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INFORMING GLOBAL HEALTH DIPLOMACY: EXAMINING HEALTH AND PEACE THROUGH THE LENS OF THE GLOBAL BURDEN OF DISEASE

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Abstract: *In this study, we aimed to examine the interconnectedness of health and peace, recognizing its significance within global health diplomacy, international relations, and human rights. For that purpose, we used the results from previous and ongoing Global Burden of Disease studies, which represent a comprehensive systematic appraisal of health problems and risks affecting populations worldwide. This paper could use its methodological underpinnings to analyze the impact of war, conflict, and terrorism on mortality and overall human health. In 2000, war and conflict were responsible for an estimated 310,000 deaths globally, compared to 2019, when this number decreased to 69,000. Recent findings reinforced the association between war, conflict, and increased all-cause mortality. Interpersonal violence also significantly contributed to human health loss resulting from disrupted peace. In Europe, disability-adjusted life years due to injury – including those caused by conflict – declined between 2000 and 2019. As we prioritize global health, peace-building initiatives, and global health diplomacy, big data will increasingly play a substantial role in accurately predicting and describing the health effects related to conflicts.*

Keywords: *Diplomacy; Peace; Health; Disease; Conflict; Terrorism; Mortality*

INTRODUCTION

The interrelationship between health and peace is fundamental to the rights of every human being. Achieving peace is a crucial determinant of good health; conversely, a healthy population is essential for attaining and sustaining peace (Hyder et al. 2022, 1). However, the nature of this dynamic relationship is complex and multifaceted, with significant challenges in defining its various pathways and measuring the impact of wars and conflict on health-related outcomes (Hyder et al. 2022, 7).

Both health and peace encompass a myriad of factors. As postulated by the World Health Organization (WHO), health can be defined as "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity" (WHO 2022). Similarly, peace is more than the mere absence of war; it includes the absence of violence, the existence of harmony, justice, and equity, as well as the ability to manage emerging conflicts without using force (Galtung 1967, 6; Anderson 2004, 102). More specifically, global health diplomacy - which we can describe as practices by which governments and non-state actors attempt to coordinate

and orchestrate global policy solutions to improve global health (Ruckert et al. 2016, 1) - is actively devoted to the complex issue of the interrelationship between peace and health.

Nonetheless, we are witnessing how numerous factors, including conflicts, violence, terrorism, wars, social injustice, and climate change, threaten global peace. In the latter half of the 20th century, superpower rivalries resulted in open warfare, proxy wars, and cold wars, leading to global violent conflicts (Schüller-Springorum 2008, 568). Furthermore, conflicts arising from geopolitical, religious, ethnic, and economic issues are resolved either through nonviolent, peaceful means or through violence and war. Using the latter for conflict resolution and peace-building is unjustified, as violence is antithetical to peace (Horton 2001, 1472). Likewise, violence, terrorism, and civil wars pose significant threats to global health, resulting in economic and infrastructural damage, increased mortality or morbidity, and detrimental effects on physical and psychological health (Abuelaish et al. 2020, 1595-6).

However, the question remains of how to measure these grave global health consequences and their implications. The analyses of the connections between health diplomacy, health, and peace come with difficulties in defining this intricate association and the various factors that contribute to it. Unfortunately, there is still a visible lack of comprehensive research on the overall connection, without agreed measures or pathways that can be widely recognized in discussions of health and peace. There is also an issue with defining certain terms; for example, the intricacy of precisely defining the term "aggression" becomes apparent when examining the complexity of events and legal activities throughout historical periods (Bandov and Ogorec 2020, 65). Therefore, more academic work is required to address this issue. In the interim, many results stemming from the global burden of disease (GBD) studies and data and its overall methodological framework may be used to cast some light on this salient question.

