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Public Health Responses to Climate Extremes in the South Pacific Islands: A Case of Fiji

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ABSTRACT

Climate extremes (CE) are on the rise; these include, but are not limited to, floods, extreme heat, and drought.. The Pacific Islands are perceived as highly susceptible to climate events and their consequential health impacts. Hence, this paper reviews the public health responses from national stakeholders and international organizations in the phase of climate extremes in Fiji. Notable health issues resulting from CE emphasized in this article include: dengue fever, diarrhea, and nutrition-related diseases. Data cutting across renowned international organizations show a disconcerting association between climatic extremities and an upsurge in dengue fever and diarrhea in Fiji. Also, this article revealed that CE create favourable breeding grounds for vectors that contaminate water sources, further affecting agriculture, leading to food insecurity. Hence, Consequent, CE intensifies the prevalence of nutrition-related diseases, disrupting an already fragile public health sector in Fiji. This article identifies a critical gap in the existing health response strategies, revealing their inefficiency in addressing the mounting long-term health challenges of victims of climatic disasters. To bridge this gap, an encompassing health response mechanism was suggested. They include: establishment of enhanced health surveillance to effectively monitor and manage climate-induced health risks; integration of degree programs such as disaster medicine, humanitarian studies, and mental health psychology into university's course syllabus; provision of mental health and trauma support programs to address the psychological strain induced by climate-related disasters; mapping of disaster-prone areas; and the introduction of public health education to disaster-prone areas.

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Introduction

Climate change (CC) refers to a prolonged large-scale transformation in the typical weather conditions and average temperatures of the earth [1]. It is a phenomenon that extends beyond mere alterations in the climate, encapsulating a wide spectrum of climatic extremes. These include but not limited to unprecedented heatwaves, intense storms, prolonged droughts, erratic precipitation patterns, and rising sea levels. In essence, CC not only denotes a shift in long-term weather patterns but also manifests as an escalation in the frequency and severity of extreme climatic occurrences that can have profound impacts on ecosystems, communities, and the overall stability of the planet. The South Pacific region faces several global environmental issues, such as an increase in invasive species, land and marine pollution, habitat loss, extreme weather, and CC [2]. The Pacific community is more frequently affected by CC than any other country in the world, which is a major factor in their interdependence on international organizations. In fact, because of the recent sea level rise, the people of Kiribati are on the verge of losing their ancestral land [3]. One may frequently wonder what makes the Pacific Islands more vulnerable to recurring environmental and climatic challenges. Considering how small island nations are, the answer to this is not implausible as they have fragile coastal reef [4]. Although CC has led to more frequent and/or severe extreme weather events such as floods, droughts, and heat waves [5]. The increase in intensity and frequency of these events have increased the impacts on public health [6]. High temperature increases the possibility of heat-related death [7]. Water and vector-borne diseases are projected to increase, as well as increase in lung-related health risks [8]. It is vital to improve international collaboration across disciplines including epidemiology, pathology, geology, parasitology, economics, and occupational health as researchers work to provide insights into various health measures to prevent and help victims of climate events adapt to normalcy [9]. Responding to CE in the South Pacific will require prompt implementation of adaptation and mitigation strategies to safeguard public health. Partnerships for proactive response will span all industries and sectors, such as the department of social welfare, health, environment, agriculture and transportation, manufacturing, housing, finance, education, and sport.

There is little data from studies on public health and CC in the South Pacific, particularly in the area of long-term medical adaptations. An obtainable likelihood is an on-site intervention for casualties [10]. No recognizable approach has been practiced in terms of pre-perceived prevention of health impacts or post-climate event response in Fiji [11]. Although the health ministry has strategic framework for this course [12]. It will only take a longer time to produce a dataset that will comprehensively address all areas of climate events in connection to epidemics, child health, aged health, mental health and psychiatry, healthcare infrastructure, and health policies due to the low emergence of researchers showing interest across different discipline in the health sector and the consistent exodus of others to high-income countries. Depending on the kind, characteristics, and frequency of natural disasters, different nations have varied approaches to responding to CC in terms of health impacts. Other countries prefer to take an indigenous and remote approach harmonizing their resources with national agencies. This is in contrast to Fiji, which adopts a more internationally dependent and robust approach [10,13,14].

