseases, such as malnutrition, anemia, and TB.

Infectious diseases remain the leading cause of childhood death and ill health during armed conflict. Individuals living in war zones are at an increased risk of infectious diseases due to poor living conditions, weakened public health structures, inadequate food and dietary resources, and inadequate access to medical care. Combat-affected areas with mass population migrations have social and medical infrastructure that can spread infectious agents more freely than less densely populated areas. In such situations, the livestock and culture of the war zone may contribute to the changing disease spectrum by favoring the biological adaptations of the infectious agents. Children are the most likely to experience a rise in infectious diseases associated with overcrowding. Food and water sanitation deteriorates, which can be a critical public health problem in conflict situations.

In a displaced population without enough water, infectious diseases are potentially a major threat. Epidemics are more common when infectious diseases spread to children. There is a wide range of diseases that can induce epidemics among children. Not only are specific infectious diseases such as measles easily spread among children by virtue of their crowding and activities, but also other infective agents, such as those that cause diarrhea, are spread. Measles, severe respiratory infections, gastrointestinal illnesses, especially diarrhea and dysentery, are found to be the most common pediatric illnesses. A bombing attack can lead to an increase in childhood deaths but can also spread other infectious diseases that escalate the outbreak in locally based health facilities. The pre-war measles vaccination coverage was low, but efforts were made to target children for vaccination. Early treatment can prove effective should an outbreak of measles or cholera occur; prevention of these diseases is likely to have the most impact. It is clear that diarrhea is the predominant killer. Most children attending these clinics have diarrhea, and this has been found to be associated with hunger. Before the war, a significant percentage of the children under 5 had diarrhea illness in the month prior to the survey. The sources of water used by the displaced population are critical.

Multiple-dose vaccinations can induce a better response than single-dose vaccination regimes. However, if there is a high rate of intrapopulation mixing, then a near preservation of herd immunity may be necessary to halt an epidemic. A sufficiently high single-dose vaccination may be better because a better response can be evoked from a fresh immune system, rather than an immune system repeatedly exposed to the same antigen, and health workers who have a one-time annual chance to reach the displaced can help displaced children. To

respond to outbreaks of vaccine-preventable epidemic diseases, prepositioning of essential drugs can be a bit tricky. A vaccination program can prevent outbreaks of these diseases. Administering a second dose a month later can provide additional immunity to children, and in situations of high intra- population mixing, a second dose seems to significantly reduce the probability of an outbreak of measles or viral disease. Also, by herd immunity vaccination, it is possible to reduce the disease incidences significantly, even with incomplete vaccination coverage.

Energy malnutrition and deficiency of protein and/or other nutrients during infancy and childhood are important risk factors for death from complications of infectious diseases, especially in developing countries. Approximately 60 million children die from worldwide deaths in these children; many could be attributed to severe protein and energy undernutrition. Children living in chronic hunger often have a simple infection that can lead to death from complications of the usual infection. The interaction between nutrition and infection is dual: preventing or curing infections decreases malnutrition, while curing malnutrition decreases the severity of infection.

Protein-energy malnutrition represents a major burden for the health of children in developing countries, particularly in countries in the south. In underdeveloped zones, malnutrition has always been associated with an increase in the prevalence of infections.

These infections are most often bacterial, viral, or parasitic. In developing countries, malnutrition is an important factor transforming several infection conditions into emergencies. Indeed, nutritional disturbances contribute to around half of all mortalities.

The relationship that links malnutrition to infection is mostly of a two-way nature: in one way, malnutrition causes the infection; in the other, the infection causes malnutrition. In fact, malnutrition sensitizes individuals to infections, and conversely, infections worsen the nutritional state. This deleterious effect related to the association of malnutrition and infection is even more relevant because some infectious pathologies can be preventable by immunization when nourishment is adapted to meet nutritional needs.

Mental Health and Psychosocial Support

One of the objectives set out in the National Standards for Community Mental Health Care is to address the issue of the provision of comprehensive community mental health care, consisting of comprehensive mental health services and various types of support for people with schizophrenia and other severe mental disorders within the community, while improving the learning, working, and life experiences of people receiving these

services. The case-caring approach is a way to improve the mental health of the public and promote community mental health. Social psychological support refers to the psychological approach to problem-solving and capacity-building among people affected by mental illness.