METHODOLOGICAL ASPECTS OF ASSESSING HEALTH IMPACTS DUE TO WARS AND CONFLICTS

Global Burden of Disease as a Blueprint

The Global Burden of Disease (GBD) study is one of the largest health-related research projects, aiming to provide a systematic and comprehensive appraisal of the health problems and risks affecting populations worldwide (Murray 2022, 2019). It uses a combination of data sources (which includes censuses, surveys, vital registration systems, and disease surveillance programs) to estimate the mortality linked to an extensive range of health conditions and risk factors and measures of their frequency (Murray 2022, 2020). These health conditions include communicable diseases, non-communicable diseases, injuries, and mental health disorders. Regularly published iterations of the GBD study have impacted global health policy and research by providing a comprehensive, evidence-based understanding of the most prominent causes of disease and injuries worldwide (Murray 2022, 2019). This research enterprise has also been instrumental in identifying priorities for health interventions, allocating funds/resources, and monitoring progress towards achieving targets such as the Sustainable Development Goals.

Naturally, accurate assessment of global health loss necessitates stringent categorization and interpretations. Following the GBD definitions, armed violence involving states,

governments, and societies resulting in destruction, loss of life, and the deployment of military forces is considered a conflict (IHME 2022). On the other hand, terrorism is the use or threatened use of force or violence against individuals to achieve political, religious, or ideological goals and is typically carried out in violation of the law (IHME 2022). It is worth noting that the GBD study considers both conflict and terrorism as types of "interpersonal violence" that are an important contributor to the global burden of disease, injuries, and premature death (IHME 2022). Among many diseases and conditions, the study seeks to offer quantitative insights into the health impact of the forms mentioned above of violence to better inform policy-linked interventions to reduce their negative effects on population health (Haagsma et al. 2022, 142).

Primary Metrics of the Global Burden of Disease Approach

The population-related effects of war result from battle deaths and the indirect consequences of war that may persist long after the conflict ends. The indirect effects on the death toll could be calculated by subtracting deaths that would have occurred during a certain period if the war was not happening from the actual number of deaths that occurred during that period (Murray 2002, 346). Typically, these indirect effects are positive, indicating an increase in mortality for several years following the start of the war. However, there are cases where these effects can be negative, such as when a war leads to the removal of a regime whose policies cause high mortality (Murray 2022, 346).

Alongside mortality, a disability-adjusted life year (DALY) is a widely accepted metric for evaluating population health outcomes, coalescing years of life lost as a result of premature mortality (YLL) and years that are lived with disability (YLD) (Murray and Acharya 1997, 703). Age-standardized DALY rates can be employed to compare the impact of various causes of diseases and injuries over time and across various countries. Comparisons of the population health impact of different causes of injury are important to identify significant causes of injury and trends in injury DALYs over time, which can inform priority setting for national injury prevention and health service planning (Haagsma et al. 2022, 142). Furthermore, the comparison of injury DALY rates can help to identify health inequality gaps between countries, which are unjustifiable differences in health status between different sub-groups of the population that may become especially evident in times of conflict (Haagsma et al. 2022, 142).

In other words, injuries are often not equally distributed within societies, resulting in health inequalities measured by differences in injury incidence and mortality rates across populations (Sengoelge et al. 2019, 653). The DALY metric is critical in measuring health inequalities in conflict-related and other injuries across countries and within populations and has its place in comparing health effects on populations that stem from wars and conflict (Haagsma et al. 2022, 142). In addition, the socio-demographic index (SDI) is used as a composite measure developed by the GBD study that combines three indicators of social and economic development: education, fertility, and income (IHME 2022). The SDI is used to rank countries and regions on a scale from 0 to 1 based on their level of social and economic development; more specifically, countries with high education levels, low fertility rates, and high income are assigned

a higher score, while those with low education levels, high fertility rates, and low income are assigned a lower score.

Still, one major challenge in assessing the health effects of conflict is that information systems used in healthcare, most notably those that record the cause and event of death, frequently stop functioning in conflict-affected populations (Murray 2002, 346). Furthermore, most conflicts are highly politicized, which can result in intentionally misrepresented information being made available (Murray 2002, 346). Given these difficulties in measuring the impact of conflict, it is vital to consider how to identify deaths or injuries caused by it.