This study reviews public health responses to extreme climate events in Fiji, identifies service gaps, and highlights areas for improvement to minimize their impact on public health. The article would serve as a guiding information to mitigate the overall health impact of CC. Dr. Metuisela Tuicakau, former permanent secretary at the Fiji Ministry of Health and Medical Services, emphasized the predominantly negative effects of CC, and how CE particularly impacts low-income nations with limited adaptive capacity [10]. This perspective shows the crucial need for proactive early prevention strategies and sustained responses to tackle health challenges posed by CC. While there is an increased susceptibility to health hazards due to CC, there is also an amplification and intensification of existing health risks [15]. The recognition of the health consequences by the global health community has encouraged legislators and health advocates to establish a connection between health and CC legislation [16]. However, the partnership between lawmakers and health campaigners needs to be built on stronger foundations.

Climate extremes have an impact on the spread and transmission of tropical diseases, especially those that are vector-borne through heat waves, wildfires, floods, and droughts [17]. These affect mostly the children and the elderly, who are particularly vulnerable to illness because of the sensitivity and fragility of their organs and systems conducted an analysis using an enlarged paradigm, which demonstrated that both the direct and indirect exposure consequence of CC contributed to the effects of CC on child health, having an impact on both morbidity and mortality from a variety of diseases as well as child health determinants [18]. By employing a wider range of research techniques, examining understudied demographics and geographic areas, weighing the advantages and disadvantages of mitigation and adaptation for child health [18].

WHO Response to Climate Events in Fiji

The WHO has been steadfastly monitoring how ill-health and CC affect the development of resilient health systems throughout the South Pacific region over the past 20 years [19]. The WHO Special Initiative on CC and Health in Small Island Developing States (SIDS) began in November 2017 [20]. With the launching of this initiative, an action plan was developed the following year. A pivotal metric within the action plan involved the provision of financial assistance to safeguard citizens of the Pacific Islands against diseases influenced by climate factors and the establishment of health systems resilient to climate impacts.

During Tropical Cyclone Winston, Fiji's appeal for global aid has prompted the WHO to furnish essential medical resources and deploy extra personnel to assist Fiji in coordinating relief operations for those affected [21]. While disasters such as outbreak of diseases, disruption of water and sanitation, compromised hygiene, and food scarcity were eminent, promises were made by the WHO to provide necessary humanitarian aid. Further details have been presented in Table 1 as reported in Combes [22].

The WHO projection, spanning 2030 to 2050, suggests a staggering toll of about 250,000 annual deaths due to climate change [19]. As temperature escalates, we brace for intensified severe weather occurrences, heightened air pollution, exacerbated malnutrition, and an upsurge in infectious diseases. Addressing these global health threats necessitates concerted international collaboration and effective governance [23]. The health consequences of CC are manifold, extending beyond direct impacts to encompass the survival and proliferation of disease-carrying vectors like mosquitoes, ticks, and rodents. This extends to broader environmental shifts, including droughts, floods, and alterations in cleanliness [24]. Hence, Fiji grapples with a mounting incidence of vector-borne diseases such as malaria and dengue fever. This situation increases in relevance due to hurdles presented by shifting climate and weather patterns.

Fiji National Response to Climate Change Events

The healthcare system in Fiji comprises two primary programs [12]. The public health system, offering primary and preventive healthcare services, and the hospital services, providing curative care. These services are accessible to Fijians either freely or at a nominal cost across 214 health facilities available at the time. Healthcare is provided by nursing stations, hospitals, and specialized care institutions. The ministry identified non-communicated (NCDs) diseases as a prevalent health crisis in the country, attributing high mortality and morbidity rates to NCDs. Although such NCDs have occurred historically, CC may amplify their frequency. Extreme climate events pose significant threats to human health and overall well-being [25]. They have the potential to disrupt essential physical and social infrastructure crucial for community safety and health before, during, and after weather-related disasters. Some immediate health consequences include wounds sustained due to direct exposure to CE, mental health effects and injuries during evacuation attempts, and fatalities directly attributed to high humidity, causing events such as drowning in floods [26].

The allocation of healthcare benefits in Fiji exhibits a modest preference for the economically disadvantaged. Approximately 61% of public expenditures on nursing stations and 26% on government hospital inpatient care are dedicated to services catering to the poorest 20% of the population [27]. The financing structure demonstrates a notable degree of progressivity, as wealthier segments shoulder a larger proportion of the health financing responsibilities.

