Volume 63 Number 1 2025

NATIONAL SOCIAL SCIENCE JOURNAL

Official Journal of the National Social Science Association

Name of Publication: **NATIONAL SOCIAL SCIENCE JOURNAL**
Issue: Volume 63 Number 1, 2025

Office of Publication: Austin Peay State University
College of Education
Clarksville, TN 37040

Online journals: https://nssascholars.org/publications/

E-mail address: brusterb@apsu.edu

The National Social Science Technology Journal is abstracted in Cabell's Directory, Eric Clearinghouse, EBSCO, Economic Abstracts, Historical Abstracts, Index to Periodical Articles, Social Science Source, Social Science Index, Sociological Abstracts; the University Reference System.

We wish to thank all authors for licensing the articles. And we want to thank all those who reviewed these articles for publication.

National Social Science Association Technology Journal

Volume 63 Issue: #1

Table of Contents

Sudan, Ethiopia, and Egypt: The Nile River Conflict in Perpetuity and the Prospects for Resolution

by

Walle Engedayehu, Ph.D., Prairie View A&M University

This paper explores both the trajectory and probable outcome of the dispute over building the Blue Nile Grand Ethiopian Renaissance Dam (GERD) in Ethiopia. An ongoing rancor between Ethiopia, on one hand, and Sudan and Egypt, on the other, has been festering for more than a decade because of the GERD's construction as a hydroelectric project. In the meantime, the threats of war between Ethiopia and Egypt have loomed throughout the acrimony, in addition to Egypt's diplomatic pressure on Ethiopia to halt the construction. The results of both actions have ushered in a period of uncertainty and an ominous alarm affecting interstate relations in that subregion of Africa. Using both the qualitative method of analysis and the foregoing sequence of events, this study, therefore, posits that the GERD's completion is a foregone conclusion----the construction will be finalized without any premeditated action that would threaten its security and viability despite Egypt's occasional threats against it. The paper further conjectures that Egypt's continuing intimidation of Ethiopia, insisting that a binding agreement on the GERD must be reached first prior to the completion of the mega dam, is a strategic bid by the North African Arab country to thwart the further expansion of dam construction by Ethiopia on the other tributaries of the Blue Nile. Hence, the fundamental goal of Egypt now is to ensure and protect its water security for the future by any means possible.

Key Words: Ethiopia, Egypt, Sudan, Blue Nile, Nile River Riparian States, the Nile River Crisis

This paper explores both the trajectory and probable outcome of the dispute over building the Blue Nile Grand Ethiopian Renaissance Dam (GERD) in Ethiopia. An ongoing rancor between Ethiopia, on one hand, and the Sudan and Egypt, on the other, has been festering for more than a decade because of the GERD's construction as a hydroelectric project. In the meantime, the threats of war, particularly between Ethiopia and Egypt, have loomed throughout the acrimony (Maher, 2013, p. 2), in addition to Egypt's diplomatic pressure on Ethiopia to halt the construction. The results of both actions have ushered in a period of uncertainty and an ominous alarm affecting interstate relations in that subregion of Africa.

As downstream riparian states rely on the Nile River as a means for irrigation, drinking water, and transportation and trade routes, Sudan and Egypt see the GERD as an existential threat and, thus, a water security concern. For its part, upstream Ethiopia regards the dam as a ground-breaking national hydroelectric project capable of generating energy for domestic consumption, as well as earning billions in foreign currencies through electricity sales to the neighboring states within the region and beyond. Amid this wrangle has come about a near completion of the mega dam that could become a game changer for Ethiopia's energy export potential and, more importantly, for jumpstarting the engine of development at many levels in the resources-rich Horn of Africa country.

Upon completion, the dam will not only be the largest of its kind in Africa and one of the twelve largest in the world but also will store 74 billion cubic meters of water, with a projected capacity of 6,500 megawatts of electricity. However, the speed at which the mega dam would be filled and the volume of water that would be released downstream, especially during drought seasons, including technical issues surrounding the dam construction itself, have been the root causes of the conflict (Al Jazeera, 2022, p.1.)

Based on the foregoing sequence of events, this study, therefore, posits that the GERD's completion is a foregone conclusion----the construction will be finalized without any premeditated action that would threaten its security and viability despite Egypt's occasional threats against it. The paper further conjectures that Egypt's continuing intimidation of Ethiopia, insisting that a binding agreement on the GERD must be reached first prior to the completion of the mega dam, is a strategic bid by the North African Arab country to thwart the further expansion of dam construction by

Ethiopia on the other tributaries of the Blue Nile. Hence, the fundamental goal of Egypt now is to ensure and protect its water security for the future by any means possible.

The paper is organized under six subheadings. The introduction section is followed by tracking the beginnings of the conflict to provide some historical context to the topic. In the paper's third section, the GERD's utility to Ethiopia's national development priorities is deciphered while pointing out the key reasons why the project was launched with a great deal of fanfare, construction costs, nationalist fervor of unprecedented interest, and optimism. This section is followed by examining the heart of the dispute over the dam, providing a thorough and objective analysis of the issues that concern both Egypt and Sudan, with the GERD as downstream beneficiaries of the Nile. It is here in the fourth section where the arguments used by Egypt and Sudan to justify their opposition to the dam are thoroughly hashed out. The fifth section attempts to offer scenarios that may force the two sides to negotiate in good faith and reach an agreement after more than a decade of bickering---practically with no resolution of any kind satisfactory to all the parties concerned. The last section of the paper recaps the salient points in a summary and makes some recommendations.

The Genesis of the Conflict

The Nile River, Africa's longest, streams from two major river sources, namely the Blue Nile and the White Nile, fusing in Khartoum, Sudan, and then becoming the Nile River that descends to Egypt and empties into the Mediterranean Sea. The root causes of the Nile River conflict can be traced to the colonial era when the United Kingdom laid claim to both Sudan and Egypt in the latter part of the 19th century. In 882, Britain seized Egypt and maintained control until 1956. In effect, Sudan was under British rule for over 60 years, from 1899 to 1956. During the occupation, Britain relied on Egyptian cotton for its textile industries, so it devised a plan to use the Nile

for irrigation purposes while setting up the normalized flow of the water by building dams and lakes in the two downstream countries. It was also during that period a treaty spearheaded by Britain gave Egypt and Sudan the rights of ownership to all the Nile waters. The 1929 Anglo-Egyptian Treaty established Nile water rights for Egypt. This was further reinforced by a 1959 agreement between Egypt and Sudan, which created provisions that allocated water between the two nations. The two agreements made Egypt the unilateral arbiter over the use of the Nile waters. This meant that, by imposing colonial-era decrees unilaterally, Britain technically granted Egypt veto powers over any projects by upstream countries that would affect its share of the waters. Neither agreement made any allowance for the water needs of the other riparian states that were not parties to the deal, including Ethiopia, whose Blue Nile contributes much of the river waters (Mutahi, 2020, p. 2).

Figure 1

Map Showing the 11 Riparian States of the Nile

More specifically, the following provided the basis for the veto powers that Egypt secured from the British unilateral action benefiting Egypt and Sudan:

> After estimating the average annual flow of the Nile River as measured at Aswan to be 84 billion cubic meters, the two treaties granted 66% of Nile waters to Egypt, 22% to Sudan, and 12% to account for seepage and evaporation. These allocations exhausted the Nile's average annual flow of water. Egypt was also granted veto power over all construction projects on the Nile and its tributaries (Mbaku, 2023, p. 2).

Indeed, both the 1929 and 1959 treaties were adopted in willful disregard to the vital interests of the eleven upstream countries, which include Burundi, Tanzania, Rwanda, the Democratic Republic of the Congo, Kenya, Uganda, Sudan, Egypt, Ethiopia, Eretria, and South Sudan. Furthermore, despite being the only independent African country that successfully fended off European colonial rule, Ethiopia was never considered a party to either treaty. Paradoxically, this occurred even though “Ethiopia, whose highlands provide more than 85% of the water that flows into the Nile, has long argued that it has the right under international law to manage resources within its own

borders for its national development". So, unbound by those treaties, the Horn of Africa country went on with the building of the GERD in March 2011 in defiance of Egypt's resolve that the former should have a binding agreement signed first with both Egypt and Sudan on the operation and filling of the dam. This has since engendered a never-ending diplomatic and regional squabble between the two sides.

In its broader context, however, the Nile issue permeates transnational boundaries far beyond the main antagonists---Ethiopia, Sudan, and Egypt. As such, the founding of the Nile River Basin Initiative (NBI) in 1999 was born out of this forlorn reality. Fundamentally, the NBI is an international partnership among Nile River riparian countries. It was formed initially by African states consisting of Egypt, Ethiopia, the Democratic Republic of Congo, Kenya, Rwanda, Sudan, Tanzania, and Uganda; Eritrea, which has an observer status; and South Sudan have since joined the partnership as full members. The NBI was established to "…increase cooperation, share the river's socioeconomic benefits, and promote regional peace among Nile River riparian states." Its further goal was "…to achieve sustainable socioeconomic development through the equitable utilization of, and benefit from, the common Nile Basin water resources." The Organization for (World Peace, 2023, p.1)

The idea for the NBI was initially born out of the need to fix the unfairness embedded in the governance of Nile water resources that deliberately imposed compliance to treaties concluded during the colonial era without the involvement of any of the upstream riparian states. Given these circumstances, it became necessary to reevaluate the governance of the Nile River Basin, particularly the sharing of the Nile waters under the colonially imposed agreements. Reflecting further on this theme, the Research Triangle Institute (RTI) states that "…Claims to the Nile, and the basis for determining claims to the river and preventing or resolving conflict on an

international level becomes highly uncertain." The legitimacy of both treaties was even found to be antithetical to "Article 34 of the Vienna Convention on the Law of Treaties, which states as a rule that a treaty does not create either obligations or rights for a third State without its consent," according to RTI. **(**Research Triangle Institute, 2021, p. 1). Even so, a series of bilateral and multi-state agreements were signed by its member states following the NBI's launch, some of which were non-binding and others obligatory. For example,

> In November 2008, NBI member states signed the Khartoum Declaration, which was a non-binding agreement that declared the support for the harmonization of environmental management, data exchange, ecological impact assessment, and a coordinating role in climate change issues to establish a "cooperative framework agreement" to replace earlier bilateral treaties. In 2007, seven of the NBI's member states signed the declaration, excluding Egypt and Sudan, who requested that member states issue a "presidential declaration to launch the River Nile Basin Commission as negotiations [on the CFA] continue (International Water Governance**,** 2008, p.1)

Egypt's rejection of the Khartoum Declaration primarily stemmed from its uncompromising stance demanding compliance with the two colonial-era agreements discussed earlier. As tension, pitting Sudan and Egypt against Ethiopia continued over water rights, the NBI was expected to play a moderating role in all disputes among the riparian states but has been lifeless. In 2010, upstream states, such as Ethiopia, Kenya, Uganda, Rwanda, and Tanzania, approved "… a Cooperative Framework Agreement to seek more water from the Nile River— a move strongly opposed by Egypt and Sudan." (Knobelsdorf, 2006, pp. 1-5). The framework would have effectively provided for the protection and conservation of the basin and its ecosystem; however, a provision in it, requiring "prior informed consent" by members before building new dams, became a sticking point, thereby creating the ongoing discord between the upstream and downstream countries. Reports at the time revealed that envoys of the upstream countries involved in negotiations retorted that they "…were tired of first

getting permission from Egypt before using river Nile water for any development project like irrigation, as required by a treaty signed during the colonial era between Egypt and Britain in 1929." (Magga, 2010, 1)

While Egypt and Sudan remain in the periphery of the NBI to this day because of their continued advocacy of the colonial-era treaties, the dispute since 2010 has shifted fully to the Ethio-Egypt/Sudan domain revolving around the GERD. As Egypt, supported by Sudan, continued its opposition to the construction of the dam and to the danger that it claims poses to the two downstream riparian states, efforts to gauge the risks have led to several impact studies during the dispute. One such study was conducted by the Research Triangle Institute (RTI) in 2008, which uncovered that

> …optimized operation of the upstream dams reduced downstream peak flood values and augmented low flows in the river. Additional benefits included increased power generation and water supply for irrigation and improved flood control (Research Triangle Institute, 2021, 2)

It is against this backdrop that Ethiopia then took the huge task of building a dam at a cost of more than $5 billion, self-financed, most of which came from bonds purchased by Ethiopians at home and throughout the diaspora and contributions made by Ethiopians through payroll pledges. While a huge project like the GERD is often impossible without loans from external funding institutions, such as the International Monetary Fund (IMF), World Bank, International Bank for Reconstruction and Development (IBRD), and African Development Bank (ADB), just to name a few, Ethiopia's attempts to get external financing for the project proved difficult because of pressure exerted by Egypt on such lending institutions against it (Abtew & Dessu, 2019).

However, the exception to not having international support for the construction of the dam came from China, which covered a portion of the financing, as the quotation below makes so evident:

> Despite the massive expense of the project, Ethiopia has found a willing supporter: China. Granting $652 million in loans to Ethiopia in 2017 alone, Chinese companies have also undertaken some of the construction work, with the Chinese Gezhouba Group and Voith Hydro Shanghai receiving contracts to speed development. China has also played a role in developing other infrastructure related to the project, such as providing a 2013 loan of $1.2 billion USD 2013 to build power transmission lines connecting the dam with nearby towns and cities (Piliero, 2021, p. 2).

Nonetheless, Ethiopia's determination to launch the project, mostly with self-financing, simply galvanized the entire population of the Horn of Africa country to the extent of causing a growing, upbeat nationalism and emotional enchantment that never was seen in that country in erstwhile years as though making a statement to the rest of the world that, despite its image of a poverty-stricken and foreign-aid-dependent country, Ethiopians seemed eager to see the project coming through at any cost. Referring to the earlier years of the dam's construction, authors Abtew and Dessu noted the extent to which the funding issue affected Ethiopia, with Egypt standing as a hurdle, in these terms:

> The lack of international finance for projects on the Blue Nile River has long been attributed to Egypt's persistent campaign to maintain presumed hegemony on the Nile water share. Ethiopia is forced to finance the GERD with crowd funding through internal fund raising in the form of selling bond and persuading employees to contribute a portion of their incomes. The Chinese government is providing a significant amount of international finance to the hydropower infrastructure. The successful completion of GERD without explicit support from Western financial institutions will have a significant impact on the perception and awareness of Nile water development. The parallels between the planning, construction, and financing of the High Aswan Dam and GERD are stark reminders of the critical role of the international community in promoting cooperation and avoiding unintended and lasting ripples on the socioeconomic and political landscape of the region (Abtew & Dessu, 2019, p. 2).

As the three riparian states still searched for common ground on settling the Nile dispute, they signed an agreement in March 2015, dubbed *"Agreement on Declaration of Principles between the Arab Republic of Egypt, the Federal Democratic Republic of Ethiopia, and the Republic of the Sudan on the Grand Ethiopian*

Renaissance Dam Project (GERDP)." The agreement embraced ten principles aimed at ending the dispute over the Nile water sharing arrangements, including these clauses: Principles of Cooperation; Principle of Development, Regional Integration and Sustainability; Principle Not to Cause Significant Harm; Principle of Equitable and Reasonable Utilization; Principle to cooperate on the First Filling and Operation of the Dam; Principle of Confidence Building; Principle of Exchange of Information and Data; Principle of Dam Safety; Principle of Sovereignty and Territorial Integrity; and Principle of Peaceful Settlement of Disputes. Nonetheless, these principles have never made the resolution of the Nile crisis closer as was hoped for (Horn Affairs, 2015, p. 2)

Ethiopia's Rationale for Launching the GERD

At the core of Ethiopia's motive for the construction of the GERD are the country's critical development needs that have made it vital to launch the hydraulic project, which promises to propel the country's economic growth to a higher level in the decades to come. While this was the driving force behind the project, Ethiopia undertook the GERD even at the ire of both its downstream neighbor, Sudan, and a historical adversary ---Egypt. Supplying more than eighty-six percent of the water flowing to the Nile River, Ethiopia maintains that it is within its sovereign rights to use the waters of the Blue Nile for energy generation. As such, Ethiopia's ultimate objective is to provide electricity for 60 percent of its population but it still relies mostly on wood and kerosene for cooking and other forms of energy (Mbaku, 2023).

Added to this is the paramount need to alleviate the country's widespread poverty through sustainable energy supplies while moving Ethiopia's undeveloped economy and energy-starved citizens to a level that offers a modest degree of improvement in their living standards. Given the enormous potential of the GERD, Ethiopia's development strategy during the past several years has hinged on the production of green energy and even more so on the development of its abundant

hydroelectric energy resources for both domestic consumption and exports. As such, Ethiopia regards the GERD as a pivot of national pride that could elevate the Horn of Africa country to a middle-income status among the global South countries. As "…the centerpiece of Ethiopia's bid to become Africa's biggest power exporter," the GERD is therefore deemed to be a critical development engine powered by the Blue Nile. At the same time, the perceived threat of disrupting the current water security needs of both Sudan and Egypt has continued to drum up the conflict between Ethiopia and its downstream neighbors (Reuters, 2023, p. 1).

Equally fundamental is Ethiopia's contention that it should not be bound by any colonial-era treaties made without its participation. This perspective, as noted in the earlier discussion, is shared by all the other upstream riparian states, as well. Ethiopia's position on this thread is further amplified by the fact that the largest share of the Nile water originates from within its own national boundaries, and thus, the country has unfettered water rights to the Nile. As a developing country striving to improve the lives of more than 120 million people, the second most populous in Africa, Ethiopia's development strategy aims to utilize all its endowed resources, including its rivers, and maximize its growth potential by focusing on the dynamic sectors of the national economy. The country's hydroelectric resources, including mineral deposits, gas and petroleum reserves, agricultural harvests, and the like, all remain untapped. The GERD is therefore one of the pillars primed to drive the development strategy of the country for the near future.

Furthermore, Ethiopia argues that the mega dam will offer more benefits than harm to Sudan and Egypt in the long term. One of Ethiopia's strong claims for the GERD has been that the downstream countries should no longer worry about flooding since the dam would reduce or minimize the regular flooding that, for example,

neighboring Sudan suffers from during the rainy season. Drawing almost two-thirds of its water supplies from the Nile, Sudan is known to be extremely prone to massive flooding. While it has joined forces with Egypt ardently opposing the GERD's construction during much of the time since the beginning of the project, "...now, however, it seems to have changed its view amid hopes that the dam will help to regulate the annual floods" (Holleis, 2023, p. 2).

Amplifying the benefits of the dam to both Sudan and Egypt, Ethiopia's Prime Minister Ahmed Abiy pronounced in January 2022 that

> The benefits for downstream countries are often untold. In Sudan, for example, the GERD provides ample protection against devastating floods and the effects of water shortage during drought and dry periods. It will help Sudanese water infrastructure to be operated optimally as they receive regulated flow…. Egypt also benefits from water conservation at the GERD instead of the wastage of billions of cubic meters of water for evaporation and downstream flood plains. The GERD also helps to prevent future spillage that overtops the Aswan Dam (African News Paper, 2022, 1)

Ironically, Abiy's perspective on the dam was shared by Sudanese water experts, who observed that the GERD should be a cause for cooperation rather than acrimony among the three riparian states because it will eventually benefit Sudan and Egypt. Stressing this view was Mahmoud Zainelabdin Mahmoud, Sudanese Secretary-General for the African Center for Governance, Peace, and Transition Studies, who noted that the

> GERD has many benefits to the people of Sudan in terms of regulating water so that the Sudanese people can plant for three agricultural seasons. It reduces mud and floods. Every year, Sudan faces floods that damage many of our cities and villages on the two sides of the basin. It will also produce electricity for us, which is very important for us in the future. The regulation of water will also open opportunities for socioeconomic development in Sudan. (Ethiopian News Agency, 2022, p.1).