Estimating Direct and Indirect Mortality

When civil registration systems are non-existent, identifying conflict-related deaths can be achieved by analyzing census data pre- and post-conflict or through indirect measures like asking questions about the survival of family members in surveys (Hill and Trussel 1977, 313; Spiegel and Salama 2000, 2204). Most analyses on conflict-related deaths heavily rely on press reports, eyewitness accounts, and official combatant announcements, but these estimates can be challenging to confirm (Murray 2002, 346). Compounding this issue is a cornucopia of definitions of conflict that different databases employ (Murray 2002, 346).

Computer programs can now read and code numerous media reports accurately, sometimes better than human individuals, which is a huge step forward considering their sheer volume for reading and coding (King and Lowe 2003, 617). Nonetheless, due to the significant constraints of estimates relying on the qualitative and thematic approach to analyzing media reports, the usage of conservative estimates for some major conflicts has been observed in the literature.

In order to evaluate the indirect impacts of conflict, it is necessary to conduct a specific counterfactual analysis that measures the health outcomes compared to the hypothetical situation without conflict (Murray 2002, 347). Another possible method for estimating these outcomes is analyzing vital registration via a "time series" approach (Murray 2002, 347). However, notwithstanding the successes of certain estimation endeavors based on such recommendations, additional and very comprehensive studies are needed before we can conclude how sizeable conflict impacts mortality. Obtaining more consistent data is crucial for accurately measuring the health consequences of war and conflict. A promising new strategy involves incorporating questions about the deaths of household members and siblings due to conflict into household health surveys. This approach has proven successful in quantifying maternal mortality (Stanton 2000, 111) and could be translated for analyzing health-related effects stemming from war and conflict.

EXPLORING THE EVIDENCE BASE

Violence, War, Terrorism, and Global Burden of Disease

In a study published in the "British Medical Journal", Murray (2002) showed that, in 2000, conflict was responsible for an estimated 310,000 deaths worldwide, with more than 50% occurring in sub-Saharan Africa (Murray 2002, 347). South East Asia accounted for approximately a fifth of global conflict deaths, while the remaining deaths were mainly distributed in the Balkans, Middle East, and Central Asia (Murray 2002, 347). Direct conflict mortality comprised only 0.5% of all mortality, but a particularly significant finding was that many children and adolescents have died due to conflicts (Murray 2002, 348). Moreover, although men aged 15-44 are at the greatest risk of excess mortality due to conflict, almost a quarter of war-related deaths were among women (Murray 2002, 348). This means not only soldiers but also civilians are direct casualties of conflict; if the risk for female and male civilians is equal, estimates suggest that every direct death in the military is coupled with at least one civilian death.

In 2012, Kerridge, Khan, and Sapkota published a comprehensive analysis in the journal "Medicine, Conflict and Survival" to examine how deaths caused by war, terrorism, and one-sided violence from 1994 to 2000 were related to all-cause disability-adjusted life years (DALYs), as well as specific diseases in 2002 (both communicable and non-communicable) (Kerridge et al. 2012, 199). By controlling for various economic factors that influence public health, these researchers found that deaths due to war, terrorism, and violence had a positive association with all-cause DALYs, as well as DALYs specific for infectious and non-communicable diseases for most age and sex groups in the population. Generally, a one percent increase in deaths from such events from 1994 to 2000 has been associated with a 0.16% increase in all-cause DALYs lost in 2002 for the world population (Kerridge et al. 2012, 199). Little difference was observed in the strength of the relationship between women and men or between infectious and non-communicable diseases (Kerridge et al. 2012, 199). These findings had important implications for post-conflict recovery assessment, highlighting the significant health costs of war and supporting the need for interventions that address both groups of diseases to promote peace.