Three years ago, Fiji's National Guidelines for Climate Resilient and Environmentally Sustainable Health Care Facilities (CRESHCF) was published [16]. Cook Islands, Fiji, Nauru, Tonga, and Vanuatu are implementing environmentally friendly and non-incinerating methods for healthcare waste management, with support from Australia, the European Union, and other international partners. These measures, supported by collaborative efforts, seek to improve healthcare waste management by meeting immediate needs during the pandemic while simultaneously decreasing the healthcare system's long-term environmental footprint.

Dengue Fever

Dengue fever is common in tropical areas, and elements like temperature, precipitation, urbanization, and the presence of Aedes aegypti, the main mosquito vector, have a substantial influence on the disease's local transmission [28]. Dengue fever is currently spreading throughout the world; cases have been reported in Africa, the Americas, South-East Asia, the Eastern Mediterranean, and the Western Pacific. Aedes albopictus, a secondary vector, and Aedes aegypti are the two main vectors of the virus; nevertheless, isolated cases of local transmission have been reported in Europe and the United States [28]. The temperature rise associated with CC is expected to impact dengue fever by increasing the frequency of epidemics [29]. As documented in the Pacific Islands Climate Change Assistance Programme (PICCAP), during the outbreak of dengue fever in the early 2000s, the Fijian government under the health ministry launched an enhanced vector control program aimed at preventing the spread of the disease [30]. Simultaneously, the ministry actively promoted preventative measures to heighten public awareness, advocating for proactive steps to minimize exposure to the dengue virus. Additionally, they reinforced quarantine protocols, implementing stricter measures to contain the outbreak and prevent further transmission. Recognizing the urgency of the situation, the government also prioritized the establishment of epidemic preparedness and response strategies, ensuring a coordinated reaction to potential outbreaks in the future. Complementing these actions, they committed to implementing sound development policies, aiming to create a sustainable framework for addressing and mitigating the impact of such outbreaks on public health. While a particular percentage of reduction was not published in the years after, we assume the actions taken reinstated a positive change in the health sector.

The Fiji Red Cross Society responded perfectly to the dengue fever awareness campaign by educating community members on the need to avoid sleeping outside during humid seasons, the use of mosquito nets while sleeping, and proper disposal of coconut shells and other home appliances that could breed mosquitoes [31].

Diarrhoea

Diarrhea is characterized by the passage of watery stool occurring more than three times a day. It is most prevalent during the weaning period. It involves a softening in stool consistency, with or without an increase in stool frequency [32]. The condition is categorized into acute watery, persistent, and dysentery diarrhea diseases. It is a gastric ailment resulting from the consumption of food contaminated with microorganisms such as Salmonella, Campylobacter, Staphylococci, and Escherichia coli. The surge in diarrhea cases is exacerbated by CC, impacting factors such as water quality, sanitation, and food safety, leading to an increased prevalence of diarrheal diseases [32].

Diarrhoea may become more common in Fiji because of the warmer and wetter weather conditions, and the frequency of drought and flood may increase the disruption of water supplies and sanitation systems. A study by Singh et al. sheds light on the intricate relationship between climate variables and diarrhoea cases, emphasizing the vulnerability of communities to CE [33]. It was shown that there was a similar 3% increase in the number of instances of diarrhea in a succeeding month for every 1°C increase in temperature [33]. Their findings revealed how temperature shifts contribute to a surge in diarrhea cases, magnifying the impact of compromised water and sanitation during extreme weather events like floods. The aftermaths of the 2012 floods in Fiji proved the urgent need for comprehensive emergency responses, including the distribution of vital supplies like water purification tablets and oral rehydration salts, illustrating the critical role of swift interventions in the mitigation of health risks of CC.

Primarily, efforts have been made to enhance the reliability and safety of the water supply, ensuring consistency in the supply of clean water to prevent waterborne diseases, including diarrhoea [33]. Also, improvements in sanitation have been prioritized through media campaigns and awareness to create hygienic environments that reduce the transmission of diarrhoeal pathogens [30]. Steps have also been taken to create awareness of ways to prevent food contamination. Moreover, emergency strategies have been formulated to effectively cope with the effects of both floods and droughts, as these natural disasters aid in the spread of diarrhoea. These comprehensive measures safeguarded the public health space and established a resilient framework to combat diarrhoea in Fijian communities [30].