Support includes emotional support and practical support, breaking through the lack of understanding of mental illness and mental health and promoting the transformation of social mentality. Receiving correct information and communication is considered the basis for inclusive and equal social participation in solving psychological problems. Social psychological care is another responsibility of society. Supporting people with mental illness requires an integrated approach that includes equal and active listening and an inclusive and vibrant community that treats all people with compassion. Social psychological support is part of mental health to help service users recover and be active, and it enhances the quality of community services, ensuring the best conditions for integration and recovery. Helping establish and maintain social support networks and promoting participation in community life, combating the isolation of people affected by other mental disorders, is essential for countries that promote economic development. Promoting community mental health requires the establishment of a balance between treatment and rehabilitation while developing a social psychological support culture.

Child Protection and Rights

While the legal framework for child protection and abuse in Sudan was developed relatively early, the enforcement was weak. Although there were gaps and weaknesses, various laws addressed the rights of children and women in Sudan; however, there has been uncoordinated institutional development.

Moreover, the implementation and enforcement of these laws have shown continuous failure. Promotion and representational functions of child rights have been carried out by nongovernmental and international organizations. The primary international organization involved with children and women in Sudan has been UNICEF. Since 1U8G, UNICEF's activities in the Sudan program have expanded and concentrated in the most vulnerable rural areas of the country.

Various international organizations worked after the 1U8G crisis to help women and children using the provisions of the Child Rights Convention. The extension of child rights via an effective framework is seen as a prerequisite for a political climate conducive to long-term reconciliation and the diversion of conflict to democratic means.

Furthermore, the provision of long-term protection to children could reduce civil strife incentives and enable the promotion of safety for aid workers. However, using the Child Rights Convention alone for the protection of children will never achieve its full potential.

The number of difficulties in protecting children and the question of war crimes calls for a particularly bleak perspective. Even in the event of a break in hostilities and a subsequent peace agreement, children during and after the Sudan war, particularly internally displaced children in border-lined insurgent sectors, remained in an extremely vulnerable position. Closer support and protection will require operations in high-risk situations, with the resulting burden of additional practices for minimizing exposure to risk.

Violations of Child Rights During Crisis During the period of the situation in Sudan, children of the internally displaced persons (IDPs) and war-affected areas suffer greatly as a result of the conflict. In addition, there are shortages in health and medical care, shelters, food, and clean drinking water.

Furthermore, there are no educational opportunities or entertainment for the children and their families, in addition to the harassment and violations of children by government forces and opposition groups. Forces that are participating in these attacks also contribute to the situation.

Approximately all children involved in the conflict are between the ages of 14 and 18. They are forced to leave their schools and participate in fighting to fill the shortage of fighters. This has drawn the attention of many parties to the promulgation of the Sudanese labor law, which stipulates that the minimum age for employment is 18 years, not 14 years, and facilitates the recruitment of mercenary soldiers.

Sudan has a displaced population of about 4 to 5 million people. They have been deprived of residence since the outbreak of the war in 2003 and have since been living in different shelters, with death rates exceeding 250,000. The war has led to many severe human rights violations and has undermined the basic rights and freedoms of citizens, resulting in long-term negative economic and political consequences that are difficult to predict and evaluate, in addition to the economic and political complications of humanitarian aid to these populations. Their losses and corruption are reflected not only in the villages that are victims of war but also in the cities, especially in Darfur. Children affected by the war have suffered greatly from pain, suffering, killing, displacement, and lack of representation, which leads to ongoing conflict, violence, and negative behavior in the future. The violent behavior of children after the war in families and communities is likely to continue, necessitating urgent and permanent action by local authorities, scholars, and parents to help the younger generation overcome the devastating effects of war and armed conflict.

Prevalence and Risk Factors

People in a war environment have a very high risk of being injured and killed, but the most harm is found in children and women who survive war situations. However, there is a steady increase in the impact of wars on future generations and their birth rates. The chronic pediatric impact of war is usually caused by traumatic events affecting injured children and young people, severely damaged infrastructure, poor health, and inadequate education services, along with the spread of infectious diseases and malnutrition. These factors interact with families and create long-term physical and mental health problems for children in the future.

Children are the most vulnerable to death from serious health delays as a result of war, in addition to being exposed to daily risks that adversely affect their physical and mental well-being. The situation in Sudan started in January 2023, and the increase in deaths, injuries, malnutrition, loss of education, spread of diseases, and delayed growth in children has been observed since the beginning of the problem. The reasons and risk factors that cause these harmful complications contribute to the critical situation of children in these societies, even though the war has affected their standard of living. Hence, this review represents the prevalence and risk factors that can hinder access for the pediatric population during the period of war in Sudan. Although this overview focuses on Sudanese society under threat, there are many similar war-affected communities, especially in African countries, facing the same problems.