In addition, conflict conditions also give rise to other diseases and hazardous behaviors. In 2013, a paper from the same group (i.e., Kerridge et al.) showed how deaths resulting from war, terrorism, and one-sided violence have a significant relationship with DALYs that stem from diarrheal diseases, trachoma, and specific parasitic infections (Kerridge et al. 2013, 269). More specifically, the study found that, in most of the population groups categorized by sex and age, a one percent increase in deaths resulting from terrorism and related violence was linked to a 0.16% rise in DALYs lost to the abovementioned group of diseases after taking into account the baseline levels of improved water/sanitation, but also a plethora of economic factors. The highest associations were observed among children aged 0 to 4 (Kerridge et al. 2013, 269). These findings indicate that efforts to control many bacterial, viral, and parasitic diseases in conflict-affected populations should prioritize children disproportionately affected by such illnesses. Similar findings were demonstrated for drug and alcohol use (Kerridge et al. 2014, 61). Hence, given the evidence that terrorism and violence may have longer-term effects on DALYs

stemming from communicable diseases and substance use, control strategies should focus on improving health systems infrastructure in conflict-affected areas beyond immediate responses to reducing their incidence and severity.

According to the results in the most recent iteration of the GBD study published in "The Lancet" (Vos et al. 2020, 1204), conflict and terrorism were responsible for a total of 63,000 deaths (95% uncertainty interval 57,200-69,300) in 2019. The majority of these deaths, 47,500 (or 75%), occurred in locations with low socio-demographic index, whereas only 34 (or 0.05%) occurred in locations with high socio-demographic index (Vos et al. 2020, 1204). To ensure the accuracy of the results, the study team improved the location mapping process by implementing a hierarchy that prioritized the most reliable method for mapping raw data to GBD locations. This involved using GPS coordinates, string matching, and feedback from collaborators (IHME 2022). The team also split events spanning multiple years using rates informed by how many months were covered yearly. Lastly, many collaborators worldwide provided updates to key fatal discontinuity events, improving the estimates' accuracy (IHME 2022).

New Findings Reinforce Increased All-Cause Mortality Due to War and Conflict

In 2020, Jawad and co-authors aimed to estimate indirect mortality impacts stemming from armed conflict in civilian populations by analyzing data from 193 countries from 1990 to 2017 (Jawad et al. 2020, 266). The study revealed that armed conflict, regardless of the measurement method, was associated with increased all-cause mortality. The impact on civilian mortality was determined by the intensity of the conflict rather than the actors involved. Wars, the most severe form of armed conflict, were associated with an increase in age-standardized mortality of civilians due to all causes by an average of 81.5 per 100,000 individuals, resulting in about 29.4 million deaths between 1990 and 2017 (Jawad et al. 2020, 266). Wars were also responsible for increased deaths due to communicable, nutritional, maternal, and neonatal diseases (21.0 million deaths), non-communicable or non-infectious diseases (6.0 million deaths), and injuries (2.4 million deaths). Children under five had disproportionately larger effect estimates regardless of the cause of death.

These numbers are indeed staggering, and Jawad and colleagues emphasize that they are further compounded by difficulties in maintaining sanitation, avoiding overcrowded living conditions, and providing immunizations following armed conflict and displacement, which led to an increase in deaths from respiratory, enteric, and neglected tropical diseases (Jawad et al. 2020, 266). Increased deaths from maternal and neonatal disorders were also observed, possibly due to reduced access to skilled birth attendants and health centers for delivery. Likewise, this study identified non-communicable diseases as a significant health concern in modern-day protracted conflicts, especially in conflict-affected countries with a substantial baseline burden. This has to be considered when assessing the direct and indirect effects of wars and conflicts.

Interpersonal Violence *vs.* Peace: Recent Data from the Americas

Americas region is considered the most homicide-prone area in the world according to the GBD data. This is not war or conflict *per se*, but the toll is significant, as nearly all of the top

50 cities that have the highest homicide rates are situated in the Americas - with four of them located in the United States (PAHO 2022). Firearms are the primary weapon used in homicides in this specific region, and the highest proportion of homicides is committed with firearms in the Americas compared to other parts of the globe. This region is also home to eight of the ten most violent countries, with the United States leading in homicide rates among industrialized nations (PAHO 2022). This means that not only specific wars, conflicts, and terrorist acts should be considered when discussing the effects of disrupted peace in the context of interpersonal violence.