Nutrition-Related Disease

Food is a necessary factor for human sustenance and growth. In comparison to other nations of the world, the variety of food in Fiji is quite small, translating to a lesser amount of vital nutrient content present in the available foods [34,35]. As a result of CE; droughts, cyclones, and floods, agricultural activities are disrupted causing food insecurity. Nutrition-related illnesses are most likely to be influenced by the increase in flooding and drought. Indirect impacts may be triggered by climate change-induced environmental and ecosystem alterations, such as crop failures, reduced marine food capture, geographic range expansion of disease vectors, and reduced labour capacity [36].

Climate change declines agricultural and marine productivity, leading to reduced calorie availability and potential spikes in food prices, which could exacerbate undernutrition levels. Undernutrition is the primary cause of mortality among children under the age of five in Fiji, despite relatively lower rates of stunting (7.5%) and food wastage (6.3%) [34,37]. Concurrently, micronutrient deficiencies, particularly in iron and iodine, are prevalent in Fiji and are expected to rise due to increased reliance on imported, unhealthy canned, or preserved foods, compounding existing challenges with macronutrient intake [38].

Leptospirosis

Leptospirosis is a common and potentially lethal zoonotic disease that is endemic in many tropical regions often leading to significant epidemics following periods of intense rainfall and flooding. The pathogen is carried in the renal tubules of reservoir host animals and excretes pathogenic leptospires in their urine. The infection is either direct or indirect exposure to these animals. According to Haake and Levett, although a variety of domestic and wild animals can serve as reservoir hosts, the brown rat (Rattus norvegicus) is the main source of leptospirosis in humans [39].

Leptospirosis has established itself as a reoccurring issue in Fiji, with its presence tied to the country's climate and farming activities. Leptospirosis is sensitive to heat and rainfall. It creates higher vulnerability among young male farmers who often encounter infected animals or contaminated elements in their work [34]. Moreover, natural disasters like floods seem to worsen this risk by bringing people and disease carriers closer, leading to an increased likelihood of transmission [38]. Furthermore, there is a complex interplay between environmental factors, occupational exposure, and the aftermath of natural disasters in the prevalence of leptospirosis in Fiji. For the past 20 years, Fiji recorded annual leptospirosis occurrence of more than 100 cases, which is consistently present in the entire South Pacific region but

occurs occasionally [35]. Exposure to infected animals, contaminated land, and animal dung seems to be the first point of contact.

Table 1: Selected Climate Events in Fiji and Health aid Received by Affected Population

Climate Event	Area	Severity	Impacts	Responses	Reference
Tropical Cyclone Tomas (March 2010)	Fiji	Displaced about 1500 populations, subjecting them to the lack of portable drinking water.	Heavy flooding was reported which result in the destruction of houses and medical facilities. Most importantly, 80% of the food crops at Futuna area were destroyed. In addition, the Wallis area also recorded a 50% loss in food crops.	In the attempt to avoid malnutrition, vitamin A and other food supplement were distributed as palliative by the Ministry of Health.	[40]
Tropical Cyclone Mal (November 2023)	Solomon Island, Fiji.	Severe winds caused damage by breaking tree branches, scattering unsecured materials, disrupting communication networks, and causing power outages due to damage to power lines. Temporary and fragile structures also suffered damage from the force of the winds.	Neither the Ministry of Health nor enthusiastic researchers published any conclusive health effects about this cyclone.	The focus of the national government was to combat the underlying cases of leptospirosis, dengue fever, and diarrhoea.	[41]
Flooding (March, 2012)	Fiji	Humid temperature created an environment favorable for the proliferation of pathogens, exacerbating challenges related to compromised water safety, sanitation, and hygiene during periods of floods. About 236 leptospirosis cases were detected and 20 death cases. Flood water was the main source of transmission.	Diarrhoea and related water-borne diseases were recorded. Following the flood, leptospirosis was also detected in about 576 cases with 7% mortality. Outreach medical center was created in strategic location (western division).	Affected families received water from trucks, along with the distribution of 2559 WASH kits comprising water purification tablets, containers, and soap. Additionally, 40 large tanks, 7000 water containers, and 9600 sachets of oral salts were received	[42]
Tropical Cyclone Winston accompanied with storm surges (2016)	Fiji	This was a category 5 cyclone, that caused a huge impact on the lives of over 350,000 Fijians. By records, it is one of the most severe tropical cyclones. Total damages were estimated to be around a monetary sum of FJ$ 2.9 billion. A total of 88 health facilities were affected including hospitals, health centers, nursing stations, houses across central, west, east, and northern Fiji.	88 health facilities were destroyed out of 214 available in Fiji. A total health loss amounted to FJD 13.9 million. A total of 44 casualties were recorded of which more than 120 people sustained injuries. Furthermore, some were hospitalized.	Emergency actions were taken to render direct health services to casualties. Tetanus medication was also Administered to casualties showing symptoms of the disease to limit the risks of contracting further diseases.	[22]
Storm surges and flooding (2014)	Vunidogoloa, Fiji	Aside the mental trauma and loss of home caused by this CC, weary on the part of displaced people was also reported, stating their inability to get natural food products. Hence, they relied on processed food. This had both psychological and nutritional impacts on their health.	As impacted people assumed a new location, emerging health issues including NCDs were recorded and were attributed to a change in diets. Their preference for natural and fresh food resulted in deterioration of health.	Improved sanitation facilities were provided, which helped overcome the challenge of waterborne diseases.	[43]