The benefits of the dam are further buttressed by Ethiopia's insistence that the project could provide electric power that is affordable to both Sudan and Egypt as well

as the means for the management of the Nile River flow, including the extenuation of droughts and water saltiness, among others. (Mbaku, 2020, p. 2)

Another area of contention advanced by Ethiopia, and of course, both rival parties use it as a justification to reinforce arguments for their own respective position, was that Sudan and Egypt did not live up to the 2015 'Declaration of Principles' signed by the three countries; however, it is a known fact that each party has accused the other party of violating one or more of the terms of the agreement. Unfortunately, these standards have been at the center of contention, often subject to different interpretations, while impeding any possibility of reaching a common ground for reconciliation.

The Root Causes of Opposition by Egypt and Sudan to the GERD

While Egypt has been the fiercest opponent of Ethiopia's mega dam project, Sudan, by contrast, has not been as vehement as its northern neighbor in its opposition to the GERD. Characterizing Sudan’s position, Zeinab Mohammed Salih of BBC reported that “When discussing the Grand Ethiopian Renaissance Dam (GERD), Sudan's rhetoric has moved from being broadly welcoming to being suspicious and belligerent.” What is more, the ambivalent position that Sudan has shown during the conflict is echoed at best by Sudan’s Water Resources Minister, Yasir Abbas, who declared in February 2020 that the GERD would benefit Sudan because it would make “…the flow of the Nile more predictable and could introduce a third farming season. The dam could also mean cheaper and more reliable electricity for Sudan…” However, the minister changed his stance a year later, in 2021, claiming that “Without an agreement, the GERD is really a threat to the people downstream… both the environment and the livelihoods of the people." More importantly, he contended that “Sudan would suffer more than Egypt if filling the dam reduced the amount of water

flowing into Sudan, as Egypt has a large reserve of water sitting behind its own Aswan dam" (BBC, 2021, p. 1).

However, Sudan's shifting position on the GERD has been more the result of a border dispute that it has had with Ethiopia for years than the real impact that the dam's construction poses to its water security. In the agriculturally fertile area called al-Fashaga, located on the frontiers of the two countries and claimed by both, the boundary between the two neighboring states has never been demarcated. As a result, farmers on both sides of the border use the high-yield agricultural land for crop production, often resulting in armed skirmishes between them, which have gone unabated for decades. The border dispute between Ethiopia and Sudan has escalated even more with frequent armed clashes since the Sudanese military, headed by General Abdel Fattah al-Burhan, toppled the government of Umar Hasan Ahmad al-Bashir in 2019, a former military officer and politician who served as the seventh president of Sudan from 1989 to 2019. General al-Burhan has claimed that the disputed al-Fashaga border farmland has been historically Sudan's, and so he has been known to advocate the return of the disputed area to Sudan, even if it necessitates using force against Ethiopia to reclaim it. Likewise, Ethiopia claims the land for itself, based on historical grounds, and cites as proof the physical habitation and use of the land by Ethiopian farmers in the disputed area for several decades.

On the other hand, Egypt's concern about the GERD appears to be on grounds that are more plausible. As stated earlier, the North African Arab country relies on the Nile for 90% of its water supply, and thus, Egyptian leaders claim that having the Nile River stream without any disruptions from the tributaries in the upper stream countries would simply equate with an assurance of survivability for Egypt, a country where water is inordinately scarce. This claim is, of course, justified matter-of-factly by the

1929 treaty and the subsequent one in 1959, which gave both Egypt and Sudan absolute rights to the Nile waters. While Egypt's underlying argument for opposing the GERD is rationalized by its absolute dependency on the Nile River, the country raises other related issues aimed at stifling the filling and operation of the dam. Mostly, the dispute over the Nile is driven by issues that Egypt advances at every international forum that offers it the conduit for publicizing and gaining diplomatic support for its firm stand on the GERD. The concerns that Egypt advances revolve around these key facets: the safety of the dam's construction and operation, the timespan of filling it and the overall impact of the dam on the economies of the downstream states; the lack of adherence to the 2015 principles; and the necessity of securing a binding agreement prior to the filling and operating of the reservoir.

The technical issues associated with the GERD's construction and operation were voiced forcefully by both Egypt and Sudan at the initial stages of the project, questioning the adequacy of the safety mechanism built to stymie any accident during the construction and even after the project's completion. Egypt and Sudan expressed concern "...about the safety and stability of the dam itself, as it is being built in a seismically active area, and there have been reports of cracks in the dam's foundations." (Chiu, 2023, p. 3).

Even the reputable Italian company, Salini Impregilo, which had won the contract to build the GERD, did not escape the blame from Sudan and Egypt, as both downstream countries raised questions about the company's bid to build the dam without first conducting comprehensive impact studies, particularly on the environmental and social effects the project will have on their populations. However, subsequent studies, like the one conducted by the RTI, have proved that safety concerns were unsubstantiated, if not overstated.

On top of the safety issue, Egypt’s particular concern was also that the amount of water to be stored in the reservoir during the filling of the GERD and the time span in which each cycle of the filling will take place could directly impact the livelihood of its population. In other words, should these two factors work against Egypt, the dam could, in practice, distress Egypt’s water supply at best and imperil domestic development projects at worst. As Kamara et al. observed, “Egypt’s economy is likely to suffer due to agricultural land loss, decreased food production, and decreased agricultural output overall. Without effective cooperation, Egypt’s unemployment rate would rise along with a corresponding loss in Gross Domestic Product (GDP) and welfare.” (Kamara et al, 2022, 2).

Egypt’s apprehensions are not shared by Ethiopia, which argues that hydropower projects will cause no harm as hydroelectricity primarily uses the energy of running water, without reducing its quantity, to produce electricity. Nonetheless, experts supporting both sides of the argument have done studies on the subject, although in some cases, the conclusions reached by some show partisan leanings favoring one over another; each party appears to have engaged in the sponsorship of impact studies conducted by research institutions either within their respective country or by external ones that favor their respective position on the controversial dam. One such study, whose conclusions conform to Egypt’s fears about the GERD, was conducted by Karim M. Morsey et al. The report distinctly provides a litany of adverse impacts that the dam would have on Egypt's socioeconomic infrastructure in general, with a grim picture painted particularly on the reduction of water supplies and the side effects manifesting on the Nile-dependent Egyptian population (Morsey et al., 2021).

On the contrary, a study conducted by Tewodros Negash et al. reinforced Ethiopia's argument for its mega-dam. Similar to Morsey's, which is favorable to Egypt,

the study by Negash et al. provides a rather rosy picture of the benefits that the GERD would provide for both Ethiopia and its downstream adversaries while also acknowledging the significance of cooperation among the three riparian states and of reaching common grounds for the resolution of the outstanding issues affecting their interstate relations. Still, the latter study's overall intent navigates the acute development needs of Ethiopia in many dimensions while justifying the project's essentials for Ethiopia's export potential and domestic energy consumption. The core argument for the project stresses this undisputable fact---65% of Ethiopia's population suffers from a lack of electricity currently, so hydroelectric power would be a game changer for millions of Ethiopian citizens (Negash et al., 2020).

Equally significant is Egypt's claim that the heavy amount of water stored in the reservoir and the quick frequency with which the dam is filled would negatively impact the livelihood of its population; this anxiety has, therefore, been at the core of the simmering quarrel between Ethiopia and its downstream neighbors. Given this claim, Egypt's position had been that the dam should be filled for a longer time span so that the water level does not plummet drastically, especially in the initial stage of filling the reservoir. Egypt further argues that the reduction of the water level because of the filling would exacerbate water scarcity in the North African Arab state, especially during drought conditions, and that would have disastrous consequences for the country's ability to continue its normal food production on all its irrigated farmland, which relies heavily on the Nile for harvesting agricultural produce. To mitigate this potential problem, Egypt favors filling the dam within 12 to 21 years, rationalizing that "The longer it takes to fill the reservoir, which is going to be bigger than Greater London with a total capacity of 74 billion cubic meters, the less impact there will be on the level of the river" (Mutahi, 2020, p. 2).

Of course, Ethiopia would not allow such restrictions and instead planned initially to complete the project in six years; however, the actual construction and filling of the dam to date has taken almost twelve years due to delays during the many phases of the project because of issues associated with funding cutbacks and snafus related to the import of construction materials during the pandemic crisis and the post-pandemic period of global economic belt-tightening.

However, the most controversial element of the GERD crisis is the 2015 agreements made between the contending parties. Dubbed *"Egypt, Ethiopia, Sudan – Declaration of Principles,*" the statement outlines ten areas of agreement reached by the three riparian states that were to reign their commitment to resolving all issues pertaining to the shared utilization of the Nile peacefully and cooperatively. Nonetheless, these agreed-upon principles have been a source of friction among these states, as each accuses the other party of breaching them. Egypt cites Ethiopia's violation of the principles at every forum where it makes official statements to the media concerning the GERD. When the Nile crisis came up for discussion at international bodies, such as the United Nations or the African Union, Egypt never hesitated to condemn Ethiopia's alleged failure to comply with the terms of the *2015 Declaration of Principles.* Particularly of note is Egypt's continued claim that Ethiopia has consistently violated the terms stated under Section 10 – *Principle of Peaceful Settlement of Disputes*, which contains these provisions:

> The Three Countries will settle disputes, arising out of the interpretation or implementation of this agreement, amicably through consultation or negotiation in accordance with the principle of good faith. If the Parties are unable to resolve the dispute thorough consultation or negotiation, they may jointly request for conciliation, mediation or refer the matter for the consideration of the Heads of State/Heads of Government (Content, 2015, p. 1).

At the heart of Egypt's argument also is that Ethiopia has unilaterally decided to continue the construction of the dam despite the objection expressed by the

downstream neighbors against the latter's action. This continues to be the major obstacle hindering a mutually acceptable resolution of the issues at hand despite several attempts by mediators representing international organizations and/or countries that tried to play a constructive role in forging peace in the area, using their claimed position of neutrality in the dispute over the GERD. The UN and AU have had several rounds of hearings on the GERD crisis, while countries such as the U.S., China, Russia, and the United Arab Emirates have made some efforts to bring the two sides to talks so that they may resolve the issues through a peaceful dialogue while taking a good-faith approach to a negotiated settlement of the dispute with favorable outcomes for all parties concerned.

In a similar vein, Egypt's insistence, which is also shared by Sudan, on having a binding agreement first among the three countries before the completion of the dam project has continued to be another obstacle in resolving the Nile crisis. On paper, backed by the colonial-era treaties, a water-sharing agreement over the Nile exists between Sudan and Egypt, but none with Ethiopia. This means that Ethiopia is not under any legal requirement to comply with the bilateral agreement concluded by its downstream neighbors. This, in effect, has made the row between the two sides thornier, as it grows to be a hurdle against finding a lasting solution to the issue. The binding agreement that Egypt seeks is focused on the safeguarding of its water security and, more importantly, on ensuring that the filling and operation of the GERD are compatible with its national interest.

"Egypt will continue its intense efforts to reach a legally binding agreement on the filling and operation of the GERD," the Irrigation and Water Resources Ministry of Egypt declared, as another round of negotiations was scheduled to take place in October 2023 in Addis Ababa, Ethiopia's capital. "The agreement must safeguard

Egypt's interests, protect its water security, and preserve the interests of all three countries," Mohamed Ghanem, the ministry's spokesperson, stressed during a press conference with the media at the time (Asharq Al-Wasat, 2023). So, given these circumstances, Egypt is demanding that there should be an equitable allocation of water between the three countries and that this be agreed upon in a legally binding accord. In Egypt's calculations, the binding agreement would surmount the stalemate that has paralyzed diplomatic efforts at reaching a mutually acceptable way out of the Nile crisis. In more specific terms, Egypt insists that any future negotiated settlement must "…endorse what it sees as its established Nile rights to 55bcm of water from the river." (Abdelhadi, 2020). Ultimately, what Egypt is seeking is a legally constraining instrument that would force Ethiopia's compliance to terms and conditions favored by its downstream neighbors in the filling and operation of the river, with the hope of charting a course of action that would herald a spirit of cooperation among the three countries over the use of the Nile's water for the foreseeable future.

Filling the Dam Amid Protracted Negotiations and Diplomacy

Since Egypt had serious concerns about the GERD at its very inception, the North African Arab country demanded that its engineers be granted permission to inspect the design as well as the impact studies conducted on the dam to ease its own water security anxieties; however, Ethiopia rebuffed the request consistently, arguing that Egypt should abandon first its claim of veto power on the Nile water allocation. After a meeting between the Ministers of Water of Egypt, Sudan, and Ethiopia in March 2012, Sudan's President al-Bashir declared that he supported the building of the GERD, although declarations by other Sudanese authorities have since reversed his position; al-Bashir was sent to prison after he was toppled by the military in 2019.

To encapsulate the full embodiment of the Nile conflict, however, it is essential to chronicle especially the project's progress from the start, understand the salient issues pertaining to the dispute, and assess the extent to which diplomacy failed to settle the outstanding issues through negotiations. After Ethiopia's announcement in 2011 of the official launch of the GERD, with a $4.8 billion contract consummated with the Italian firm Salini Costruttori, Egypt immediately voiced its opposition to the project, simply because Cairo was alarmed by the size of the reservoir and the potential impact it would have on its water security. In 2024, to stymie any discord between the two sides, the three countries created the Tripartite National Committee, consisting of four members each from Ethiopia, Egypt, and Sudan, which was to conduct impact studies. Nonetheless, this Committee did not make any significant contribution to alleviating the crisis in one way or another---either finding a lasting solution to the issues on hand or lowering the tempo of belligerency coming particularly from Egypt against Ethiopia. In a similar attempt, the National Independent Research Study Group, composed of the three countries' intelligence chiefs and foreign and water ministers, was established in 2018 to deliberate on the dam's impact, filling, and operation; however, the Study Group failed to produce anything acceptable to both sides.

Despite the flops of these attempts, the three countries never stopped trying to negotiate and settle their differences over the dam. As such, several rounds of talks involving the shuttling of negotiators across the capitals of Ethiopia, Sudan, and Egypt took place, starting in 2011 when an Egyptian delegation visited Addis Ababa, Ethiopia. While none of these efforts bore fruit between 2011 and 2018, the first meeting involving the three countries took place in Addis Ababa in 2019; however, it failed to produce any positive results. The second round of talks, held in Khartoum in 2019, ended up in a deadlock, as well. The third round was held in the same year in Cairo,

while the fourth one was held in 2020 in Addis Ababa. Again, all four meetings failed to make any meaningful progress toward the settlement of the conflict. In each case, Egypt's demand for a legally binding agreement on the construction, filling, and operation of the Dam and Ethiopia’s opposition to it grew to be the roadblock to any negotiated settlement of the issues over the Nile. Eventually, Ethiopia pulled out from the meeting altogether, declining to discuss proposals presented by Egypt, which were intended once again to iron out the differences over the filling and operating of the dam with legally binding accords that would protect the water rights of both Egypt and Sudan. Subsequently, the U.S. released a statement calling for the three countries to reach a “cooperative, sustainable, and mutually beneficial agreement. Accordingly, the three riparian states agreed to hold a meeting in Washington, D.C., in 2019 under the sponsorship of the U.S. Treasury Department and the World Bank. However, Ethiopia withdrew from the sponsored meeting a year later, alleging that the U.S. demonstrated bias against it during the talks while also claiming that the U.S. was engaged actively as an arbiter rather than as an observer role during the negotiations; Ethiopia strongly griped that the U.S. showed favoritism toward the stance taken by both Egypt and Sudan. In 2020, after abandoning the U.S.-mediated talks in Washington, D.C., the Prime Minister of Ethiopia, Abiy Ahmed, put forth a proposal that would place the two years of filling the dam under the scrutiny of engineers and officials representing the three countries, but both Sudan and Egypt rejected his plan seeking instead a comprehensive agreement that would cover the entire period of the dam’s construction, filling, and operation.

Egypt continued to protest what it considered to be Ethiopia’s “unilateral action” to build the dam and registered an appeal to the United Nations General Assembly’s 74th session in September 2020, where both Egyptian President El-Sisi and his

Ethiopian counterpart Sahle-Work Zewde addressed the GERD problem. Afterward, El-Sisi called for international intervention in the GERD negotiations, stressing that the Nile's water was a matter of life for Egyptians and anything affecting its current flow would be an existential threat to his country. In fact, Egypt's potent response to Ethiopia's unyielding position on the GERD was better reflected in this statement, as quoted from AhramOnline.

> Egypt submitted a 17-page letter to the UNSC protesting Ethiopia's actions and demanding that it halt construction until an agreement is reached. Addis Ababa sent a letter to the UNSC saying Ethiopia has no legal obligation to seek Egypt's approval to fill the GERD and blames Cairo for the deadlock in talks (Zeinab El-Gundy, 2021, p. 1).

Meanwhile, Ethiopia announced in July 2020 the first filling of the dam, as Egypt sought the UN Security Council's intervention, calling Ethiopia's action "an imminent threat to international peace and security." (Ibid). However, Egypt's appeal did not lead to the UNSC taking any meaningful action against Ethiopia because the alleged threat did not seem to justify the requested intervention. The UNSC rather advised that the African Union was a better setting to resolve "an African issue with an African solution," a position that Ethiopia had advocated since the beginning of the row between the two sides. Given this fundamental principle, South African President Cyril Ramaphosa, Chair of the African Union (AU) at that time, had to reach out to the leaders of Egypt, Ethiopia, and Sudan, entreating them to resume the Nile talks and find a lasting solution to the issues in question. Following Ramaphosa's plea, "Trilateral talks resumed via videoconference under the AU's auspices. Observers from the EU, US, AU commission and legal and technical experts attended the talks, but no consensus was reached at the technical and legal levels."

In 2021, Egypt and Sudan called for additional international mediators, this time composed of the United Nations, the European Union, the United States, and the

African Union, to facilitate the negotiation between the three African countries over filling and operating the GERD. Ethiopia vigorously objected to it, insisting that any such intervention violated its sovereign rights to use any resources within its territory, as President El-Sisi threatened that “No one can take a drop of water from Egypt.” Ibid. Notwithstanding, Ethiopia announced that the second filing of the GERD would occur in July 2021. As the second filling was underway, a new round of talks once again was held in Kinshasa, Democratic Republic of Congo, among the riparian adversaries under the auspices of the AU, but it ended in an impasse after Ethiopia rejected the suggested timeframes, which called for a gradual filling of the dam and an increase in the level of water to be released from the reservoir during the time of droughts. Once more, at the request of Egypt and Sudan, the UNSC convened a meeting in New York in July 2021 to discuss the latest developments on the GERD. Tunisia, the Arab member of the UNSC at the time, pushed for a binding agreement, suggesting a six-month grace time to do so. That suggestion went nowhere, as Ethiopia objected to any binding provision on an agreement that would impinge upon its ability to use the Blue Nile for domestic development. The dispute continued throughout 2021, with mediators from the UN Secretary-General António Guterres to South African President Cyril Ramaphosa and to President Félix Tshisekedi of the Democratic Republic of Congo still calling for a resumption of talks, but all to no avail.