In other words, quantitatively measuring the lack of peace is cumbersome, but proxy circumstances can provide insights into its impact. Interpersonal violence is leading among causes of disability and mortality in the Americas, resulting in over 260,000 deaths in 2019 due to intentional physical force, including using firearms and deliberate self-harm (Hyder et al. 2022, 5). In the rankings, interpersonal violence was recognized as the third leading cause of DALYs and the second leading cause of YLLs due to premature mortality in the Americas (Hyder et al. 2022, 5). This is also an important vantage point within this context, so it must be emphasized.

While a decrease in rates of interpersonal violence (but also self-harm) has been observed in the past five years, mortality and DALY rates per 100,000 individuals in 2019 remain elevated compared to other regions of the world (Hyder et al. 2022, 5). In particular, the Latin American region within the Americas is characterized by the highest-burden rates for these specific violence types (PAHO 2022). These statistics highlight the continuing heavy toll of acute/chronic violence, which is indicative of the absence of peace that continues to persist in the region.

A European Primer: Falling Rates Across the Continent

According to a comprehensive study by Haagsma and colleagues (2022, 142), the incidence of injuries due to all causes in all European countries in 2019 was 109.7 million, while 458,669 people died as a result. The mortality rate per 100,000, specifically for conflict and terrorism, was 0.12 (95% uncertainty interval 0.11-0.13) in Eastern Europe, while the incidence rate per 100,000 was 19.4 (15.7-23.3) and 0.4 (0.3-0.5) for Eastern and Western Europe, respectively. Compared to previous years, in Eastern Europe, declines were observed for DALY rates considering all categories of injury; however, the largest reduction was observed in the conflict above and terrorism category (i.e., a 90% reduction) (Haagsma et al. 2022, 142). Moreover, Central Europe also had the largest decrease in DALY rates for injury caused by conflict and terrorism (a 76% reduction), while Western Europe decreased by 54%.

Still, notwithstanding the significant reduction in DALY rates due to conflict and terrorism, the burden of terrorism remained high in Croatia, Bosnia and Herzegovina, and Serbia over the 20-year study period encompassed in this study (Haagsma et al. 2022, 142). This may be explained by the profound impact of the Croatian War of Independence and the Bosnian War of the early 1990s on health and disabilities, resulting in many Balkan residents experiencing the long-term consequences of injury almost 30 years later. Of course, considering the ongoing war

in Ukraine, the picture in the WHO European Region will inevitably change and become much more dire in future iterations of the GBD analysis.

TOWARDS ACCURATE FORECASTING OF CONFLICT-RELATED HEALTH IMPACTS

Evaluating the health impacts of conflict can furnish an essential evidence base for risk assessments, which is indispensable for preparedness and policy planning. While political scientists have made strides in forecasting both international and intranational conflicts (Russet 2005, 346), as well as state failure (King and Zeng 2001, 623), their studies are not only infrequently pursued but also based on outdated data sources and not amenable to reliable measurements. To facilitate better measurement, it is important to develop updated risk forecasts based on ongoing events, which can be automated through news stories or eyewitness accounts (Murray 2002, 348). Ensuing validated forecasts will help the public health community carry out its duty of assessing risk, which in turn could prevent the health consequences of conflict (Murray 2002, 348).

In a nutshell, more precise valuations of the likelihood of conflict and the possible magnitude of its effects would allow for the prevention of its health consequences. Political scientists have analyzed the root causes of war for a long time, including the appeasing effects of democracies within the international system (Murray 2002, 348). Collaborating with public health researchers could establish a stronger foundation for preventing conflicts. Unfortunately, these two fields are not well-connected. Therefore, creating a more comprehensive approach by combining their research output would benefit both sides and, in turn, bring greater focus to the international community's efforts to safeguard individuals and populations from the effects of conflict.