The lack of baseline healthcare information is one important challenge responding to the public health crisis amid CC. This challenge was raised at the 2021 meeting of the Pacific Island health ministers. In approaching this, the WHO in conjunction with diverse collaborators including the United Nations Children's Fund (UNICEF), the Pacific Community (SPC), and various development agencies, is actively involved in a concerted initiative aimed at compiling essential data on the accessibility of basic water, sanitation, and hygiene (WASH) services in healthcare facilities [16]. This comprehensive evaluation extends to encompass the management of health-care waste. Furthermore, an energy assessment has been initiated in specified Pacific Island Countries (PICs), seeking to understand the patterns of electricity consumption in major healthcare institutions and foster the establishment of sustainable energy supply systems [16].

Economic Situation Influences Health Response to Climate Events

Before funding healthcare programs, it is imperative to fully understand the economic implications of resource allocation for addressing the health concerns posed by CC. These economic factors include the gross domestic product (GDP) of a country, employment trends, domestic revenue, debt levels, project expenses, foreign reserves, and the long-term financial benefits of funding health initiatives that are specifically designed to lessen the effects of CC [44]. Hence, the region's economic strength needs to be taken into account when discussing health measures.

In addition to financial considerations for implementing healthcare projects, the recurrent CE events in Fiji have resulted in numerous economic repercussions for both the populace and the government. Emphasized the financial damages to casualties resulting from tropical storm passing near Fiji, Samoa, Tonga, and Vanuatu between 1970 and 2018 [45]. More data about the numbers of various ethnic groups and people in Fiji during the tropical storm Winston in 2016 was provided. Similarly, a social media poll estimated the financial burdens associated with property damage and rising healthcare expenditures, and the implications of underfunding adaptation and mitigation efforts for CC at the national and household levels [46]. Due to CE, Fiji's health sector has been significantly impacted by these disasters as seen by an increase in hospital admissions and treatments for injuries and infectious diseases such as leptospirosis, typhoid, diarrhoea, dengue fever, malnutrition, and sickness related to stress [12].

Strategies for Responding to Public Health Challenges Arising from Climate Extremes

Effective Surveillance

It is uncertain whether there are efficacious health surveillance protocols to aid individuals affected by extreme events. An essential long-term strategy for reducing the health effects of climatic events in Fiji is to enhance the functioning of public health monitoring systems to promote health-related resilience to CC. Health surveillance is defined as the continuous gathering, handling, evaluation, and communication of data, followed by the distribution of these data to promote public health actions [47,48]. The US Global Change Research Program and the IPCC both openly acknowledge that the capabilities of the public health sector, particularly its surveillance system, mitigate the health effects of CC [14]. There is no idealistic surveillance approach currently used by the Fijian Ministry of Health to track possible health risks that might deteriorate with the emergence of climate events. However, interconnected and web-based surveillance approaches may be effective in this clime of the world. Available data indicates a successful strategy for monitoring and managing Aedes vectors in the Pacific region, aiding countries in enhancing their capacity to collect information on the escalating proliferation of these disease-transmitting mosquitoes [16].

Training National Experts for Climate-Responsive Public Health

The global healthcare industry has faced immense strain due to the COVID-19 pandemic and Fiji was no exception [24]. Therefore, an expanded healthcare workforce will be needed to manage the debilitating consequences of CE expected in the future. This could encompass a need for specialized training, enhanced medical facilities, training of health workers and para-medical practitioners, and increased staffing in response to long-term issues resulting from climate-related events as contained in the 2015 Climate Change and Health Strategic Action Plan [11].