As stated earlier, the first filling of the reservoir occurred in 2020, followed by the second phase in 2021, and then the third phase in 2022, culminating in the fourth one in 2023. The levels of water restored in the reservoir went from 4.9 billion cubic meters in 2020 to 3 billion cubic meters in 2021 and to 9 billion cubic meters in 2022. At the dam’s current 625 meters above sea level, the reservoir currently contains 41 billion cubic meters. The size of the dam's fourth and last filling is 24 billion cubic

meters, and the construction of the walls still takes 4-7 years to complete. (Tawil, 2023). The dam is projected to have these features: “At full capacity, the huge hydroelectric dam – 1.8 kilometers (1.1 miles) long and 145 meters (476 feet) high – could generate more than 5,000 megawatts.” (Fana Broadcasting Corporate, 2023). In February 2022, the GERD produced electricity for the first time, delivering it to the grid at a rate of 375 MW. A second 375 MW turbine was put into effect in August 2022.

While announcing the last and fourth filling of the GERD in September 2023, Ethiopia’s Prime Minster Abiy Ahmed claimed that

> "It is with great pleasure that I announce the successful completion of the fourth and final filling of the Renaissance Dam. There were a lot of challenges. We had been dragged backward. We encountered internal challenges and external pressures. We have overcome all these and are able to arrive at this stage. However, we have not yet completed climbing the uphill, though we have just arrived at the tip of the hill.…the fourth and final filling of the Renaissance Dam".

As expected, Abiy’s announcement triggered Egypt’s denunciation of the filling, as noted in the following quoted statement from the *Aljazeera* television network by the Foreign Ministry of Egypt:

> The Egyptian foreign ministry condemned as “illegal” Ethiopia’s announcement that it had filled the dam on the Nile. The “unilateral” measure by Addis Ababa to complete the mega-dam’s filling would “weigh on” negotiations with downstream Egypt and Sudan, which were suspended in 2021 but resumed last month, the foreign ministry said in a statement (Al-Jazeera, 2023, 1).

The fourth filling further fueled a fierce diplomatic clash between Ethiopia and Egypt as the latter took the issue before the UNSC, accusing the former of “…repeated violations of international law,” including the 2015 Declaration of Principles Agreement between the three countries, to which Ethiopia responded, “…that the subject matter was ‘outside of its [the Security Council’s] mandate” (Bogale, 2023, p. 2). In fact, Egypt brought the GERD issue before the UNSC three times each in 2020 and 2021, and one time in 2022, for a total of seven occasions, record sessions for the international body on an issue that had no implication for international peace and security (Ibid). It is also relevant to note here that, in 2021, Ethiopia spurned an Arab League resolution

calling on the United Nations Security Council to intervene in the drawn-out row between Egypt, Sudan, and Ethiopia over the GERD. Again, in May 2023, while "…addressing an Arab League meeting in Cairo, Egyptian Foreign Minister Sameh Shoukry said he wanted fellow Arab nations to pressure Ethiopia to halt its "unilateral and uncooperative practices and embrace the necessary political will to accept one of the compromise solutions offered on the negotiations table." As expected, Ethiopia argued that it would only accept recommendations on the operation and filling of the dam while declaring that any legally binding agreement on its mega hydroelectric project would be an infraction of its national sovereignty (Hendawi, 2023).

The Prospects for Settlement

The Nile conflict has proven to be one of the most formidable challenges to international mediation. For more than a decade, diplomatic efforts aimed at deescalating tension and forging cooperation between the Nile foes have failed. Only recently have the two sides taken the positive step to the resumption of trilateral negotiations on the insistence of international mediators. Following the *2015 Declarations of Principles of Agreement*, a series of negotiations took place, but the position of Sudan and Egypt during those negotiations was weakened because Ethiopia had already begun the construction of the dam. This, in effect, limited the options of the downstream counties to resolve all the outstanding issues concerning the project.

As early as 2012, the three countries established a panel of international experts charging them with assessing the project's impact on the downstream countries immediately after the dam's construction was underway. The panel consisted of 10 members, including six from the three countries and four international observers, all with their respective expertise in water resources management, dam

engineering, socioeconomic impact analyses, and environmental science. After a series of meetings, the report that the panel produced in 2013, unfortunately, did not satisfy either party's desired position, which subsequently led to the secession of negotiations between the two sides. In 2014, Egypt abandoned the dam negotiations altogether and embarked on a diplomatic offensive against Ethiopia, even to the extent of taking the matter to the UN Security Council. Before appealing to the Security Council for intervention, however, Egypt launched a shuttle diplomacy wooing African countries as well as Arab League nations, which it felt could exert pressure on Ethiopia, to rally behind its cause. It sent its foreign minister to Tanzania and the Republic of the Congo in 2014, seeking support for its stance on the Nile. On many occasions throughout the decade, Egypt appealed to members of the Arab League for diplomatic support against Ethiopia. Oddly, Sudan initially criticized its Arab neighbor for whipping up the friction unnecessarily by wielding diplomatic pressure on Ethiopia while claiming neutrality. At the same time, Egypt's diplomatic campaign was so entrenched that it even courted Uganda, Kenya, South Sudan, and Tanzania to be on its side while eliciting further support for its cause by sending emissaries to the various European capitals to garner support for its position on the GERD. However, in the same year, Ethiopia extended an invitation to its downstream adversaries, expressing its willingness to settle the issues surrounding the dam in good-faith negotiations, and this led to the establishment of a Tripartite Ministerial-level meeting. Nonetheless, the stalemate has continued without any breakthrough to this day.

Given the genesis of the Nile conflict, as narrated in depth in the foregoing discussion, there are now some indications suggesting that the time for reaching a common ground between the Nile adversaries may have come closer. As such, what are the likelihoods for a resolution? Four possible interrelated conditions exist that may

provide a sense of guarded optimism for a diplomatic breakthrough in the end. These are as follows:

- The anticipated completion of the dam construction within the next few years, with the last filling of the reservoir having been accomplished already.
- Egypt's realization of the tenuousness of the colonial-era treaties, to which it ardently clung for decades, including the need to deescalate tension with Ethiopia; Egypt's underlying goal now is to protect its water security for the future while being able to influence diplomatically Ethiopia's impending, additional dam projects and ensuring that such projects would not be harmful to the downstream countries;
- The more constructive and neutral diplomatic efforts that the U.S. is pursuing at this time are aimed at pressuring both sides to reach a compromise through negotiations and
- The existing political volatility of the Ethiopian regime under Prime minster Abiy's leadership and the possibility that his government would be more willing to compromise in a position of a more diminished national power; this shrunken national power has come about as the result of the extreme domestic conflict that has continued to plague the Horn of Africa country among its numerous ethnic groups, most of which could be attributed to the ongoing hostilities between the forces of freedom and the military throughout much of the country; Abiy has created these hostilities if not exacerbated them through his harsh rule. This view will be further elaborated in its proper context after a few paragraphs below.

Let us now turn to the four elements mentioned above that could, taken together, provide the needed impetus for settling the Nile conflict in the conceivable future.

According to recent progress reports on the GERD's construction, as well as the filling of the reservoir, the dam was 90 percent complete as of the summer of 2023 (Mwaalimu, 2023). Therefore, with much of the work on the mega dam already completed, the stage seems set for real negotiations based on mutual interest and new realities. The threats of military retaliation and diplomatic offensive by Egypt against Ethiopia, be it using the Arab League or other individual states in alliance with it, may have now passed their time of utility as a bargaining chip. In other words, using force by the downstream countries, such as the bombing of the GERD by the Egyptian air force, would not likely be a viable option for Egypt anymore. Such an option would only bring calamitous consequences to the lives of millions in both downstream countries, considering that the billions of cubic water already stored in the reservoir would cause both countries unimaginable human costs, should such bombing take place and, as a result, flooding occur from this deliberate action. As one political pundit once retorted, the GERD, at its current water capacity, is like being armed with "a nuclear bomb" capable of destroying the livelihoods of both Sudan and Egypt. Literally. detonating such a “a nuclear bomb” would be tantamount to desiring an unknown outcome of mammoth human sufferings through self-destruction. Simply stated, the massive flooding that could descend into the two countries from a bombed-out mega-dam would be simply incalculable. Thus, this fact alone might generate a higher impetus for negotiations between the two sides while making military confrontations a remote possibility, if not a non-issue, in the months and years to come. In this connection, the impetus for a negotiated settlement would be more in tune with the national interest of both Egypt and Sudan, as the military option forcing Ethiopia to change course is quickly fading as we speak.

A related fact, also emanating from the bitter dispute between Ethiopia and its downstream neighbors over the GERD, is that the latter's historical domination of the use of the Nile waters has simply run its course. The NRB's 11 riparian states, which also includes Eritrea on an observer status, have absolutely made it clear, plainly through their official pronouncements, that the colonial-era treaties that had bestowed particularly on Egypt an unfair and outdated veto power on the use of the Nile waters are invalid. This has come at a time that Sub-Saharan African states are increasingly asserting their independence more forcefully not only by organizing regional and continent-wide councils and communities and creating common grounds for cooperation but also by forming a united front against neocolonial ambitions exerted by global powers as well as against regional power hegemony within the continent itself. This is simply to say that colonial-era treaties have no relevance to current African realities. Thus, Egypt's continuing rhetoric of embracing such treaties has grown to be looked at as a backward diplomatic maneuver that the other riparian states would be unable to take seriously anymore. Certainly, Ethiopia has already made it a known policy, asserting that the 1929 (Anglo-Egyptian Treaty) and 1959 (Nile Treaty) accords are non-starters for any negotiation with Egypt and Sudan regarding the GERD. Given these circumstances, therefore, Egypt and Sudan seem to have come to the realization that citing those treaties as the basis of negotiation for their water security needs is a matter that has passed its time. The realistic approach instead lies on other alternative solutions to be proposed as negotiable agenda items that the future trilateral meetings should take on, as good-faith negotiations sponsored by neutral international observers, including influential states such as the U.S. or international organizations such as the UN, EU, and AU, take place in the coming weeks and months.

The third critical element powering the momentum for settling the Nile conflict is the role the U.S. is expected to play prospectively in bringing the parties in dispute to the negotiation table by placing pressure, using its multifaceted diplomatic leverages, on the three countries. During the Trump administration, Ethiopia accused the U.S. of being a partisan advocate for Egypt's position in the conflict, contending that the U.S. administration was attempting to impose in 2020 the terms of a proposed agreement on the Nile that were seen as incompatible with Ethiopia's national interest. This was the time when representatives of the three counties met in Washington, D.C., under the sponsorship of the U.S. Treasury Department and the World Bank; however, the Biden administration, by contrast, appears to have the ears of both disputants at the present time. During that meeting in Washington, D.C., Ethiopia balked at the U. S's stance of not acting as a facilitator of the negotiations but rather an arbiter of the decisions being made during the negotiations. Following Ethiopia's withdrawal from the meeting because of this, Mr. Trump was reported as having said that "Egypt would not be able to live with the dam and might "blow up" the construction," thus causing a diplomatic furor and compelling the Ethiopian negotiators to reject American intervention on the face of it. The Prime Minister of Ethiopia at the time declared, in response to Trump's unwelcome rhetoric, that his country "will not cave into aggressions of any kind." (BB News, 2020, p. 1).

However, things seem to have changed a bit lately with the Biden administration for the better, as the security climate in the Horn of Africa particularly becomes a critical foreign policy priority for the U.S. Consequently, during the summer of 2022, the Biden White House sent special envoy Ambassador Mike Hammer to Egypt and Ethiopia to build relations and discuss the Ethiopian Dam. Incidentally, at about the same time, the United Arab Emirates, which enjoys good diplomatic relations with both Ethiopia

and Egypt, served a notice expressing its desire to see the two sides resume negotiations again and that it would facilitate the talks if needed.

While President Joe Biden's recent official pronouncements still seem predisposed in favor of Egypt over the Nile dispute, especially when considering his statement in 2021 affirming U.S. commitment to protecting Egypt's water supply, there is no question that he wishes to see a peaceful resolution of the conflict that is acceptable to both sides. Ethiopia's strained relations with the U.S. over the war in the northern Ethiopia region of Tigre appear to have finally been mended, thanks to the active diplomacy of Mike Hammer, who became United States Special Envoy for the Horn of Africa on June 1, 2022; he has traveled several times to the Horn of Africa, especially to Ethiopia since his appointment, and is credited with forging better diplomatic relations between the U.S. and the Horn of Africa country. Although the U.S. administration is still concerned about Ethiopia's inability to resolve its domestic political woes through peaceful means, it is still committed to the policy of constructive engagement with the Horn of Africa county while putting diplomatic pressure on Abiy's regime to calmly engage his opponents through peaceful negotiations, avoiding altogether the undertaking of extreme force, which raises the predilection to escalate more violence in a country that has already seen thousands of people killed and millions displaced from their dwellings. So, it is against this backdrop that U.S. diplomatic influence and advantage must be reckoned with, as both parties to the conflict are more likely to acquiesce to American pressure and arm-twisting diplomacy.

The fourth and last element of connection to the timeline, boosting the chances of negotiation between the two opposite sides of the Nile conflict, is the multilayered political crises in which Ethiopia currently finds itself. To illustrate this further, one may only think through the appalling consequences of the recent war that occurred in the

northern part of the country between the Tigrayan People Liberation Front (TPLF) and the Ethiopian National Defense Forces (ENDF) between 2020 and 2022 in which thousands of men and women, both military and civilian, perished along with billions of dollars in property damages. Another civil war involving the Amhara region, the country's second-largest, was brewing at the time of this writing, following the state of emergency imposed by Prime Minister Abiy Ahmed in August 2023, resulting from the forced disarming of the region’s special forces and the paramilitary Amhara Fano militia, who fought alongside federal troops against Tigrayan forces during the two-year war that ended in November 2022 in the Tigray region; their rejection of disarming precipitated the crisis.

The United Nation (UN) Human Rights Office, for example, reported in November 2023 that "it is troubled by the devastating impact of drone strikes and other violence on the population in the Amhara region” (United Nations Human Rights, 2023, 1). As the conflict progressed, Abiy was using drones and military jets, along with the most sophisticated arms in the military’s arsenal, to subdue the Amhara forces. Even churches and mosques were not spared from destruction during the military operations. The costs of destruction in the Amhara region, particularly in both economic terms and civilian casualties, were enormous as the conflict dragged on unabated (Gedamu, 2023)

Furthermore, the Abiy administration’s crackdown in the Oromia region, from which he hails, has put an added urgency, making his authoritarian, one-party rule look like those of his predecessors in Ethiopia and of other autocratic African leaders in the continent. The Oromia conflict involves the Oromo Liberation Army (OLA), which the government calls Onege Shene, whose ultimate political objective is to force a

referendum on the independence of the Oromia region from Ethiopia proper; the conflict has gone unabated for decades.

Abiy's refusal to share power with organized groups to allow the establishment of a provisional government inclusive of all stakeholders or resolve political differences through peaceful negotiations with his opponents has put his government in constant political turmoil where the country's survival as a state has now come into question. As such, he is constantly being pressured by foreign governments, multinational organizations, and the international media to seek a peaceful approach to the existing armed conflicts, shying away from using force and avoiding the immeasurable costs the country is paying in both human lives and property losses; however, he has shunned such calls and continued the destructive measures he has embarked on. He is using the military to punish all freedom forces with impunity, and consequently, his leadership efficacy has plummeted to the lowest level ever recorded for someone who had been the winner of the prestigious Nobel Peace Prize.

The Ethiopian Prime Minister made peace in 2018 with bitter foe Eritrea, ending a 20-year military stalemate following the 1998-2000 border war between the two neighboring countries. For his effort, he was awarded the 2019 Nobel Peace Prize. Unfortunately, Abiy has now become a pariah among all other past Nobel Peace Prize winners because of his advocacy of force and violence to suppress the voices of freedom in his own country. His leadership has come into question as he continues his brutish actions against his own people. As a result, many international leaders have been observed displaying their discontentment with his policy when meeting him at international forums, while international monetary organizations, such as the International Monetary Fund (IMF) and the World Bank, have also shown a reluctance to approve loans or development aid for Ethiopia because of Abiy's missteps.

Even more so, Ethiopia and Eritrea are becoming bitter rivals in the Horn of Africa once again because Abiy bungled up the good neighborly relations that the two states had enjoyed for more than five years. The Prime Minister provoked Asmara when he unwisely ratcheted up his rhetoric demanding---rather than using diplomacy---Eritrea's acquiescence to Ethiopia's need for access to the Red Sea through its ports; Ethiopia is known to be the only country in the world with a huge population (120 million) that is land-locked and no sea harbor for its import-export cargos. Thus, a growing tension resulting from Ethiopia's perceived aspirations to use force to gain access to the Red Sea has caused a simmering alarm among the states in the region; Eritrea-Ethiopia relations have particularly ebbed since October 2023, when the Prime Minster inexplicably forewarned Eritrea that Ethiopia's access to the Red Sea was a matter of profound national interest and that using force could not be ruled out to make this a reality. This immediately sent shockwaves throughout the region, and, therefore, at the time of this writing, the neighboring Horn of Africa states were, as expected, reeling from this ominous threat (Endale & Mengesha, 2023, p. 1).

More importantly, the Prime Minister is being maligned and condemned by the Ethiopian diaspora, who gave him unconditional support when he ascended to power in 2018. They taunted him at every international forum that he participated, protesting his presence and the atrocities that he has inflicted on the people of Ethiopia, particularly in the areas that are at war, as well as for commanding his forces to use the most extreme violence and deploying the county's military resources that could only be seen during wars between nations. Consequently, he is being accused of committing war crimes against humanity, genocide, ethnic cleansing, and other forms of cruelty, pointing to the brutality of the worst kind that happened to the people of Tigray in the earlier war and now of Amhara. In every corner of the country, armed

conflicts, human displacements numbering in millions, property destruction, rape, and killings of the most heinous types have occurred during his reign. The country's image as Africa's investment mecca has been tarnished, perhaps irreparably, as security conditions deteriorate and regime uncertainty becomes more manifest. Under the current political environment, dozens of armed conflicts involving the country's armed forces, including the air force that is bombing churches, mosques, bridges, and highways, in addition to targeting crops, farmers' homes, and farming equipment, have taken place. Wanton destruction of property and infrastructure, using military jets, missiles, and tanks, has been witnessed, all conducted by the direct orders of the Prime Minister. To put it bluntly, the country has become a non-governing, failing state under Abiy's leadership (Misikir, 2023).

Once touted as having one of the largest military forces in Africa, Ethiopia has now become a weakened state in which the government's inability to contain armed conflicts and bring peace and security to the country has drastically reduced the regime's military valor. This has resulted from the loss of thousands of troops and military equipment to domestic wars that have yet to capture the attention of the outside world. Consequently, the country's ability to influence regional politics with its neighbors and foreign powers alike is fading quickly and perceptibly. Overall, these realities have indisputably transformed that country's once respected regional power ranking, which it projected in the Horn of Africa and beyond, into an unalterable obscurity.

The political turmoil described above has side effects on the economic arena, as well. Once dubbed Africa's fastest-growing economy, with a double-digit growth rate during the past two decades, Ethiopia has now lost its economic momentum as the country faces crises in the many facets of both its economy and society, with ominous

signs of disaster in the making. One of the alarming signs of this is its excessive foreign debt, which may have resulted from years of deficit spending, borrowing to cover a budget deficit, or accepting a loan on unfavorable terms; one estimate in 2021 put Ethiopia's foreign debt at $29 billion. Various international media reported that Ethiopia's foreign exchange reserves have depleted so much that it is becoming difficult for the government to meet its financial liabilities. Besides, the rapid depreciation of the national currency is making servicing foreign currency debt more expensive, making it more difficult to meet obligations and increasing the cost of imports. Foreign investors who had been making their way into Addis Ababa in droves no longer wish to come. In November 2023, for example, French telecoms firm Orange (ORAN.PA)

> decided to withdraw from the process to purchase up to 45% stake in Ethiopian operator Ethio. Telecom.… After analysis, the Group believes that the conditions do not allow for the rapid deployment of our strategy and the completion of a project that would create value for the company (Aaron Ross, 2023, p. 2).