Impact on Pediatric Population

Pediatrics make up one-third of the global population and over half of the Sudanese population. They are a vulnerable category, especially during wars. Children were the first to lose vital services, including immunization, due to conflict. These factors can dramatically alter their future prospects and increase poverty. It is important to recognize the physical and psychological toll that current conflicts, arbitrary killings, bombings, and displacement are taking on children. It is likely that children are the most affected in the crisis rather than the ones doing the fighting. Aside from issues related to direct violence, children are also the most vulnerable in economic and social crises, coming in at the top of the hierarchy of vulnerable groups. They are gripped by hunger, malnutrition, and lack access to basic healthcare and education. They are also targets of alluring scams by various groups with fewer scruples. Emergencies lead to the deterioration of a community's standard of living and exacerbate social problems, disrupting their routines, relationships, risks, and resources. These require immediate responses both nationally and internationally, as delaying action risks endangering a generation of children and subsequent generations. For this paper, I would first establish children's vulnerability to emergencies compared to other populations and then highlight the impact of the current crisis

on this group. Finally, I would propose strategic interventions as recommendations to address these issues.

Healthcare Access and Challenges While the war creates an increased burden of disease, it also disrupts access to healthcare. In Sudan, conflict-related activity leads to the destruction of health facilities, displaces residents, and drives up the cost of care.

Security restrictions and the difficulty associated with obtaining needed medical supplies complicate healthcare delivery. And yet, lakes and deserts separate beleaguered families and their communities from government medical care. One of the crueler aspects of war is that while medicine can help children, health can assist warring factions or united non-state threats, and therefore walls divide the sick from physicians. If they could leave the country, patients and their families might go to other countries for care, but they often do not know what country can help, how they will get to the border, what it will cost, or what requirements and threats may await them at the border. In this context, many children have died at home with common childhood diseases that could have been treated. One consequence of these barriers has been that death rates from disease among children are beginning to outpace the conflict. “There is no presence of aid groups, and children are in a very dire health condition,” he said, adding, “many children are coming to the hospital in the final phases of their illness, or dead on arrival, because their parents are unable to provide them with any kind of care or medicine.” In addition, for the small population still living in Kordofan, they report, “just this year they have listed 2000 cases of acute malnutrition among children.” There have even been case reports of children freezing to death. In such an environment, in which food, water, and healthcare resources are exhausted or lack access, the residents are even less able to manage symptoms of chronic conditions.

Importance of Research in Crisis Settings Research is crucial in humanitarian crises. However, research in crisis settings is associated with specific ethical challenges, including the need for appropriate frameworks, consent, and community involvement. Rapid ethical review timeframes are also required. For pediatric critical patients, limited evidence is available, which can be explained by issues with access, lack of funding and setup, and the presence of ethical barriers. Even in peacetime, pediatric care is often considered a low priority in hospitals, as children are generally considered to be resilient. In war zones, they are doubly disadvantaged. Additionally, there is inequality and discrimination in the accessibility of medical assistance in developing countries.

To answer the demand for specific data related to children in emergency settings, human rights organizations are increasingly advocating high-quality, peer-reviewed research. Over the last decade, the ethical debate has focused mostly on the establishment of databases and interventional research. Although less attention has been paid to the requirements of patients in integrated pediatric critical care centers in less secure and more immediate emergency situations, the principle of beneficence advanced by modern medicine is deeply rooted in the philosophy of attempting to avert and alleviate human suffering wherever it occurs, and regardless of how unattractive and unwinnable the cause might seem.

Conclusion and Recommendations

In conclusion, the war has increased the effects of malnutrition and disease on pediatric health, resulting in many preventable child deaths. Although more research is needed to provide more specific data about pediatric disease in the Sudan war, strategies can and should be taken to minimize the health impact of the war on Sudan. Recommendations can help save the lives of thousands of Sudanese children. • Military intervention should be used as a last resort, and decisions about military intervention should be made in accordance with relevant moral, legal, and strategic considerations. • At the national level, policymakers should make child welfare a priority, and by embedding child health and nutritional priorities in conflict resolution and reconstruction operations, minimize the health impact of the war on Sudanese children. • Missionaries should be detained during the time of detention with access to adequate food, water, hygiene, and health care. Misappropriation of humanitarian assistance should be prosecuted, and the international community should provide NGOs and international organizations with the resources they need, including logistics and supplies, to help vulnerable populations • National and international agencies, organizations, and governments should allocate the necessary resources and obtain up-to-date information on disease rates and patterns of disease in Sudan in order to obtain up-to-date information on child health, malnutrition, and disease in war-affected areas based on available information.



Medtronic