Incorporating Climate Change and Health into University Curricula

One major confrontation for physicians and medical workers is the ability to navigate through disaster.It has been reported that 79.4% out of 100% of medical students supported the inclusion of topics on CC and health in their program curriculum [49]. This follows topics in adaptation, climate change-related health impacts, climate change-friendly healthcare, and co-health benefits. Of the three universities in Fiji, one effectively provides programs addressing health responses to climate events, covering emergency medicine, nutrition, dietetics, public health, environmental health, epidemiology, and rehabilitation medicine [50]. However, there is a need to integrate humanitarian services and disaster medicine into both undergraduate and postgraduate studies. These courses will concentrate on the immediate care of critically ill and injured patients of climate events, aiming to build skills in emergency procedures and interventions, while also improving communication between healthcare professionals and disaster victims. Regrettably, the University of the South Pacific (USP) has not yet established a fully operational school of health and medical sciences dedicated to addressing public health. In the last quarter of 2023, USP plans health studies expansion, Vice Chancellor Ahluwalia shares intent during open-day, with exploration ongoing for new study areas [51].

Organizing Disease Intervention Programs

For disease prevention amid CE, a unified and collaborative effort is required which involves government, communities, donors, and global networks to effectively invest in prevention systems [35]. These systems should be capable of detecting initial signs of epidemics or communicable diseases as they emerge, spill over, and spread [52]. This approach will formulate a robust response strategy for disease prevention against future CC occurrences.

Rehabilitation of Healthcare Infrastructures

In the health sector, it is apparent that CC exacerbates health risks already present rather than creating entirely new ones [53]. Climate disaster strains local health services by growing demands, specifically regarding heat-related illnesses, diseases transmitted by vectors or water, and housing needs arising from extreme weather events.

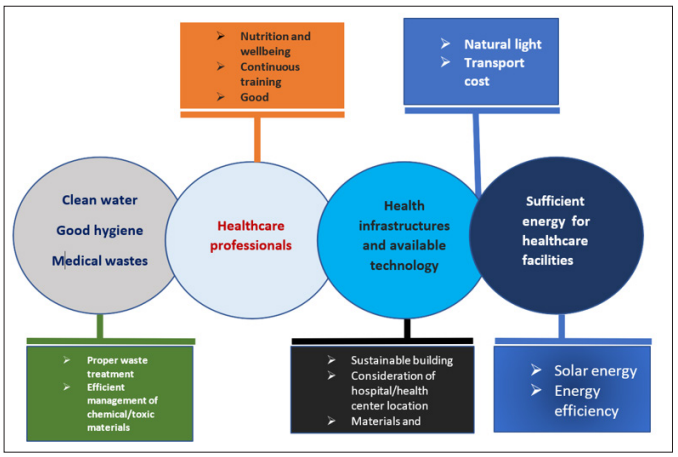

Figure 1: Four Fundamental Pre-requisites of Climate-Resilient and Environmentally Sustainable Health Care Facilities [19].

In Fiji, most health professionals recognize these threats, and yet no local health departments prioritize positive responses [54]. Health departments should start focusing on infrastructural needs in strategic locations to avoid areas of vulnerability. The WHO guidelines for Climate-Resilient and Environmentally Sustainable Health Care Facilities stressed critical infrastructure measures as presented in Figure 1. These include responsible site development, environmental impact reduction, and habitat preservation. The guideline equally suggests the need for water conservation through rainwater collection and non-potable sources. As a contributory pre-requisite to infrastructure, the WHO encourages energy efficiency in the health sector involving natural ventilation, solar solutions, and insulation. The WHO also prioritizes waste minimization, recycling, and proper disposal. Also, integrating photovoltaic systems and prioritizing chemical management align with the WHO's recommendations for resilient and eco-friendly healthcare facilities. The Fijian Ministry of Health adopted this preconditional requirement in 2020.

Mental Health and Traumatic Support

Mental ill-health is one condition with many traditional misconceptions. While many Fijian and African traditions attribute mental ill-health to superstitions, others assume such patients are suffering retribution due to offenses committed against the gods. Whichever the case may be, the medical causes could result from poor management of stress [55]. Through pain, loss, worry about the future, health effects, social upheaval, and a break from nature, CC has a negative influence on mental health. Particularly vulnerable groups frequently encounter more difficulties. In Fiji, stigmatization as an effect for mentally challenged patients is not given the required attention [56]. A study conducted among health workers in Fiji showed that the majority of participants thought that substance misuse was the root cause of mental disease [57]. The study also acknowledged the differences in mental illnesses, and saw hospitals as valuable resources, after agreeing that medicine was an effective treatment. Fewer than 25% of the participants expressed a willingness to settle into marriage or work alongside a mentally ill person [57]. In light of the adverse consequences of mental disorders, proactive strategies are essential for both pre- and post-climate extreme events. Implementing measures to accommodate rehabilitation and prevent social impacts is crucial in mitigating the effects of mental illness associated with environmental challenges.