The adverse conditions implicitly referenced by the French telecom firm are nothing other than a revelation of the political turmoil occurring throughout Ethiopia. Therefore, given the social, political, and economic uncertainties in which Ethiopia finds itself at present, it would be reasonable to assume that the Addis Ababa regime could be amenable to a negotiated settlement of the Nile conflict at this time more than ever before. It would be within the national interest of that country not to draw out the animosities it has had for decades with Egypt particularly, which has the power to influence the politics of the Horn of Africa region. Ethiopia's neighbors, such as Eritrea, Djibouti, Somalia, and even Kenya, can be easily pressured by Egypt against Ethiopia, with possible adverse consequences for the latter in the vital areas of interstate trade and investments, imports and exports, regional security, and law enforcement. This

was evidenced already in the recent rejection of Ethiopia's application for membership to a Red Sea alliance of states formed in 2020, with Saudi Arabia and Egypt leading the way. In December 2023, Egypt pressured Eritrea, Djibouti, and Sudan to reject Ethiopia's membership application to join the alliance. Named the Council of Arab and African Coastal States of the Red Sea and the Gulf of Aden, the member states include Saudi Arabia, Sudan, Djibouti, Somalia, Eritrea, Egypt, Yemen, and Jordan. The Council's prescribed mission is aimed at providing a security zone "… to tackle piracy, smuggling, and other related issues. The council aims to enhance stability in the region, but regional rivalries and notable exclusions from the initiative remain a key sticking point" (Bagnetto, 2020, p. 1).

While Sudan has its own internal political conflict, settling the dispute over the Nile would still be a win-win for all three riparian countries. To illustrate the Sudanese case further, the conflict in Sudan started in April 2023 between the Sudanese Armed Forces (SAF), led by General Abdel Fattah al-Burhan, and the paramilitary Rapid Support Forces (RSF), headed by General Mohamed Hamdan "Hemediti" Dagalo; The war is between rival factions of the military government of Sudan because of power rivalry, with the fighting concentrated around the capital city of Khartoum and the Darfur region. As of October 2023, an estimated 10,000 people had been killed and 6,000 to 12,000 others injured.

Taken as a whole, this section of the paper examined the prospects of settling the Nile conflict through the lens of four potential scenarios that readily offer a new perspective on conflict resolution relative to the Nile dispute while providing added value to a better understanding of the crisis under investigation. Each element was found to have the potential of changing the negotiating positions of the leaders of the three riparian states, leading them potentially toward compromise or at least bringing

the debate concerning the dam to the middle ground so that mediators on both sides of the dispute could take advantage of it to reach a lasting, verifiable agreement that has eluded the riparian adversaries for more than a decade.

Conclusion

Relying on the qualitative method of analysis, this research explored the trajectory of the Nile crisis and the possible settlement that may result from a more deeply engaged negotiation among the parties in the conflict. Some dynamic forces, which may propel the momentum toward reconciliation and compromise, have been extrapolated in the study, including the role that international mediators might play in bringing the conflict to an end. As some conclusions are drawn from the study, it is time now for this section of the paper to provide a summary of recommendations.

As part of a negotiated solution to the Nile conflict, some water energy experts, as well as subject area specialists, have offered their perspectives on the settlement of the outstanding issues concerning the Nile crisis, based, of course, on their respective expert analysis. Sebastian Sterl, a Senior Research Associate on Energy Transitions at the World Resources Institute (WRI), notes that other forms of energy should be developed by the three riparian states, in addition to the hydroelectric power the GERD will provide for, to lessen the impact of the dam on the water security of the downstream counties. Sterl further observes that" A win-win situation can be found for GERD's long-term operation. If Ethiopia, Sudan, Egypt, and their neighbors were to deploy large-scale solar and wind farms and establish a regionally integrated power grid, and if Ethiopia agreed to operate GERD in synergy with solar and wind power, the long-term benefits of this huge investment would outweigh the costs." (Sterl, 2022, p.1).

Likewise, John Mukum Mbaku, a Senior Fellow with Africa Growth Initiative, recommends four wide-ranging actions for the three counties to consider so that a lasting, mutually acceptable solution to the conflict may be attained. Mbaku recognizes the importance of the already existing NBI framework that both Sudan and Egypt abandoned a few years after joining the 11-member partnership of riparian states over disagreements on the management of the Nile water allocation. He suggests that the partnership should still be the forum where future negotiations and collaboration must be managed, with all upstream and downstream states being involved once again. In Mbaku's view, Egypt and Sudan must return to the NBI and use the framework that is already there to advance their water rights in the spirit of cooperation and compromise with their fellow African riparian states. Secondly, he opines that a spirit of cooperation can happen only when Ethiopia and the other upstream counties within the NBI acknowledge readily the total dependence, especially of Egypt on the Nile, and that they ought to show flexibility in their management of the waters of the Nile. Implied in Mbaku's opinion is that Ethiopia should make a provision in any reasonable negotiation, ensuring that Egypt and Sudan have an equitable share of waters during drought conditions; this is to say that additional water would have to be released from the GERD reservoir to accommodate water scarcities that may occur during the drought seasons in the downstream countries. The third action recommended by Mkabu is that Egypt should do away with the 1929 and 1959 treaties, which it has used stubbornly for decades to justify its exclusive water rights to the Nile. He explicitly states that demanding the use of those outdated treaties as a framework for any negotiations on the Nile does not hold water anymore because those agreements have no applicability to today's political realities other than being a hurdle to any resolution of the conflict at hand. Lastly, Mkabu believes that Egypt's continued pleas for

intervention by the UNSC, EU, and global powers such as the U.S. and others in the Nile impasse should be completely written off, as well, seeking instead better avenues for full-faith negotiations using mediatory mechanisms within the African context while making genuine efforts to improve interstate relations and creating a better understanding of the shared values that the people of the three riparian states can take advantage of (Mbaku, 2020).

While these recommended actions indeed have merit in themselves, other additional suggestions can still be made to reinforce what has been imparted by Mbaku and Sterl. Of course, no one would challenge the assertion that both Egypt and Sudan should rejoin the NBI and use diplomacy in good faith to protect their water security interest by working closely with all the upstream states. At the same time, a conflict with the magnitude of the GERD should also be managed within the AU framework since all 11 riparian states are members of the continental organization. Any future negotiation between Ethiopia and its downstream neighbors, whether concerning the existing dispute or those that may arise in the future, should be the concern of the AU, as well, and both parties should be inclined to respect and use the good offices of the continental body rather than pleading for a diplomatic intervention by the UNSC or other external powers.

On its face value, one can firmly conclude from the perspectives of both Mbaku and Sterl that the construction of the GERD is about to complete its course and ready for full operation, and so, any conflict resolution on it between the disputants from hereon should be no more than hashing out the associated issues that may come about while the mega dam is in full operation. As part of the future negotiation, however, leaders of the three countries, including all those represented in the NRB, should stress the need for alternative energy resource development, as suggested by

Sterl, using water extraction methods that have been effective in tapping groundwater, for example, from aquifers. An aquifer is an underground layer of water-bearing rock fractures where groundwater can be extracted using a water well. If Egypt is endowed with aquifers among its natural resources, the country should make this method of extraction part of its water security plans, along with other methods of solution to water scarcity. Some of the most prominent ones, in addition to dams and reservoirs, include rainwater harvesting, aqueducts, desalination, water recycling, and water conservation. Rainwater harvesting involves catching and storing rainwater before it reaches the ground, while aqueducts can move water from where it is plentiful to where it is needed. The most common method in today's water recovery technology is also desalination that involves removing salt and minerals from seawater. The advantage of this method is that many countries have an unlimited supply of salt water, and detoxification of such water offers a great deal of usable water supply and helps overcome chronic water shortages at any given period. Also essential is the method of water recycling, which is simply reusing water for appropriate purposes, including irrigation, drinking water supply, industrial use, and environmental restoration. Finally, water conservation, the most widespread practice even at the household level, can be of immense help to overcome water scarcity, which means using less water and using it more efficiently. (The Conversation, 2023).

To sum up, there is convincing evidence that any negotiation from hereon between the parties in the Nile dispute would still have to grapple with issues that may arise from other dam projects that Ethiopia may construct on a smaller scale in the future. It is expected that the Horn of Africa will pursue, as part of its long-term development strategy, the full utilization of its hydroelectric resources, which are incidentally in abundance, and initiate small-scale water projects on the tributaries of

the Blue Nile in the years to come. This view is juxtaposed with the reality that the construction of the GERD is now at its final stages, and therefore, nothing in the cards---a military action or diplomatic pressure of any kind---can stop its full operation at this time in the game. Therefore, the attention of the downstream states regarding the Nile River should pivot not only to the future hydroelectric projects that Ethiopia may launch but also to explore the best avenues peacefully that would help mitigate the adverse effects that may be felt by them.

References

Abdelhadi, M. (2020, July 30). *Nile dam row: Egypt fumes as Ethiopia celebrates*. BBC News. Retrieved from https://www.bbc.com/news/world-africa-53573154

Abtew, W., & Dessu, S. B. (2019). *Financing the Grand Ethiopian Renaissance Dam.* In *The Grand Ethiopian Renaissance Dam on the Blue Nile*. Springer Geography. Springer, Cham. https://doi.org/10.1007/978-3-319-97094-3_11

Admin. (2022, January 21). *Ethiopia Stresses GERD Benefits To Sudan, Egypt – New Business Ethiopia.* African News Paper, https://www.africannewspaper.net/2022/01/21/ethiopia-stresses-gerd-benefits-to-sudan-egypt-new-business-ethiopia/

AFP. (2023, September 23). *Ethiopia, Egypt, Sudan resume Nile dam talks.* Agence France Press, https://www.yahoo.com/news/ethiopia-egypt-sudan-resume-nile-203413818.html

Al-Jazeera. (2022, February 21). *Ethiopia's Blue Nile mega-dam explained.* Al-Jazeera, https://www.aljazeera.com/news/2021/7/8/explainer-ethiopias-massive-nile-dam

Al-Anani, K. (2022, September 16). *The Grand Ethiopian Renaissance Dam: Limited Options for a Resolution.* Arab Center Washington DC, https://arabcenterdc.org/resource/the-grand-ethiopian-renaissance-dam-limited-options-for-a-resolution/

Al-Jazeera. (2023, September 10). *Filling of Grand Renaissance Dam on the Nile complete, Ethiopia says.* Al-Jazeera, https://www.aljazeera.com/news/2023/9/10/filling-of-grand-renaissance-dam-on-the-nile-complete-ethiopia-says

Al-Ula, Jumada. (2023, August 22). *Egypt Hoping for Legally Binding Agreement on GERD, Ethiopia's Stance Unchanged*. AsharqAl-Awasat, https://english.aawsat.com/arab-world/4516501-egypt-hoping-legally-binding-agreement-gerd-ethiopia%E2%80%99s-stance-unchanged

AP. (2023, September 25). *Latest talks between Ethiopia, Sudan, and Egypt over mega dam on the Nile end without breakthrough. Associated Press*, https://www.yahoo.com/finance/news/latest-talks-between-ethiopia-sudan-112608252.html

Bagnetto, L. A. (2020, October 1*). New Red Sea alliance launched by Saudi Arabia but excludes key players*. RFI, https://www.rfi.fr/en/africa/20200108-new-red-sea-alliance-formed-saudi-arabia-notable-exclusions

BBC. (2020, October 24). *Trump's comment on 'blowing up' Nile Dam angers Ethiopia*. BBC News, https://www.bbc.com/news/world-africa-54674313

BBC. (2021, April 22). *Gerd: Sudan talks tough with Ethiopia over River Nile dam,* BBC News, https://www.bbc.co.uk/news/world-africa-56799672

BBC. (2023, September 12). *Why is Egypt worried about Ethiopia's Dam on the Nile?* BBC News, https://www.yahoo.com/news/why-egypt-worried-ethiopias-dam-102354633.html

Bogale, S. (2023, October 7). *GERD tensions flare again as Ethiopia, Egypt trade letters at UN Security Council,* The Reporter, https://www.thereporterethiopia.com/36884/

Chiu, E.. (2023, March 26). *The Grand Ethiopian Renaissance Dam: Cooperation and Conflict Resolution.* E-International Relations, https://www.e-ir.info/2023/03/26/the-grand-ethiopian-renaissance-dam-cooperation-and-conflict-resolution/

Content, Curated. (2015, March 25). *Official Text: Egypt, Ethiopia, Sudan – Declaration of Principles.* Horn Affairs, https://hornaffairs.com/2015/03/25/egypt-ethiopia-sudan-agreement-on-declaration-of-principles-full-text/).

El-Gundy, Z. (2021, October 6). *GERD Timeline: From construction till expected resumption of African Union-mediated talks*. *Ahramonline*, https://english.ahram.org.eg/News/426270.aspx

El-Tablawy, T. (2023, September 10). *Ethiopia Completes Filling of Controversial Nile Dam, PM Says.* Bloomberg, https://www.yahoo.com/news/ethiopia-completes-filling-controversial-nile-094445374.html

El Tawil, N. (2023, September 9). *Size of Ethiopian Dam's 4th filling is 24B cubic meters: Egyptian geologist*. Egypt Today, https://www.egypttoday.com/Article/1/127021/Size-of-Ethiopian-Dam-s-4th-filling-is-24B-cubic

ENA. (2022, September 9). *Sudanese Experts Stress that GERD Benefits Downstream Countries*. *Ethiopian News Agency*, https://www.ena.et/web/eng/w/en_38269

Endale, A., & Selamawit, M. (2023, October 14). *Red Sea takes center stage as Ethiopia looks to assert regional presence.* The Reporter. Retrieved from https://martinplaut.com/2023/10/14/ethiopia-demands-access-to-the-red-sea/

Fahmy, N. (2021, Summer). *The Renaissance Dam after the Security Council.* The Cairo Review of Global Affairs. Retrieved from https://www.thecairoreview.com/essays/the-renaissance-dam-after-the-security-council/

FBC. (2023, September 10). PM *Abiy Announces Successful Filling Of Fourth Final, Round Of GERD, Fana Broadcasting Corporate*, https://www.fanabc.com/english/pm-abiy-announces-successful-filling-of-fourth-final-round-of-gerd/

Gedamu, Y. (2023, August 24). *Ethiopia's Amhara Crisis: Abiy's Political Failures Threaten a Return to War. The Conversation*, https://theconversation.com/ethiopias-amhara-crisis-abiys-political-failures-threaten-a-return-to-war-211754

Hendawi, H. (2023, November 25*). Egypt appeals to Arab nations for help in Nile dam dispute with Ethiopia.* NMENA, https://www.thenationalnews.com/mena/2023/03/08/egypt-boycotts-cairo-arab-league-meeting-over-libya-chairmanship/

Holleis, J.. (2023, April 8). *Ethiopia's GERD dam: A potential boon for all, experts say.* DWI, https://www.dw.com/en/ethiopias-gerd-dam-a-potential-boon-for-all-experts-say/a-65254058

ICG. (2020, June 17). The Grand Ethiopian Renaissance Dam: A Timeline. *International Crisis Group*, https://www.crisisgroup.org/africa/horn-africa/ethiopia/grand-ethiopian-renaissance-dam-timeline

IWG. (2008). Nile River Basin Entitative. *International Water Governance*, http://www.internationalwatersgovernance.com/nile-river-basin-initiative.html

Kamara, A, Mohamed A, & Benavides, A. (2022, January 20). Environmental and Economic Impacts of the Grand Ethiopian Renaissance Dam in Africa. *Water* 14, no. 3: 312. https://www.mdpi.com/2073-4441/14/3/312

Knobelsdorf, V. (2006). *The Nile waters agreements: Imposition and impacts of a transboundary legal system.* Columbia Journal of Transnational Law.

Retrieved from https://www.semanticscholar.org/paper/The-Nile-Waters-agreements%3A-imposition-and-impacts-Knobelsdorf/8be177611444c16db722b915a22f437ad8b30229

Magga, G. (2010, May) *Uganda: Ethiopian led river Nile agreement signed without Egypt and Sudan.* Afrik.News, https://www.afrik-news.com/article17639.html

Maher, A. (2013, June 2). *Egyptian politicians caught in on-air Ethiopia dam gaff*., BBC News, https://www.bbc.com/news/world-africa-22771563

Maina, J. (2022, July 25). *Ethiopia's dam dispute: five key reads about how it started and how it could end.* The Conversation, https://theconversation.com/ethiopias-dam-dispute-five-key-reads-about-how-it-started-and-how-it-could-end-187644

Mbaku, J. M. (2023, July 26). *Egypt and Ethiopia are finally working on a water deal – what that means for other Nile River states*. The Conversation, https://theconversation.com/egypt-and-ethiopia-are-finally-working-on-a-water-deal-what-that-means-for-other-nile-river-states-210255.

Mbaku, J. M. (2020, August 5). *The Controversy over the Grand Ethiopian Renaissance Dam.* Brookings, https://www.brookings.edu/blog/africa-in-focus/2020/08/05/the-controversy-over-the-grand-ethiopian-renaissance-dam/

Misikir, M. (2023, August 14). *At Least 26 Killed in Drone Strike in Ethiopia's Amhara Region*. Voice of America, https://www.voanews.com/a/at-least-26-killed-in-drone-strike-in-ethiopia-s-amhara-region/7224199.html

Morsy, K. M., Gaber A. & Mostafa, M.K. (2021, September 8) *Comprehensive Assessment for the Potential Environmental Impacts of the Grand Ethiopian Renaissance Dam on the Downstream Countries: Itaipu Dam in the Rearview*

Mirror. Sage Publications, https://journals.sagepub.com/doi/full/10.1177/11786221211041964.