GLOBAL HEALTH DIPLOMACY AND PEACE-BUILDING INITIATIVES WITH A FOCUS ON GLOBAL HEALTH

Taking an all-inclusive approach in the analysis is a way to understand how health and peace promotion share similar goals and methods and are inherently interconnected in their aim to attain cooperation and social harmony. The methods of global health diplomacy, implemented by states or non-state actors, contribute the most to better global health and promote peace. One example is medical professionals from organizations such as Médecins sans Frontiéres or the International Committee of the Red Cross, as they impartially treat affected individuals and victims from different sides of a conflict sans prejudgments or prejudice (Abuelaish et al. 2020, 1590). Initiatives aiming to improve a population's health with concomitant contributions to peace and security are often called "peace-health initiatives" (MacQueen 2000, 293). Moreover, shifting toward peace in war zones generally improves the health and healthcare of the affected population (Hyder et al. 2022, 6).

Public health programs and policies can aid the foundation and sustainability of peace efforts. One example is the Red Cross, which supported the development of national societies in different countries of the world to coordinate health and social interventions in peacetime and to establish protocols for treating victims and prisoners in times of armed conflict based on

humanitarian principles (Di Liscia et al. 2019, 1). In addition, a study of the influence of the Colombian Peace Agreement on social determinants of health over ten years found that there is a strong link between the peace process and improvements in health, educational, economic, and social inequalities/inequities by using documentary data (Mondragón-Sánchez et al. 2021, 1). Consequently, these approaches can also generate valuable data in further assessing this problem.

Arya proposed a model called "peace through health", based on a prevention model in public health sciences where war is treated like a disease and introduced health interventions act as preventive measures (Arya 2004, 242). This model recognizes that medical professionals have the potential to act for peace based on their character, activity, and knowledge. Character refers to the personality traits, such as solidarity, altruism, dissent, personification, and diplomacy, which inform health services delivery in conflict situations. Activity refers to a professional medical stance, which emphasizes the importance of recognizing that war readiness is not only a political, social, or economic issue but also a medical one. Lastly, knowledge involves not only knowledge but also the training, expertise, and skills of medical professionals needed to work in post-traumatic situations, apply mediation principles, and develop an improved understanding of conflict and peace concepts (Arya 2004, 242).

CONCLUSION

The interrelationship between health and peace is fundamental for the sustainable development of global society and for protecting the human rights of every human being. When society lives in a period of peace, citizens live in a significantly healthier environment; at the same time, healthy populations are key to achieving sustainable peace in any society. Consequently, global health diplomacy is extremely important in promoting peace and ensuring health for all.

In order to achieve global peace and the good health of citizens in any country, international cooperation is necessary, and the instruments of global health diplomacy have the highest success rate in such instances. State and non-state actors are active in global health diplomacy, and the role of both actors is crucial for achieving the final goals. In addition, the role of international governmental organizations (such as the UN and WHO, which belong to state actors) is also crucial, as their members are primarily states and state bodies. However, non-state actors such as Médecins sans Frontiéres and the International Committee of the Red Cross are paramount in promoting health and advocating for peace. They cover areas of activity in which state actors are not sufficiently active. Neither peace nor good health can often be fully realized without international cooperation. Examples range from pandemics, natural disasters, and climate change to interstate, regional, and global conflicts.

At the same time, the current discourse on violence reduction within the context of interventions for promoting peace is largely based on the body of evidence from studies conducted in high-income countries and primarily on explicit measures. These measures typically consist of preventive actions, such as identifying risk and protective factors, law-enforcement strategies, such as punishment and incarceration, and various community-based approaches. However, additional evidence on effective violence reduction in low- and middle-

income countries, where we saw from the available studies that the burden is indeed significant, is indispensable for informing and developing regional policies.

It can be stated that the connection between peace and health is intricate, multifaceted, and laden with challenges concerning definitions, outcomes, and pertaining measurements. This article tried to examine this connection within the available evidence of the GBD, highlighting the need for interdisciplinary research and empirical investigation to tackle these pertinent challenges. It can directly improve human welfare by enhancing the accuracy of war-related health impacts and reducing many uncertainties. The concept of "human security" is, and should be unequivocally focused on, ensuring appropriate guarantees for the future, and the role of big data will become ever more prominent. For improved quality of life of citizens and sustainable development of society, a genuine commitment to citizens' good health and promoting and advocating peace with the coordination mechanism of global health diplomacy is necessary.

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