Promoting Policies that Support Response to Public Health

The 2015 policies for CC contain ten components to ensure inclusivity of the health sector and its operational basis in the Fijian health system to address increasing challenges presented by CE [11]. The examination of policies revealed that the three health consequences of CC (diarrhoea, dengue fever, and malnutrition) were given limited attention, frequently addressed indirectly, in both the Fiji National CC Policy, its corresponding National CC Adaptation Strategy, and the Public Health Act. Moreover, CC and its effects on health were not included in any of the supporting documentation from important industries like agriculture and water [58].

Education as an Effective Response to Climate Change-Related Health Challenges

Education is an influential sector with potential to respond positively to CE events. While this review is aimed at evaluating the health responses to CE in Fiji, education can impact community health response by promoting inter-disciplinary learning amongst students, local leaders, chiefs, and educational stakeholders could be practicable to achieve constant educational awareness. Although there is little data on the incorporation of education in addressing public health challenges arising from CC in Fiji, Boyko showed that health workers should be offered every educational opportunity to learn about CC, because it forms the foundational knowledge in enlightening their patients in the hospital [6]. Giudice argue that obstetricians and gynecologists have a unique opportunity to raise awareness, educate, and advocate for adaptation strategies related to CE that threaten the communities of their patients and families [59]. The aftermath of CC significantly and disproportionately affects most victims from financially disadvantaged families [59]. It has been established in earlier sections how CE enhances the predisposition of people to pathogenic and vector-borne diseases [59].

The integration of health-related CC programs into school curricula is crucial to equip future public health practitioners with the necessary knowledge and skills to address this challenge in their professional pursuits [60]. A study conducted among health sciences students in Ethiopia found that over three-quarters of the students were aware of the health consequences of CC [61]. This suggests that public health responses have helped increase awareness among young healthcare professionals. The same study also showed that electronic mass media was a major source of information for the students, indicating the importance of disseminating information through various media channels. Furthermore, students who were knowledgeable about CC were more likely to perceive it as a serious health threat and considered their departments to be concerned about CC. This highlights the potential of public health responses to create a sense of urgency and engagement among students. Another study conducted in Bangladesh revealed that people with higher educational levels were more knowledgeable about CC and its impact on health [62]. This suggests that integrating CC education into school curricula can significantly contribute to increasing awareness [62]. The same study also emphasized the importance of community-based guidelines and adaptation strategies informed by public perception and knowledge.

Conclusion and Recommendation

To create a health system that is climate resilient, it is imperative to prioritize various aspects such as effective governance and leadership, public awareness campaigns, smart resource allocation, emergency preparedness, efficient delivery of health services, and academic research.

Four climate-sensitive diseases have been identified in Fiji to be a consequential impact of CE. They include: dengue fever, leptospirosis, diarrhoea diseases, and nutrition-related diseases. These diseases pose a significant setback to public health systems. To enhance early awareness of CC as it relates to health impacts, integrating CC courses into the curriculum of secondary and tertiary schools emerges as a crucial step in this review. Effective surveillance and communication among stakeholders are imperative to preventing policy overlaps that could inadvertently neglect certain health aspects. Also, proactive measures must be implemented to manage health disaster responses stemming from tropical cyclones. In the area of agriculture and food security, disruption of irrigation patterns by CE stands as a critical concern, potentially reducing food crop yields and intensifying food insecurity grappling with malnourishment and poverty for the farmers.

Active support for inter-sectoral and international action should be emphasized through effective advocacy at national and international forums. Prioritizing the enhancement of climate resilience in healthcare facilities, including setting ambitious targets, ensuring access to essential resources, and fortifying health infrastructure against climate shocks. Finally, the study highlighted the pivotal role played by WHO and UNDP in Fiji, in the area of public health amid climate disaster. Through continuous joint projects, significant achievements will be made in enhancing the realization of recommended response mechanisms detailed in this review.

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