Mutahi, B. (2020, January 13*) Egypt-Ethiopia row: The trouble over a giant Nile dam,* BBC News, https://www.bbc.com/news/world-africa-50328647

Mwaalimu, P. (2023, May 25). *Grand Ethiopian Renaissance Dam (GERD) Project.* Construction Review, https://constructionreviewonline.com/construction-news/construction-of-grand-ethiopian-renaissance-dam-gerd-90-complete/

Negash, T., Ferede, T., & Dirib, G. (2020, August). *The economic significance of the Grand Ethiopian Renaissance Dam (GERD) to the Eastern Nile economies*: *A CGE modeling approach*. Ethiopian Economics Association (EEA). Retrieved from https://www.eea-et.org/wp-content/uploads/2021/01/Policy-Working-Paper-05-2020.pd

OWP. (2022, May 22). *Nile River Conflicts*. The Organization for World Peace, https://theowp.org/crisis_index/nile-river-conflicts/

Piliero, R. J. (2021, June 5). *Ethiopia's Grand Renaissance Dam: Assessing China's Role*. U.S.-*China Perception Monitor*, https://uscnpm.org/2021/06/05/gerd-assessing-chinas-role/

RTI. (2021). *The Nile River Basin Initiative*, Research Triangle Institute, https://www.rti.org/impact/nile-river-basin-initiative

Reuters. (2023, September 11). *Ethiopia says it has filled the reservoir on its highly controversial Blue Nile mega dam project.* Reuters, https://www.cnn.com/2023/09/11/africa/ethiopia-blue-nile-reservoir-climate-intl/index.html

Ross, A. (2023, November 27). *Exclusive: France's Orange withdraws from process to buy stake in Ethio Telecom*. Reuters. Retrieved from

https://www.reuters.com/business/media-telecom/frances-orange-withdraws-process-buy-stake-ethio-telecom-2023-11-27/

Sterl, S. (2022, July 25). *Ethiopia's dam dispute: five key reads about how it started and how it could end*. The Conversation, https://theconversation.com/ethiopias-dam-dispute-five-key-reads-about-how-it-started-and-how-it-could-end-187644

The Conversation. *Here are 8 ways the world can tackle water scarcity*. World Economic Forum, 28 March 2023, https://www.weforum.org/agenda/2023/03/here-are-8-ways-the-world-can-tackle-water-scarcity/

United Nations. (2021, July 8). *Ethiopia, Sudan should negotiate mutually beneficial agreement over management of Nile waters, top official tells Security Council*. United Nations. Retrieved from https://press.un.org/en/2021/sc14576.doc.htm

UNHR. (2023, November 17) *UN Human Rights troubled by devastating impact of drone strikes in Amhara.* United Nations Human Rights, https://borkena.com/2023/11/17/ethiopia-un-human-rights-troubled-by-devastating-impact-of-drone-strikes-in-amhara/

Wahba, A. L. (2023, August 28). *Egypt-Ethiopia Talks on Giant Nile Dam End Without Breakthrough.* Bloomberg, https://www.yahoo.com/news/egypt-ethiopia-talks-giant-nile-195306848.html

Zaidi, A. (2023, September 6). 25 *Largest Dams In The World*. Insider Monkey, https://finance.yahoo.com/news/25-largest-dams-world-140858672.html?fr=sycsrp_catchall

Texas Leverages Medicaid Policies and Programs to Promote Maternal Health and Close Disparities in Maternal Outcomes

by

Dr. Praphul Joshi, Sam Houston State University, Brandy Lanns

Sam Houston State University Student

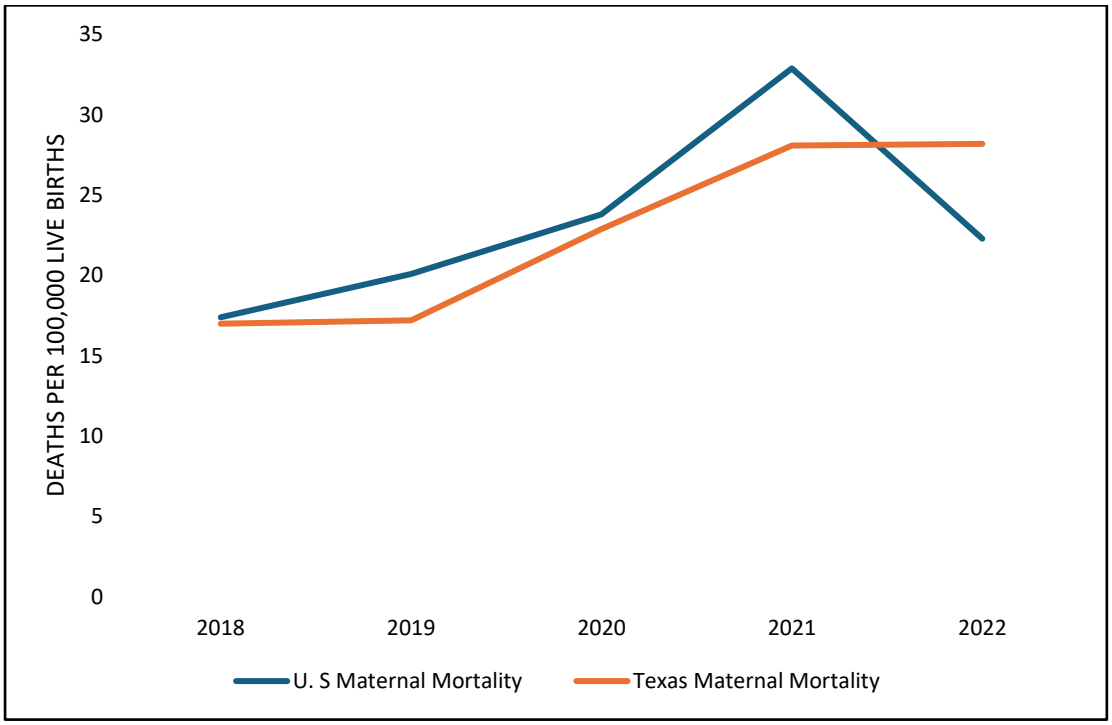
The U.S. has the highest maternal mortality rate of any industrialized country, and the maternal disparity crisis continues to grow, impacting Black women at an alarming rate. Black women are more than twice as likely to die of pregnancy-related causes than the national average rate for all women, regardless of education level or other socioeconomic factors. Over 80% of maternal deaths in Texas are preventable (HHS, 2024). Since 2018, Texas has implemented and adopted several policies and programs to improve and close the gap in maternal health outcomes and equity. Despite studies indicating a strong connection between states that adopted the Medicaid expansion and lower maternal mortality rates, Texas still has not adopted the Medicaid expansion policy. Growing research indicates that the quality of healthcare, from preconception through postpartum care, is a critical lever for improving outcomes for racial and ethnic minority women. This literature research reviews how Texas leverages Medicaid policies and programs, underlying drivers of disparities, and initiatives to promote maternal health and maternal outcomes.

Key Words: Texas Medicaid, Maternal Outcomes, Health Disparities

Texas leverages policies and state-level Medicaid programs to address racial and ethnic disparities in maternal outcomes, underlying drivers of these disparities, and initiatives designed to improve maternal outcomes. Prior to the COVID-19 pandemic, maternal mortality deaths in the United States were high and continuously growing (WHO, 2024). Maternal mortality death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes (WHO, 2024). However, the pandemic exacerbated the issue and introduced additional challenges by limiting access to care, increasing stress, and limiting the social support available before, during, and after birth.

Figure 1

U.S. and Texas Maternal Mortality Rates



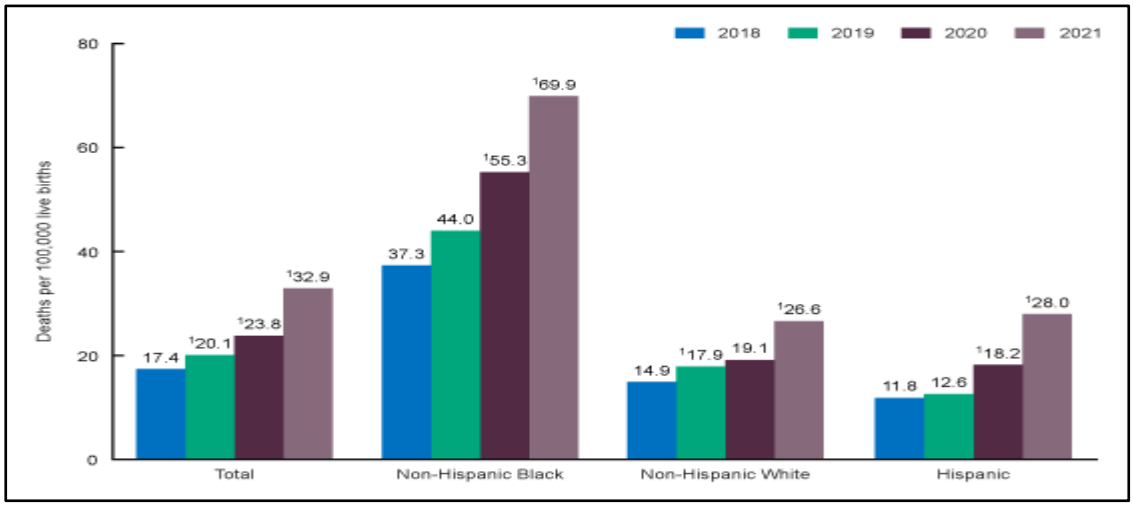
The National Vital Statistics System data from 2018 to 2021 (figure 1) shows a steady increase in maternal mortality rate (Hoyert, 2021). The maternal mortality rate is the number of maternal deaths per 100,000 live births (WHO, 2024). In 2021, the maternal mortality rate reached an all-time high of 32.9 per 100,000 live births for the general population of United States women compared to the rate of 23.8 per 100,000 live births in 2020 and 20.1 in 2019. For the first time since 2018, Texas's 2022 maternal mortality rate (28.2) is higher than the national average 2022 maternal mortality rate (22.3) (Hoyert, 2021). The downward trend shows promise, with the general population of women's maternal mortality rate slowly returning to the pre-COVID-19 pandemic rate, but unfortunately, the same does not reflect Texas's maternal mortality rate.

From 2020 to 2021, all groups, Black, White, and Hispanic origin, experienced a significant increase in maternal deaths across the U.S. Black women were

approximately three times more likely than White women to experience pregnancy-related deaths. The maternal mortality rate rose significantly from 2019 to 2020 for populations of Black and Hispanic women. In 2021, the maternal mortality rate for Black women was 69.9 deaths per 100,000 live births, 2.6 times the rate for White women deaths per 100,000 live births (Hoyert,2021).

Figure 2

Disparities in Uninsured Rates for Women of Childbearing: Age (18-44) by Expansion Status and Demographic, 2019



The increase in rates in 2021 for Black women was significant and highlighted the disparities between that of Black and Hispanic origin women compared to White women. According to the 2024 Texas Maternal Mortality and Morbidity Review Committee and Department of State Health Services Joint Biennial Report, the pregnancy-related maternal rate (PRMRs) in Texas for Hispanic women and Black women increased for deaths per 100,000 live births (MMMRC, 2024). Meanwhile, White women's PRMR in 2020 was 16.1, which decreased from 2019 to 18.8. One reason for this alarming racial and ethnic disparity gap in maternal health is decades of policies and programs that have systematically discriminated against Black people, Indigenous people, and other people of color (BIPOC) in the U.S. (Clark et al., 2021).

Policies, even without intent, over several decades have contributed to less than favorable outcomes for BIPOC women. Policies such as such challenge women of the BIPOC population's access to high-quality healthcare services and limit their economic opportunities (Ndugga et al., 2024). The BIPOC populations also encounter systematic and interpersonal racism in everyday life beyond seeking health care (Clark et al., 2021). For instance, implicit biases—defined as the attitudes, beliefs, and stereotypes that unconsciously affect one's treatment of others based on categorizations like race—can affect maternal health clinicians' perceptions of BIPOC women. This may result in unequal treatment decisions, patient-provider interactions, and health outcomes that compound other inequities these women face (Haley et al., 2021).

The Medicaid program is the largest single-payer of maternity care in the United States (U.S.). The program covers more than 40% of U.S. births and plays a critical role in ensuring healthy moms and babies (ACOG, 2024). At least one-half of American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, and White mothers were covered by private insurance, while at least one-half of Black and Hispanic mothers used Medicaid (Valenzuela et al, 2021). Medicaid policies are adopted at the state level, so state-level Medicaid programs are essential to addressing racial and ethnic maternal health disparities. The state-level Medicaid role is significant in the country's ability to identify and address the root sources of racism in maternal health care. However, this issue requires support from more than the state-level Medicaid program to make a meaningful impact. However, state-level Medicaid program participation is essential in shaping access to and the affordability, appropriateness, and quality of available health care. The state-level Medicaid is critical in leading policy changes that support clinical improvements, enhanced services, and community investments necessary to reduce racial disparities in

maternal health outcomes. For instance, the Medicaid/CHIP postpartum coverage policy, required by all state-level Medicaid programs, aids in addressing disparities in maternal health outcomes by opening the door to postpartum care for hundreds of thousands of women. (CMS, 2022).

However, the question remains, "what more can state-level Medicaid do to address disparities in maternal health outcomes." Studies have shown that the ACA Medicaid expansions have resulted in improved preconception coverage for pregnant women, some improvements in preconception health for women of reproductive age, and a significant reduction in the infant mortality rate (Eliason, 2020). These findings imply that, despite the existence of pregnancy-related Medicaid coverage, Medicaid expansion could contribute to improved pregnancy health, early access to care, and birth outcomes (Eliason, 2020).

Methods

This research relied on national policy scans and state-level Texas policy scans. Gathered information from published sources on a national and state level, which adopted various Medicaid policies. Such as policies designed to improve maternal health care and reduce racial-ethnic disparities between Black and Hispanic women when compared to White women.

This research has several limitations. The policy scan relied on published information that may not reflect more recent policy changes. The lack of being able to speak directly with Texas Medicaid enrollees to hear their perspectives on policies that they think would be most effective at closing racial and ethnic gaps in maternal health. In addition, a limited number of Texas maternal health initiatives were researched. The number of initiatives included is not meant to be an exhaustive list of relevant initiatives in Texas for maternal health outcomes. The intent of the list is to show that Texas has

programs in place to address underlying barriers that impact maternal health outcomes. Lastly, though many of the policy approaches suggested could be applicable to Medicaid programs around the country, some of the insights discovered, such as political barriers, may not be as relevant in Texas.

Findings

In recent years, a growing number of Medicaid programs have adopted policy changes that could improve the racial and ethnic gap in maternal outcomes. In Table 1, there is a list of Medicaid policies available for state level adoption and Texas decision (Eldrige, et al., 2023). The policies are divided across three domains: eligibility, coverage, and services; care delivery transformation; and data and oversight. The list is not an exhaustive list of policies but highlights policies reviewed for this research and identified as important in advancing maternal health within Texas Medicaid.

Table 1

Selected Medicaid/CHIP Maternal Health Policies as of 2022. Source: Johnson et al., 2023.

Domains	**Medicaid/CHIP Maternal Health Policy for States to Adopt:**		**# of Adopted Policy** *N=51*	**Texas Adopted Policy**
Eligibility, Coverage, and Services	**Family Planning & Related Services:** As of September 2022, has Texas adopted an option under the ACA to expand eligibility for family planning using Section 1115 waiver?		27	Yes

	Adoption of ACA Medicaid Expansion: As of September 2022, has Texas adopted the ACA's Medicaid Expansion, covering nondisabled women with income below 138% of FPL who qualify for access to health insurance throughout their reproductive years.		39	No
	12-Month Postpartum Extension: As of September 2022, has Texas adopted a 12-month extension for Medicaid/CHIP postpartum coverage?		26	No
	Immigrant five-year residency waiver for pregnancy-related coverage: As of September 2022, has Texas waived the five-year waiting period for lawfully residing immigrants to receive pregnancy-related Medicaid/CHIP?		25	No
	Perinatal Community Health Workers: As of September 2022, does Texas allow perinatal community health workers		27	Yes

	to prepare individuals to serve within their community in various capacities?			
	Doula Services: As of September 2022, does Texas reimburse for professionally trained doula services such as: non-clinical emotional, physical, and educational support to a mother before, during, and after childbirth? ***Note:*** Doula services help individuals meet their goals for labor and birth by using techniques that require minimal interventions and have high rates of patient satisfaction.		36	No
	Presumptive Eligibility: As of September 2022, Texas adopted providers to begin treating pregnant people when they first seek prenatal care rather than waiting until after their Medicaid eligibility is reviewed and determined, which can take several weeks.		32	Yes

	Freestanding Birth Centers: As of September 2022, does Texas reimburse for freestanding birth centers that are a healthcare facility that uses a midwifery model of care to provide services during pregnancy, labor and delivery, and the postpartum period? Freestanding birth centers are not connected to or affiliated with hospitals.		13	No
Care Delivery Transformation	**Telemedicine for Pregnancy Care:** As of September 2022, does Texas reimburse for telemedicine services for pregnancy care?		51	Yes
	Payment Reform: As of September 2022, does Texas allow adjusting financial incentives for providers to improve maternal health outcomes? ***Note:*** States are using payment incentives to reduce poor outcomes and increase access to pregnancy-related and postpartum care.		32	Yes

	Reimbursement for Postpartum Long-Acting Reversible: As of September 2022, does Texas reimburse for long-acting reversible contraception (LARC) such as intrauterine devices and the contraceptive implant are highly effective and safe? ***Note:*** Immediate postpartum LARC (inserted during the period following childbirth and prior to hospital discharge) has the potential to reduce unintended and short-interval pregnancy, which leads to better health outcomes and cost savings.		47	Yes
Data and Oversight	**Maternal Mortality Review Committees.** As of September 2022, Texas Maternal Mortality Review Committees (MMRC) investigate pregnancy-related mortality and morbidity and develop comprehensive recommendations for		50	Yes

	states and legislatures to reduce future deaths.			

A large and growing number of states have extended postpartum Medicaid/CHIP coverage from 60 days (mandatory for all state-level programs) to up to 12 months postpartum (optional for state-level programs). This optional Medicaid policy is available to all states. This allows states the option to extend health care for women until one year after delivery or when the pregnancy ends. Texas adopted this policy on March 1, 2024; however, as of August 1, 2024, 47 states, including Washington, D.C., have implemented a 12-month extension for Medicaid postpartum coverage (KFF, 2024).

The uninsured rate for all women of childbearing age has dropped from 21.0 percent in 2013 to 12.8 percent in 2019 (Clark, et al., 2021). As of the latter part of 2024, 41 states (including Washington D.C.) have adopted the ACA Medicaid Expansion, and the number is continuously growing (KFF, 2024). However, Texas is not among the states that have adopted the ACA Medicaid Expansion. Research shows states that adopted the Medicaid Expansion policy saw the steepest declines in the uninsured rate for women of childbearing age (Eckert, 2020). More than half of the 7.5 million uninsured women of childbearing age—53.8 percent— lived in the 17 states that had not expanded Medicaid by 2019. Roughly one out of every four uninsured women of childbearing age in 2019 lived in either Texas or Florida (Clark, et al., 2021). Women of childbearing age who lived in non-expansion states were more than twice as likely to be uninsured (19 percent) than women living in states that had expanded Medicaid (9.2 percent) in 2019, and the trend extended to all racial and ethnic groups (see Figure 3). For instance, a Black woman in Texas, a non-expansion

state, had an uninsured rate (21.4 percent) more than double the average rate for Black women living in expansion states (9.0 percent).

Figure 3

Disparities in Uninsured Rates for Women of Childbearing: Age (18-44) by Expansion Status and Demographic, 2019.

	Uninsured Rate: Expansion States	Uninsured Rate: Non-Expansion States	Women in Non-Expansion States are X Times More Likely to be Uninsured
Race			
American Indian/Alaska Native	19.9%	31.1%*	More than 1.5x
Asian/Native Hawaiian/Pacific Islander	6.8%	11.3%*	More than 1.5x
Black/African American	9.0%	18.2%*	2x
Other	16.3%	32.9%*	2x
White	8.3%	18.2%*	More than 2x
Ethnicity			
Hispanic/Latina	17.7%	35.5%*	2x
Not Hispanic/Latina	7.0%	14.6%*	More than 2x

Note: "Other" category includes those who identify as "two or more races" or "some other race." The American Community Survey measures race and ethnicity as two separate facets of an individual's identity. Hispanic/Latino individuals can be of any race.

** Indicates that change is significant at the 90% confidence level relative to the category indicated.*

Source: Georgetown University Center for Children and Families analysis of U.S. Census Bureau American Community Survey (ACS) 2019 Public Use Microdata Sample (PUMS).

Medicaid has opportunities to improve maternal health through better care before, during pregnancy, and delivery. In states such as Texas, the lack of Medicaid expansion limits access to reproductive health care, preconception care, and the postpartum period, all of which affect maternal outcomes (Clark et al., 2021). The median Medicaid threshold for nonpregnant adults is 138 percent of the federal poverty level (FPL) in states that have adopted the ACA's Medicaid expansion (Eckert, 2020). For instance, in Texas, a mother in a one-parent household set up, will need to earn below 138% x $14,580 = $20,120.40 in 2023 to be eligible for Medicaid.

Underlying Drivers of Disparities

Several drivers were identified as being advancing maternal health care equity in the Texas Medicaid program. To improve health outcomes, reduce maternal mortality, and address health equity disparities, Texas must address these drivers:

- Political sensitivities include an unwillingness to acknowledge and discuss racism or inequity directly to how it impacts healthcare outcomes.
- A lack of awareness of or interest in available tools to promote perinatal health and how it can improve maternal health outcomes.
- A lack of quality data on racial and ethnic disparities and detailed plans for evaluating the effectiveness of policies implemented to address equity.
- The variation in access to maternal health services and providers and coordination across the continuum of care.
- Limited funding for care delivery transformation initiatives, such as freestanding clinics and doula services.
- The high number of uninsured women of child-bearing age in Texas lack access to before, during pregnancy, and delivery care.

Initiatives Promoting Maternal Health and Outcomes

Research about Texas Medicaid revealed several efforts happening at the state level to improve and promote maternal health and outcomes. These key projects include:

- Texas Alliance Innovation on Maternal Health (TexasAIM) project works with hospitals and clinics to improve safety projects for pregnant women. Also, provides support and training on three safety ‘bundles’ – a set of strategies shown to improve health outcomes. (DSHS, 2024).
- Texas Maternal Mortality and Morbidity Review Committee (MMMRC) is a review committee that studies maternal deaths to identify trends and recommend ways to reduce pregnancy-related deaths (DSHS, 2024).
- Community Coalitions provide funding to nine communities to improve maternal health (DSHS, 2024).

- Texas Collaborative for Healthy Mothers and Babies (TCHMB) provides funding and support to the University of Texas Health Science Center in Tyler to work with health care providers, hospitals, advocates, scientists, and insurers to improve birth and health outcomes (DSHS, 2024).
- Texas Mother Friendly Worksite Program aims to provide education and support to employers to provide a space for breastfeeding mothers returning to work. (DSHS, 2024).

These projects directly address maternal care and health outcomes. They also highlight Texas' efforts to improve maternal outcomes with current resources and programs. These projects are not meant to be an exhaustive list and do not include efforts that hold MCO accountable, performance improvement projects, and coverage of additional services in Medicaid. as the road map for quality improvement and accountability.

Conclusion

Like other states across the nation, Texas adopted policies to expand access to care and improve maternal outcomes, such as extending postpartum coverage. The policies adopted by Texas highlight the need for more research to understand the decision as to which policies are adopted and should be adopted to specifically increase maternal access and improve maternal health equity. There is the potential that the policies adopted may seem beneficial but have not improved maternal outcomes or reduced the disparity gap. Also, policies that work together and support each other to improve outcomes in aggregation could allow established disparities to remain in place. For Medicaid programs to improve access to care and reduce the race and ethnicity disparity gap, complete data is required for Medicaid enrollees, and updates to policies and adoption of new policies are required for Texas to dramatically

improve maternal health equity and access to maternal healthcare. Also, the overturning of Roe v. Wade increased barriers to abortion will add a different set of challenges to the existing challenges in maternal health. There are approximately 860 women dying each year from pregnancy-related causes and many more experiencing maternal morbidities, so improving maternal health and narrowing inequities are crucial priorities, not only for Texas but for the nation.

References

American College of Obstetricians and Gynecologists (ACOG). (2024). *Policy priorities: Medicaid*. Retrieved from https://www.acog.org/advocacy/policy-priorities/medicaid#:~:text=Share,ACOG%20advocates%20for

Centers for Medicare & Medicaid Services (CMS). (2022). *Supporting Maternal Health Through Medicaid & the Children's Health Insurance Program*. Supporting Maternal Health Through Medicaid & the Children's Health Insurance Program | CMS

Clark, M., Bargeron, E., & Corcoran, A. (2021). *Medicaid expansion narrows maternal health coverage gaps, but racial disparities persist*. Georgetown Health Policy Institute. Retrieved from https://ccf.georgetown.edu/wp-content/uploads/2021/09/maternal-health-and-medex-final.pdf

Eckert, E. (2020). *It's Past Time To Provide Continuous Medicaid Coverage For One Year Postpartum*. Health Affairs Blog. DOI: 10.1377/hblog20200203.639479

Eldridge, G. N., Khanal, P., & Zephyrin, L. C. (2023). *State policies to improve perinatal health outcomes.* Commonwealth Fund. Retrieved from https://doi.org/10.26099/x0x0-gt30

Eliason, E. L. (2020). *Adoption of Medicaid expansion is associated with lower maternal mortality*. Women's Health Issues, 30(3), 147-152.

Haley, J. M., Johnston, E. M., Hill, I., Kenney, G. M., & Thomas, T. (2021). *The public health insurance landscape for pregnant and postpartum women*. Urban Institute. Retrieved from https://www.urban.org/research/publication/public-health-insurance-landscape-pregnant-and-postpartum-women

Hoyert, D. L. (2021). Maternal mortality rates in the United States. *NCHS Health E-Stats*. DOI: https://dx.doi.org/10.15620/cdc:124678

Johnson, R., Eldridge, G. N., Khanal, P., & Zephyrin, L. C. (2023). *State Policies to Improve Perinatal Health Outcomes.* The Commonwealth Fund. State Policies to Improve Perinatal Health Outcomes | Commonwealth Fund

KFF. (2024). *Medicaid Postpartum Coverage Extension Tracker*. https://www.kff.org/medicaid/issue-brief/medicaid-postpartum-coverage-extension-tracker/#:~:text=Medicaid%20Postpartum%20Coverage%20Extensions:%20Approved%20and%20Pending,*%20Limited.%20coverage%20extension%20proposed%20(1%20states .

Ndugga, N., Pillai, D., & Artiga, S. (2024). *Disparities in health and health care: 5 key questions and answers.* KFF. Retrieved from https://www.kff.org/racial-equity-and-health-policy/issue-brief/disparities-in-health-and-health-care-5-key-question-and-answers/

Texas Maternal Mortality and Morbidity Review Committee (MMMRC). (2024). *Texas Maternal Mortality and Morbidity Review Committee and Department of State Health Services joint biennial report 2024*. The Texas Department of State Health & Human Services. Retrieved from https://www.dshs.texas.gov/sites/default/files/legislative/2024-Reports/2024-MMMRC-DSHS-Joint-Biennial-Report.pdf

Texas Department of State Health & Human Services (HHS). (2024). *Campaigns, programs, and activities – Maternal and child health.* Retrieved from https://www.dshs.texas.gov/maternal-child-health/healthy-texas-mothers-babies/maternal-health-

texas#:~:text=Texas%20Alliance%20Innovation%20on%20Maternal,shown%20to%20improve%20health%20outcomes

World Health Organization (WHO). *Maternal Mortality. 2024.* https://www.who.int/news-room/fact-sheets/detail/maternal-mortality

Translation and cross-cultural adaptation of the Brisbane Evidence-Base Language Test to MEAA, a Maltese-English Aphasia Assessment for Maltese Bilingual Adults

by

Lorraine Vassallo, University of Malta

Adapting an aphasia test for bilingual Maltese individuals will address a critical unmet need, in that a standardized, psychometrically robust aphasia assessment tool, in Maltese and English, for Maltese bilingual adults is not available. The research study is divided into three phases : (1) the translation/adaptation of the Brisbane Evidence-Based Language Test (BEBLT) into Maltese, now known as the Maltese-English Aphasia Assessment (MEAA); (2) the pilot and normative study; (3) the main study when MEAA will be administered to bilingual persons with stroke (BPwS) and bilingual persons with aphasia (BPwSA) as a result of stroke. Phase 1 and part of Phase 2 (the Pilot study), which provides the preliminary performance of neurotypical Maltese bilinguals, will be discussed.

Key Words: bilingual aphasia, language impairment, stroke, assessment, speech-language therapy

Assessment for Maltese Bilingual Adult

Although, to date, a full consensus on the definition of aphasia has not yet been reached (Berg et al., 2022), aphasia will be defined here as an "acquired selective impairment of language modalities and functions resulting from a focal brain lesion in the language dominant hemisphere" (Papathanasiou & Coppens, 2022). This neurogenic disorder affects the reception and production of language across modalities. As an acquired loss of a degree of language abilities, aphasia is due to some event condition or type of neurological disorder that leads to a loss of language ability. Although aphasia may be caused by traumatic brain injury, neoplasms, or neurological disease, the most common etiology is a cerebrovascular accident (stroke).

According to the World Stroke Organization (WSO, 2023), an estimated 12 million new stroke events occur annually, with half ending in death. Currently, 100 million individuals are stroke survivors worldwide, with 50% suffering from chronic

disability (Donkor, 2018). Just under 90% of individuals with stroke will suffer a communication disorder (O'Halloran et al., 2009), and one in 3 people will acquire aphasia (Brady et al., 2016). According to the National Aphasia Association, a quarter of a million people in the U.K. and over 2 million individuals in the US have aphasia, with a staggering 27 million globally.

According to the Malta Directorate of Health Information and Research (DHIR, 2021), 736 patients were diagnosed with cerebrovascular disease before being discharged from the local hospital. For the population size of Malta, which is around half a million, this is a substantial number. Individuals diagnosed with stroke need to be identified and comprehensively assessed to make sure that they are referred to for the necessary services. The Burden of Stroke in Malta report (King's College London) predicts a 66% increase in cerebrovascular episodes by 2035. Maltese and English are the country's official languages, and the majority of the population uses both languages to varying degrees. According to The State of the Maltese Language, National Survey (2021), the Maltese sociolinguistic scenario is described as bilingual, with 97% of citizens claiming Maltese as the primary spoken language, with most nationals also able to speak English with various degrees of proficiency in multiple domains. In this study, bilinguals are individuals who use more than one language on a regular basis (Grosjean, 2021). Therefore, in the bilingual Maltese sociolinguistic scenario, attention to the interrelation between bilingualism and the recovery of language difficulties in Maltese adults with post-stroke aphasia is necessary.

Research has shown that post-stroke language difficulties can differ between the languages spoken by the bilingual individual or polyglot (Kuzmina et al., 2019), leading to varying language recovery prognoses. Because the pattern of language difficulties and recovery in bilingual persons who acquire post-stroke aphasia may not occur at

the same rate and to the same degree per person and per language, assessing a bilingual's post-stroke aphasia in only one language provides only a partial/limited picture of his/her reality, leading to potentially incorrect diagnosis and suboptimal treatment options. Hence, comprehensive testing is needed in both languages (Paradis, 2014) with a linguistically and culturally equivalent instrument.

Currently, a few language assessments in Maltese exist, such as the Maltese version of the Boston Naming Test (Grima & Franklin, 2016), the Maltese Aphasia Screening Test (MAST) (Grima, 2015), and the Token Test (Grima, 2016; Fenech, 2019). Although validated and normed on the Maltese population, a shortcoming of these assessments is that the psychometric data pertains to assessment solely in the Maltese language and only on certain components of language. A much-needed standardized, reliable, valid, and normed assessment that is comparable in both languages (Maltese and English) to test the Maltese-English bilingual person with post-stroke aphasia is unavailable. Emphasis is made on the need to create more bilingual assessments globally to determine the presence and severity of language disability in bilingual individuals, reliably assessing both of the bilingual's language capabilities. This paper, which describes the adaptation project of the B-EBLT, illustrates the value of the creation of MEAA**,** the Maltese English Aphasia Assessment. The research intends to produce a culturally and linguistically equivalent tool in Maltese and English (MEAA), which, normed on native bilingual Maltese speakers, will furnish data for improved clinical analysis, leading to enhanced accuracy in the differential diagnosis of language impairment in Maltese - English bilingual persons following stroke. As an aid to concentrated therapy, the MEAA will consequently assist in the improved recovery of one's linguistic competence.

This shortage of Maltese-English language tools leads one to surmise that Maltese bilingual stroke individuals struggling with language difficulties have been, to date, tested in only one of their languages or tested informally in both. Administering an evidence-based linguistically and culturally equivalent aphasia test in both the Maltese and English languages not only aids in improved accuracy in the diagnosis of aphasia but also provides a clear and selective description of the difficulties encountered in both languages and the degree of the language impairment in both languages (Paradis & Libben, 2014). This current study is the first to identify the most appropriate aphasia test for bilinguals who speak both Maltese and English. Developing a culturally and linguistically appropriate aphasia measurement tool that looks specifically at language impairment in Maltese and is comparable and equivalent to its English counterpart will uphold the science of bilingual aphasia assessment. As emphasized by Paradis (2014), all the languages of a person with post-stroke aphasia should be assessed with a linguistically and culturally equivalent instrument to accurately evaluate the individual's linguistic competency.

The Multilingual Aphasia Practices Group (MAP), a subgroup of the Aphasia Assessments and Outcomes working group of the Collaboration of Aphasia Trialists, works to promote the adaptation of comparable assessment tools across European spoken languages. Following these guidelines, various aphasia assessments (in English) were compared and contrasted for strengths and weaknesses to identify the most appropriate aphasia instrument for the Maltese bilingual population. These included:

- The Quick Aphasia battery (QAB; Wilson, Ericsson, Schneck, & Lucanie, 2018),
- The Boston Diagnostic Aphasia Examination (BDAE; Goodglass & Kaplan, 2001),

- The Comprehensive Aphasia Test (CAT; Swinburn, Porter & Howard, 2005),
- The Brisbane Evidence-Based Language Test (B-EBLT; Rhode et al., 2020)
- The Bilingual Aphasia Test (BAT; Paradis & Libben, 1987)

The approach used to determine which aphasia test would be adapted for this study included a systematic review and a comparative analysis with a discussion of the pros and cons of each aphasia test. Following analysis, the Brisbane Evidence-Based Language Test (B-EBLT) (Rohde et al., 2020) was identified as the appropriate aphasia test to be translated and adapted into Maltese and used in the proposed research study.

Several issues were taken into consideration during the evaluation of the available aphasia tests. In addition to being comprehensive, the B-EBLT is also time efficient when compared to other lengthy assessment tools for use in clinical settings. Furthermore, the BEBLT boasts of elevated psychometric standards as its development was guided by evidence-based practices. In addition, a preliminary systematic review of existing commonly used English aphasia tests shows no published diagnostic validation data, indicating that these tests are not diagnostically validated to diagnose aphasia in stroke, whereas the B-EBLT is. The translated and adapted B-EBLT to Maltese will be known as the Maltese–English Aphasia Assessment (MEAA).

Materials and methods

The research project is divided into three phases:

Phase 1: The translation and adaptation of the B-EBLT into Maltese (MEAA)

Phase 2: The pilot study and the normative study

Phase 3: The main study during which MEAA will be administered to adults with a history of stroke with (BPwSA) and without aphasia (BPwS).

Phase 1: The translation and adaptation of the Brisbane Evidence-Based **Language Test**

A draft translation of the selected instrument (B-EBLT) was followed by a high-quality professional translation together with a linguistic and cultural analysis to ensure the adaptation of the tool for the Maltese community. Meetings were held with the author of the B-EBLT. Tasks on the original B-EBLT and the reason for their selection were addressed. Further discussion followed with the team of supervisors to determine cultural equivalency between the English version and the translated Maltese version, ensuring comparability.

The International Classification of Functioning, Disability, and Health (ICF) is the WHO classification system that provides a common language in providing a scientific basis for the comparison of health and disability data across cultures. Based on ICF principles, the WHO Disability Assessment Schedule (WHODAS) was developed as a standardized method for measuring disability and health across countries. Stemming from this instrument is WHODAS 2.0 Translation Package which provides protocols for translation.

The forward translation of the B-EBLT into Maltese was performed by a qualified translator, thus abiding by the first step of the WHODAS 2.0 Translation package guidelines. Hence, the first version of the MEAA was born.

The state of the science of bilingual aphasia assessment is that an accurate evaluation of a bilingual's linguistic abilities entails testing both languages with an equivalent assessment tool. Directly translating a test from one language to another is never appropriate (Paradis, 2014) because there is no reciprocal match between words, syntax, or phonemic intricacies between any two languages. Hence, in the MEAA project, what has been proposed is not simply producing a translation of an

aphasia test in Maltese but rather an "adaptation" of a different language version upholding the original's "cognitive capacities."

Therefore, to create a linguistic instrument for the Maltese - English bilingual individual with aphasia, a mere translation of the assessment into Maltese would potentially create an inadequate assessment tool. The creation of a meaningful project that would allow assessment of aphasia involves adapting the assessment from one language to another ensuring linguistic and cultural equivalence between the two versions.

Continuing with the WHODAS 2.0 principles, the backward translation followed the forward translation step. Back-translation entailed the translated MEAA from the source language to Maltese, being now translated back to its original language (English).

Discussions ensued between the forward and backward translators together with an expert Maltese linguist from the Department of Maltese at the University of Malta, a speech-language pathologist, the researcher, and the supervisory team to address certain terms, linguistic differences, gender issues with respect to the Maltese language and potential modifications. To establish content validity, the professional Maltese linguist and the SLP reviewed the translated tools, ensuring the questions covered the constructs being measured, in addition to cross-language equivalence. This determined whether any amendments were needed in both the Maltese and English versions of the BEBLT, certifying adaptation to the local Maltese context. Some adjustments were implemented. The original meaning of the task/question/word asked in the source language of the aphasia assessment tool (B-EBLT) guided the cross-language and cross-cultural equivalent adaptation of the B-EBLT into the target language (Maltese).

Participants

Phase 2: The pilot study and the normative study Neurotypical (healthy) group (NG). In Phase 2, two pilot studies (Step 1a and Step 1b) tested the feasibility of the adapted assessment tool, MEAA, contributing face and content validity. The two pilot cohorts included:

Step 1a. 20 young (20 - to 35 35-year-old), randomly selected, healthy, highly proficient (post-secondary and tertiary education), bilingual Maltese-English adults with no neurological and /or language impairment history. This step identified any potential ambiguities and deficiencies, and any necessary amendments were made, contributing to preliminary validation (face validity). (See Table 1 for NG characteristics).

Step 1a (piloting for face validity) involved the administration of both the English and Maltese versions of the MEAA to a young cohort of 15 randomly selected neurotypical individuals. The pilot study Step 1a was to originally include 20 healthy young individuals ages 20-35 years of age. Alternatively, the group consisted of a cohort of 15 individuals, as the researcher was more successful at recruiting older (>35 years of age) participants. Consequently, more than 20 individuals participated in the pilot study Step 1b. This small-scale preliminary study, which is the first step to standardizing the MEAA, was to test the feasibility of the MEAA adaptation, addressing clarity and comprehensibility, with the purpose of effecting possible amendments to the preliminary Maltese-English version and the study design, easing the administration of MEAA in Maltese bilingual individuals. Piloting on a young, healthy cohort contributed to face validity by providing the opportunity to analyze and consider potential amendments to the project. Having face validity for the MEAA is the initial indicator of whether this bilingual aphasia assessment tool is likely to measure what it

is intended to measure. The pilot study step is crucial before undertaking the normative study, as it allows for identifying possible deficiencies in areas such as the research protocols, data collection instruments, and strategies employed in recruitment and research techniques (Hassan et al., 2016).

The data and information acquired while piloting allowed for minor translation modifications in several questions on the MEAA to ensure linguistic equivalence between both the Maltese and English versions. Step 1a (and proceeded in Step 1b) allowed probing for ambiguities in instructions or visual misperception of stimuli and determined the necessary changes to the adaptation of the Maltese-English aphasia test before commencing the normative study.

In addition, Step 1a enabled the determination of appropriateness of the Demographic and Language Background Questionnaire (DLBQ), that is, whether the terminology used, both in the Maltese and English sections of the DLBQ, were comparable and comprehensible. In fact, a few questions pertaining to “Language functionality by modality” were minimally reworded due to a number of participants reporting an issue with dubious comprehension of particular terminology. It was decided that during the administration of the rating of a participant's ability in various areas of language functions (spoken and written comprehension and production), the researcher would ask the question in a simplified manner, for example. "How do you rate your understanding of spoken Maltese/English '' instead of the original statement ("How do you rate your Maltese/English spoken comprehension?"), which on occasion prompted the participant to verify more than once what was expected of him/her. This step also provided insight into whether patient consent forms were user-friendly with no ambiguous statements that would need to be modified.

Step 1b. This step provided a solid foundation and the groundwork for the research project. Content validity was ascertained by an expert review of MEAA by a qualified SLP with experience working with adults, a Maltese linguist, and a professional translator. Evaluation of the preliminary translation and adaptation of the assessment and the DLBQ ensured the content of the tools was suitable to the assessment aims. The DLBQ will be used to collect language history data from participants, including the individual's self-reported language proficiency in Maltese and English and the participant's personal history of bilingualism, language use in various environments, and language dominance. The DLBQ provides a participant's self-rating total score in Maltese and total score in English on spoken language comprehension, spoken language production, written language comprehension, and written language production. These scores generate a DLBQ composite score. Because this score is subjective, creating a statistical dependency that is intrinsic to the individual, a subtraction score has been calculated to remove the statistical dependency.

Subsequent to the first pilot study (Step 1a) and a review for face validity, piloting Step 1b proceeded on yet another small cohort (35 individuals), this time comprising healthy, neurotypical individuals of varied ages and education levels. (See Table 1 for NG characteristics). In addition to the original goal of 20 participants, 15 additional participants were included in the piloting step 1b because the modification of a written task in Maltese had not yet been finalized. Hence, these participants were not included in the normative study but were counted as part of the pilot study. Most NG participants were right-handers and reported no visual and auditory impairments (except for some individuals needing corrected-vision prescription glasses).

The subject matter experts audited both translated tools (MEAA and the DLBQ) to assess whether the items included were comprehensive and relevant in

representing the concepts being studied. Additionally, their expert judgment determined whether any amendments would be needed in both the Maltese and English versions of the BEBLT/MEAA and the DLBQ, ensuring adaptation to the local Maltese context. Meetings were held with the experts to address linguistic and cultural issues, such as (a) Maltese being a gendered language in comparison to English, (b) whether any sentence types or word variables needed to be changed in the original English version of the MEAA (the B-EBLT) to ensure cross-language equivalence and produce the best adaptation for the Maltese bilingual community.

During administration of the MEAA in the pilot study, attention was given to particular words, sentences and language differences that resulted from the two translation versions. Data from this sample provided targeted responses and typical performances of adults, to be able to make comparisons. Of note is that the Step 1b pilot participants covered an age spectrum that includes the age of individuals who will be the most prevalent demographic group in the eventual cohort of people with aphasia (i.e., over 65 years old).

Step 2. In addition, MEAA is being administered to a larger normative sample of neurotypical adults [N = 100] with proposed equal/similar gender distribution of varying ages and years of education. The Phase 2 normative study will be discussed in the following paper. To evaluate reliably and quantify the strengths and weaknesses of a person with aphasia, an assessment needs to be normed (Ivanova et al., 2021). This study will identify scores of typical performances of the assessment to establish a baseline distribution for MEAA.

Table 1

Pilot Study Participants' Characteristics

N	50 (step 1a N = 15; step 1b N = 35) *
Gender (M/F)	13/37
Age (years)	18-81
Years of education	Primary, secondary, post-secondary, tertiary and beyond

Note. *The reason for a larger group of pilot study participants is explained above.

Clinical group (CG): BPwSA and BPwS

In Phase 3, the main study, MEAA, will be administered to adults with a history of stroke, with aphasia, and without aphasia. The cohort of neurologically impaired bilingual individuals with a goal of N = 250 with a diagnosis of an ischemic or hemorrhagic stroke will be divided into two subgroups: Group B1, BPwS (bilingual persons with stroke and no language impairment) and Group B2, BPwSA (bilingual persons with stroke and aphasia). Of note here is that this research project abides by the definition that bilinguals are individuals who use more than one language on a regular basis (Grosjean, 2013) to varying degrees of proficiency.

Individuals will be recruited from the Stroke Unit at the Karen Grech Rehabilitation Hospital in G'Mangia, Malta. The participants will include both male and female, medically stable patients who are able to sit up for at least 20 minutes. Participants may be diagnosed to be in the subacute phase, typically 3 months post-onset. However, if the patient is medically stable after just a few weeks following the cerebrovascular event, (s)he may be included in the study, keeping in mind that in the end, the population that will need to be assessed and will benefit from the MEAA will include all individuals who have experienced a stroke. Both the BPwSA and BPwS

participants will be of all ages and of all levels of education, excluding participants with a confirmed diagnosis of major cognitive disease (such as dementia), neurological conditions such as TBI, brain tumors, previous strokes, and other significant medical conditions that could render challenging the participant's ability to participate fully in the study. A signed consent form is necessary to proceed. Data collection from these cohorts of neurologically impaired patients will help identify scores for increased accuracy in the diagnostic classification of language impairment in Maltese BPwS and BPwSA.

To ensure that data collection, data analysis, and data reporting of both groups of neurologically impaired participants are accurately described in the bilingual aphasia research project, DESCRIBE standards (Wallace, Isaacs, Ali & Brady, 2023) will be adhered to. These standards have been created to help researchers be consistent when describing participant characteristics. Abiding by the DESCRIBE checklist will eliminate any discrepancies and/or ambiguities when comparing data in post-stroke aphasia studies.

Inter-rater and Test-retest reliability and validity of the normative group and the BPwSA and BPwS groups

Inter-rater reliability will be analyzed by randomly selecting a small number of individuals (10%) from the clinical sample cohort and comparing independent clinician/SLP scores of randomly selected audio recordings of the MEAA sessions. This will be undertaken both in the normative study as well as the main study.

Furthermore, the MEAA will be administered on two separate occasions to 10% of the clinical sample population, 2-3 weeks apart, preferably with no treatment provided between sessions. This will help measure the consistency and stability of the instrument over time, contributing to MEAA’s reliability (test-retest reliability). In

addition to the MEAA, another test will be administered to a small group of the healthy and the clinical sample cohorts to address concurrent validity. This would evaluate the MEAA scores and address whether the assessment is comparable to another measure by yielding results comparable to those of the established test. This comparable test will be the MAST (Maltese Aphasia Screening Test) (Grima, 2015). Administering this test will determine whether the MEAA is measuring what it is supposed to measure. The MAST (a gold standard Maltese Aphasia Screening Test) will be administered to a portion of Sample B1 (BPwS)and B2 (BPwSA) participants (10% of the cohort). In addition to being comprehensive and time efficient, the MAST screening test is a reliable and valid tool for identifying language difficulties in Maltese individuals with post-stroke aphasia. To establish a significant and strong construct, concurrent and convergent validity, the correlation between the MEAA and the MAST, as a well-established Maltese test, is crucial. This comparison between the two assessment instruments is important for establishing MEAA's accuracy, reliability, and consistency.

Rationale and development of the MEAA

There is a need to create more bilingual assessments as a way of determining the presence and severity of a language disability in bilingual individuals. In non-English populations one encounters a shortage of standardized, normed, and validated assessments to reliably assess both of the bilingual's language capabilities.

The scientific rationale for this research project has its roots in the current understanding that bilingual adults must be assessed in each of the languages they speak pre-morbidly when aphasia is suspected (Lekoubou et al., 2015). There exists a gap with respect to the evaluation of aphasia in Maltese bilingual adults. This can be addressed by developing the MEAA that will lead to accurate diagnosis, a severity

rating, and identification of specific areas of language impairment in Maltese and English in the context of aphasia post-stroke. The purpose of this study is to create/adapt a culturally and linguistically equivalent/comparable Maltese-English aphasia assessment tool that will be specifically developed and validated for bilinguals who speak Maltese and English, thus filling a specific clinical need, complementing the current diagnostic and assessment repertoire available for speech-language pathologists (SLPs). As a standardized, reliable, and valid assessment, the development of MEAA will be a significant contribution to the Maltese healthcare system and a benefit for the stroke patient.

The general structure of the test

MEAA in English (see Fig 1) and Maltese (see Fig 2) is an innovative, comprehensive, multimodal assessment tool that can be administered to the Maltese bilingual individual in a shorter amount of time than other aphasia assessments in the field. The five subtests (Perceptual, Auditory Comprehension, Verbal Expression, Reading, and Writing) include a total of 49 multidimensional tasks (including four self-rating questions) to assess and measure all levels of linguistic structure (word and sentence) and domains, including phonology, syntax, and semantics (see Fig 3).

The five domains include various subtests in visual and oral form and in order of difficulty. This hierarchy helps determine at which level each modality language function is impaired or retained. The time efficient and user-friendly MEAA takes about 45 minutes to administer per language (Maltese and English). Administration and Scoring Guidelines are provided to assist in the administration and interpretation of the MEAA results. Each task, with its individual score, leads to measures indicative of the individual's linguistic abilities.

An accurate evaluation of a bilingual's linguistic abilities entails testing both languages with an equivalent assessment tool.

Translation and Adaptation of the Brisbane - EBLT

As explained in the Materials and Methods section earlier, Phase 1 of the entire research project was dedicated to an extensive review of available aphasia tests to identify the appropriate aphasia assessment for use in the Maltese context. This led to the selection and translation/adaptation of the Brisbane Evidence-Based Language Test (Rohde et al., 2020) into Maltese. It is now known as the Maltese-English Aphasia Assessment (MEAA). This now completed step ensured the cultural and linguistic aspects of language were considered, ascertaining content validity and promoting equivalency and the accurate adaptation of the test. A preliminary attempt to translate the B-EBLT instrument into Maltese was followed by a high-quality professional translation together with a linguistic and cultural analysis to ensure the adaptation of the tool for the Maltese community. Directly translating a test from one language to another is never appropriate (Paradis, 2014) because there is no reciprocal match between words, syntax, and phonemic intricacies between any two languages. What was undertaken here was not simply producing a translation of an aphasia test in Maltese but rather creating a meaningful project that would allow assessment for bilingual aphasia. Assessing the Maltese bilingual adult requires an in-depth evaluation of his/her linguistic and communication capacity in both languages with an equivalent and comparable instrument; such a tool would, therefore, yield individual assessment findings at all linguistic levels and modalities (including speaking, understanding, reading, and writing).

Figure 1

*Page 1 of the English version of the adapted Brisbane Evidence-Based Language Test (B-EBLT) in English, now known as the Maltese-English Aphasia Assessment (MEAA) *

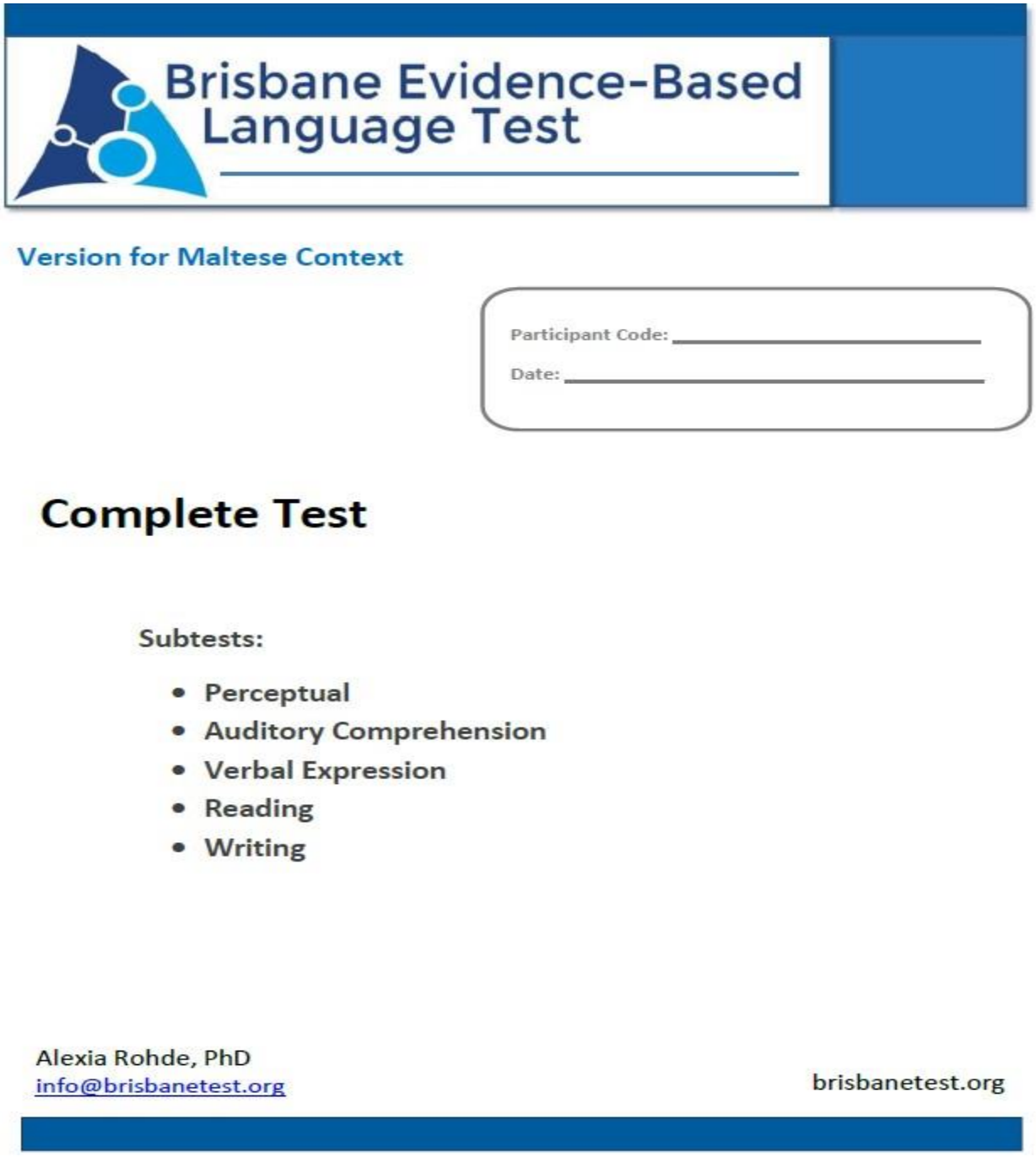


Figure 2

Page 1 of the Maltese version of the adapted B-EBLT assessment in Maltese, now known as the Maltese-English Aphasia Assessment (MEAA)

Figure 3.

Page 2 of the adapted B-EBLT/MEAA assessment in English.

Results Summary

SUBTEST	SCORE	COMMENTS	TOTAL
PERCEPTUAL			
1. Copying Gestures	/2		
2. Object to Object Matching	/2		
3. Demonstrating Object Use	/2		
4. Demonstrating Object Use from Pictures	/2		
5. Object to Picture Matching	/2		
6. Picture to Picture Matching (semantic links)	/5		/15
AUDITORY COMPREHENSION			
7. Yes No Questions	/10		
8. Following Verbal Commands	/8		
9. Identifying pictures by description	/6		
10. Identifying objects by function	/2		
11. Odd-one-out	/2		
12. Complex Question	/6	*(13) Self-reported difficulty? (Yes/No)*	
14. Synonyms	/2		/36
***VERBAL EXPRESSION**			
15. Automatic Speech	/1		
16. Sentence Completion	/2		
17. Personal / Orientation Questions	/6		
18. Repetition	/4		
19. Object Naming	/2		
20. Naming Actions	/2		
21. Picture Naming	/4		
22. *Naming objects from the room	/4		
23. Naming gestures	/2		
24. Verbal Fluency – Animals	/45		
24. Verbal Fluency – Words starting with F	/35		
25. Picture Description	/16	*(26) Self-reported difficulty? (Yes/No)*	
27. Word Definitions	/4		
28. Similarities and Differences	/2		
29. Proverbs	/3		/132
READING			
30. Object to Word Matching	/2		
31. Single Word Reading	/2		
32. Written Word to Picture Matching	/6		
33. Following Written Commands	/4		
34. Sums	/2		
35. Reading Aloud	/1		
36. Medicine Label	/3		
37. High Level Sentence Comprehension	/2	*(38) Self-reported difficulty? (Yes/No)*	
39. *Delayed Recall	/21		
40. Inference	/1		/44
WRITING			
41. Drawing Completion	/1		
42. Simple Copying	/2		
43. Functional Writing – Name	/2		
44. Functional Writing – Address	/3		
45. Writing to Dictation	/6		
46. Written Naming – Object	/1		
47. Written Naming – Gesture	/1		
48. Sentence Construction	/13	*(49) Self-reported difficulty? (Yes/No)*	/29

Total Brisbane EBLT Score	/256
Adapted Brisbane EBLT Total Scores	
Adapted score: excluding hospital ward items *If test is not administered at hospital bedside omit *Subtest 22 (which requires the naming of hospital ward objects) (note total possible test score is now 252)*	/252
Adapted score: excluding verbal expression subtests *If patient performance is proportionally more affected in Verbal Expression, query the presence of other expressive conditions (such as apraxia of speech) which may impact test score. If significant other expressive co-morbidities exist, exclude the *Verbal Expression section Q 15 - 29 and *Delayed Recall Q 39 and calculate total test score from the remaining items in the four following areas (Perceptual, Auditory Comprehension, Reading and Writing) (note total possible test score is now 103)*	/103

Note. The 5 subtests; Perceptual, Auditory Comprehension, Verbal Expression, Reading and Writing, include various tasks to assess each modality, the scores per task and the total score per section and per entire assessment.

Administration of the MEAA

Data collection commenced with administering the Clock Drawing Test (Shulman scale), a 5-minute cognitive components test, subsequently followed by a demographic and language background questionnaire (DLBQ). The DLBQ is a tool to obtain background information about the bilingual speaker and provides information about all the languages the participant acquired over the years. In addition, the questionnaire helps gain insight into the linguistic environment of the bilingual, the age of acquisition of his/her languages, and the individual's self-reported language proficiency in each of the languages (Maltese and

English) pre-morbidly. The DLBQ is administered only once in the participant's language of choice.

Both the Maltese and English versions of the adapted aphasia assessment (MEAA) were administered to the pilot study participants and subsequently the large normative study group. MEAA will be administered to the stroke cohorts in the coming months. Oral responses to the verbal fluency task (task 24) and the picture description task (task 25) were recorded on an audio recorder. On occasion, the entire assessment, both in English and Maltese, was recorded to investigate psychometric properties, namely inter-rater reliability and test-retest reliability.

During the assessment, pilot and normative study participants were asked to perform

44 out of the 49 tasks were grouped under the five subtests: Perceptual, Auditory Comprehension, Verbal Expression, Reading, and Writing. (5 tasks were not administered in the pilot and normative studies as this involved self-rating (no score) questions in which the participant would have to rate their performance in comparison to their premorbid capacities, and task 22, which involved naming objects in a (hospital) room. See Fig 3 for the 'Adapted score excluding hospital ward items'). The

task scores provided measures of the bilingual's linguistic abilities at various levels, which are in the phonological, morphological, syntactic, semantic, and pragmatic domains. The score obtained on both the Maltese and English versions of MEAA will be analyzed in collaboration with a qualified speech-language pathologist to gain insight into the individual's linguistic competency by examining each task and stimulus response in each language.

The adapted aphasia assessment typically takes around 45 minutes to complete per language. However, for the clinical sample, depending on the severity of symptoms, it is anticipated that the assessment session would take longer, depending on each participant. In addition, observant of the patient's abilities, the assessment may not be administered in its entirety. For continuity with the original administration of the Brisbane – EBLT assessment, the administration of the adapted tool, MEAA, will be paused when a participant appears fatigued or when medical care issues arise. In that case, it is discussed with the patient that, ideally, the administration of the assessment be resumed the following day. It is important to record the performance of the stroke participant around the same time while allowing a certain time frame to lapse to minimize the impact of spontaneous recovery. Oral responses will be recorded on an audio recorder. Discontinuation rules for Auditory Comprehension, Verbal Expression, Reading, and Writing modalities are as follows: Administration of the assessment will be discontinued if the patient is unable to score on three consecutive tasks. Consequently, the remaining items in the section will be recorded as incorrect, and the MEAA administration will proceed to the next section. With regard to the Perceptual modality, nil discontinuation rules apply. All patients will complete the subtest. Data collection from the cohorts of neurologically impaired patients will

help identify scores for diagnostic classification of language impairment in Maltese BPwS and BPwSA.

The administration of the MEAA in Maltese and in English will take place in a randomized order, at times administering the Maltese version first and the English second, and conversely initiating assessment in English followed by the Maltese MEAA. Subtests may also be randomized in the order of administration. This counterbalancing technique is used due to the MEAA's repeated measure design, which minimizes order effects in the administration of the Maltese and English versions.

Results and Discussion

Performance of the neurotypical group (NG) (the pilot study)

The research intends to produce a culturally and linguistically equivalent/ comparable tool in Maltese and English (MEAA), which will lead to enhanced accuracy in the differential diagnosis of language impairment in Maltese bilinguals post-stroke. Descriptive statistics for each subtest (Perceptual, Auditory Comprehension, Verbal Expression, Reading, and Writing) are presented in Table 2.

Pilot Study Data

The sample (N = 50) was made up of 37 female participants and 13 males. Data from 2 individuals were not included in the study due to the revelation of conditions that had not been revealed prior to the MEAA assessment session. Epilepsy and a cerebrovascular diagnosis in previous years were exclusion criteria. The youngest participant was 18, and the oldest was 81 years of age. The same participant is administered the English and Maltese versions of the

MEAA.

Table 2

Measures of central tendency

Descriptive Statistics ▼

	Adapted score: excluding hospital ward items _/252		Perceptual Total Score _/15		Auditory Comprehension Total Score _/36	
	English	Maltese	English	Maltese	English	Maltese
Valid	50	50	50	50	50	50
Missing	0	0	0	0	0	0
Mode	196.859	183.821	14.961	15.000	33.997	34.019
Median	195.000	184.500	15.000	15.000	34.000	34.000
Mean	190.200	184.220	14.600	14.920	32.600	32.980
Std. Deviation	31.534	13.718	2.138	0.396	5.222	4.830

*Verbal Expression Total Score _/132		Reading Total Score _/44		Writing Total Score _/29		DLBQ Total Score _/20	
English	Maltese	English	Maltese	English	Maltese	English	Maltese
50	50	50	50	50	50	50	50
0	0	0	0	0	0	0	0
83.576	69.959	34.682	36.922	28.641	27.343	19.793	19.670
83.000	72.500	35.000	36.000	28.000	27.000	19.000	19.000
81.540	74.660	34.460	35.720	27.000	25.940	18.380	18.220
15.712	9.456	6.380	3.923	4.314	2.598	2.059	2.418

Note. The description of the visible characteristics of the pilot study data set. The three measures of central tendency (mode, median, and mean) are very similar, implying that scores are approximately normally distributed. The distribution of the performance scores obtained by participants in the pilot study, in both the English and Maltese versions of the MEAA, satisfies the assumption of normality. The measure of dispersion (standard deviation) displays a measure of variability, showing how spread out the data tends to be.

Preliminary analysis of data (N = 50) provides baseline performance of neurotypical Maltese bilinguals, Perception [English (Eng) (M = 14.6, SD = 2.14) and Maltese (Mlt) (M= 14.9, SD = 0.40)], Auditory Comprehension [Eng (M = 32.60, SD = 5.22) and Mlt (M=32.98, SD = 4.83)], Verbal Expression [Eng (M = 81.54, SD = 15.71) and Mlt (M 74.66, SD = 9.46)], Reading [Eng (M = 34.46, SD = 6.38) and Mlt (M = 35.72, SD = 3.92)], and Writing [Eng (M = 27.00, SD = 4.31) and Mlt (M = 25.94, SD = 2.59)]. The total score on the MEAA English version is 190, and the Maltese MEAA score is 184. These preliminary descriptive statistical results indicate that although performance is similar in both languages, participants appear to perform better in

English than in Maltese in the overall MEAA assessment. When comparing the five modalities, Maltese performs better in perception, auditory comprehension, and reading. Inferential statistical analysis needs to be performed, especially in the healthy normative study group. Data collected in the normative phase of the study will set the baseline for the performance of healthy individuals on the MEAA. MEAA, which is normed in the Maltese population, will lead to increased accuracy in the diagnostic classification of language impairment in Maltese BPwS.

Of mention is that the extent of linguistic equivalence in an aphasia language assessment can be determined through various methods, including:

1. Translation (forward and back translation): This involves translating the assessment tools (the aphasia instrument, the DLBQ) from the source language (English) into the target language (Maltese) and then back-translating them to the source language to ensure accuracy and equivalence.
2. Cultural adaptation: Adapting the assessment tool to suit the cultural context of the target language (Maltese context).
3. Piloting: Administering the MEAA to a small sample of healthy bilingual individuals and comparing their responses in both Maltese and English.
4. Expert review: Having a Maltese linguist review the assessment materials for accuracy and equivalence to provide valuable insights into the linguistic comparability of the assessment in both language versions.
5. Norming: Administering the MEAA to a large sample of neurotypical Maltese bilingual adults in both English and Maltese.

By using a combination of these methods, the extent of linguistic equivalence in the MEAA assessment is being determined and norms for the performance of Maltese bilingual adults are being established.

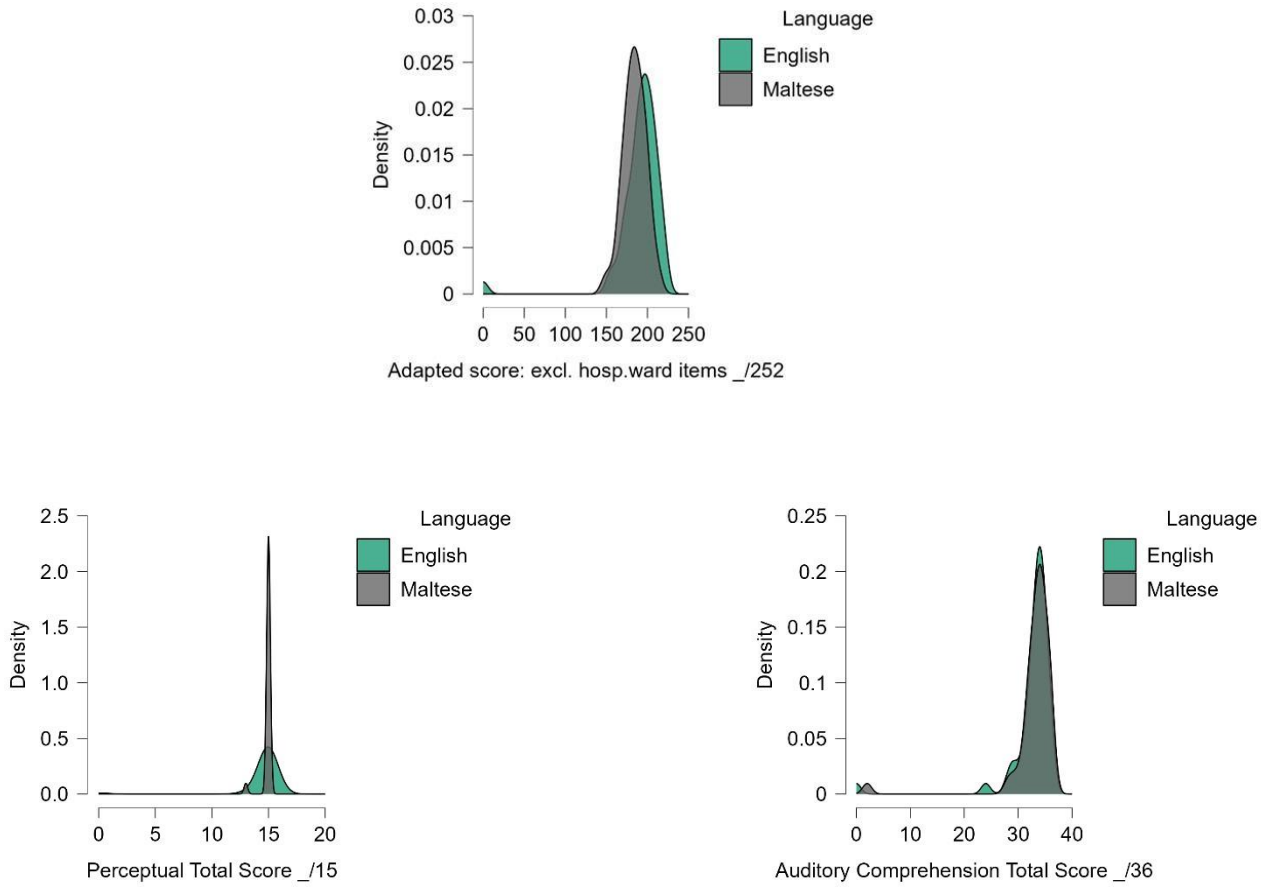
Statistical analysis is ongoing with the expert assistance of a statistician. The evaluation of the participant's performance and the generation of data from the pilot and normative study (and followed by the main study) participants are viewed in Excel and JASP. Data analysis is performed continuously throughout the administration of MEAA. Data is converted into means where applicable, and the standard deviation is recorded. Factors that will be considered as potential variables influencing the distribution of the data include age, years of education, gender, and language dominance, as well as other variables that subsequently might become apparent during the progression of the study. Descriptive statistics, correlation/regression analysis, and post hoc tests will be conducted to analyze data results and find connections between variables.

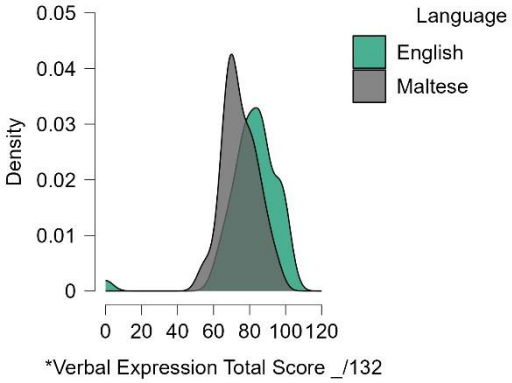
A JASP density plot is a graphical representation of the distribution of data in a dataset. Descriptive statistics for the pilot study cohorts for the total score (excluding hospital ward items) of the MEAA and scores of all five subtests are presented in Fig 4. Language equivalence and the fact that the MEAA is a comparable instrument, linguistically and culturally equivalent, were immediately evident from the pilot study data. The JASP density plots for each subtest show the scores (a continuous variable) on the x-axis, while the y-axis represents the density of data points at each value of the subtest score. These plots show the performance of the pilot study participants. The overlay depicts the extent of comparability of pilot participant performance in the Maltese and English versions of the MEAA. When the plot is split by two languages, the data is separated into

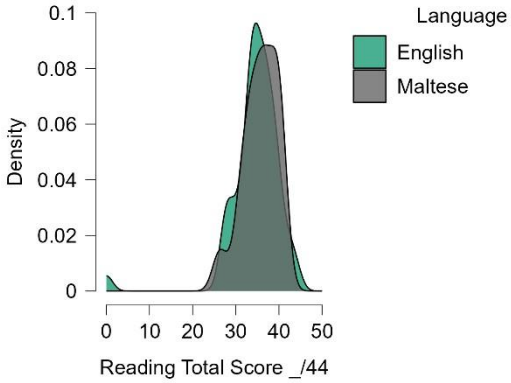
two groups based on the language variable, and a separate density plot is created for each group. The JASP density plots below (Fig 4) show the distribution of data in the dataset split by two languages, English and Maltese. The plot displays the density of data points for each language group and shows the performance of the pilot participants for each task on the MEAA and the overall score of the MEAA and the DLBQ.

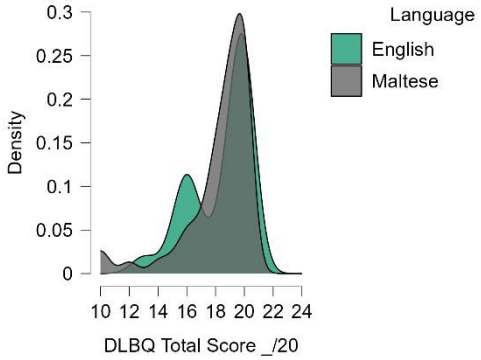
Figure 4

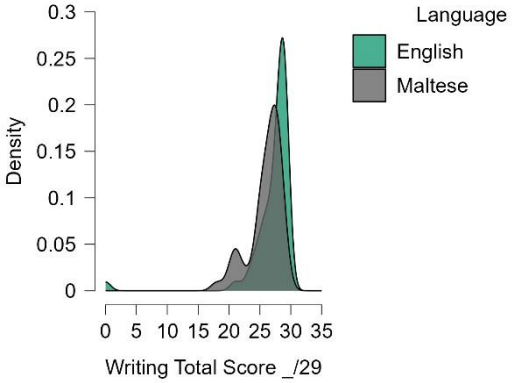
JASP density plots











Note. JASP density plots show the distribution of data in the pilot study dataset split by two languages, English and Maltese, for each modality.

The “apparent” normal distribution indicates comparability in the performance on all the subtests of the MEAA in both Maltese and English. More analysis is necessary to analyze the effects (if any) of age, gender, years of

education and language dominance on the MEAA performance. This crucial step will be undertaken in the normative study.

Conclusion

Currently, there is no standardized, reliable, or valid aphasia assessment for Maltese-English bilingual adults with post-stroke aphasia. MEAA will address this critical gap, fill a clinical need, and complement the current repertoire of assessments for SLPs while promoting quality of life for stroke survivors.

The next steps in the research study include ongoing work on the normative study data collection and analysis. In addition, work on the main study (BPwS and BPwSA) data collection and analysis will commence in 2025.

Aphasia is one of the more devastating long-term sequelae following a stroke. A stroke survivor with aphasia faces daily challenges. Such a life-changing event can affect one's ability to communicate by reading, writing, understanding, and speaking, potentially generating frustration in the individual and disturbing one's life at a personal and social level. Normed on the Maltese population, by integrating cultural and linguistic parameters, the MEAA will provide increased accuracy in the diagnostic assessment of aphasia following stroke, thus improving clinical evaluation, intervention, and rehabilitation of the Maltese -
English bilingual individual with aphasia post-stroke.

The immediate impact of this work will be the contribution to stroke-induced bilingual aphasia research locally and beyond. MEAA will be a significant contribution to the Maltese healthcare system and a benefit for the stroke patient, improving quality of life.

Given the prevalence of stroke, the MEAA research project is an investment in knowledge-driven growth and will benefit the Maltese population by making it

available to help stroke patients from day 1. The conception of MEAA aligns with the Stroke Action Plan for Europe 2018-2030 intervention guidelines for *initial screening and assessment* within 48 hours of stroke using a standardized protocol. Reference here is made to SAPE (Stroke Action Plan for Europe) endorsed by the WSO (World Stroke Organization), ESO (European Stroke Organization) and SAFE (Stroke Alliance for Europe).

There exists a lack of comparable assessment tools across world languages, so the creation of MEAA will contribute to cross-cultural and cross-linguistic adaptation models in aphasia assessment across the globe. In the long term, there is the potential that a tool such as the MEAA could lead to more research in the exploration of testing acquired language difficulties arising from different aetiologies of neurocognitive disorders, such as dementia. Given the impact of aging, neurocognitive decline, and language impairment over time, there is the potential that the development of more specific language instruments for Maltese bilinguals may improve outcomes, not only after stroke, but also after other neurodegenerative disease, such as Parkinson's disease, Alzheimer's disease, and multiple sclerosis, in bilingual and monolingual populations.

References

Annual Report, 2021. (2021). National Statistics Office

Assessments and outcome measures*: The Collaboration of Aphasia Trialists.* The Collaboration of Aphasia Trialists. (2023, July 11).

Berg, K., Isaksen, J., Wallace, S. J., Cruice, M., Simmons-Mackie, N., & Worrall, L. (2020). Establishing consensus on a definition of aphasia: an e-Delphi study of international aphasia researchers. *Aphasiology*, *36*(4), 385–400.

Berthier, M. L. (2005). Poststroke Aphasia: Epidemiology, Pathophysiology and Treatment. *Drugs & Aging*, 22, 2, 163-182

Bialystok, E., & Kroll, J. (2013). *Understanding the Consequences of Bilingualism for Language Processing and Cognition.* "Bilingual Aphasia Test (BAT)." *Linguistics*, 7 Oct. 2019 www.mcgill.ca/linguistics/research/bat

Brady, M. C., Kelly, H., Godwin, J., Enderby, P., & Campbell, P. (2016). Speech and language therapy for aphasia following stroke. The Cochrane database of systematic reviews, 2016(6), CD000425. https://doi.org/10.1002/14651858.CD000425.pub4

Brisbane Evidence-Based Language Test. (n.d). *Brisbane Evidence-Based Language Test*. http://brisbanetest.org/home/test Collaboration of Aphasia Trialists. (n.d.) *The Collaboration of Aphasia Trialists*. https://www.aphasiatrials.org

Donkor, E. S. (2018). Stroke in the 21st Century: A Snapshot of the Burden, Epidemiology, and Quality of Life. *Stroke Research and Treatment*, 2018, 3238165.

Goodglass, H., Kaplan, E., Brand, S., & Barresi, B. (2001). *The Boston diagnostic aphasia examination (BDAE)*. Lippincott Williams

Goral, M., & Hejazi, Z. (2021). Aphasia in Multilingual Patients. *Current Neurology and Neuroscience Reports*, 21(11), 60.

Grima, R. (2015). *The Maltese Aphasia Screening Test* (MAST).

Grima, R., & Franklin, S. (2016). *A Maltese Adaptation of the Boston Naming Test: A Shortened Version*.

Grosjean, F. (2021). *Life as a Bilingual: Knowing and Using Two or More Languages*. Cambridge: Cambridge University Press. doi:10.1017/9781108975490

Hassan, Z. A., Schattner, P., & Mazza, D. (2006). Doing A Pilot Study: Why Is It Essential? *Malaysian family physician: the official journal of the Academy of Family Physicians of Malaysia, 1*(2-3), 70–73.

Howard, D., Swinburn, K., & Porter, G. (2010). Putting the CAT out: What the Comprehensive Aphasia Test has to offer. *Aphasiology*, *24*(1), 56–74.

Ivanova, M. V., & Hallowell, B. (2013). A tutorial on aphasia test development in any language: Key substantive and psychometric considerations. *Aphasiology,* 27, 8, 891-920

Ivanova, M. V., Akinina, Y. S., Soloukhina, O. A., Iskra, E. V., Buivolova, O. V., Chrabaszcz, A. V., Stupina, E. A., Khudyakova, M. V., Akhutina, T. V., & Dragoy, O. (2021). The Russian Aphasia Test: The first comprehensive, quantitative, standardized, and computerized aphasia language battery in Russian. *PloS one, 16*(11), e0258946. https://doi.org/10.1371/journal.pone.0258946

JASP Team (2024). JASP (Version 0.19.0) [Computer software].

Kertesz, A. (2007). *Western aphasia battery* (Rev.). Pearson.

King's College London. (2020). *The Burden of Stroke in Malta.*

https://www.safestroke.eu/wpcontent/uploads/2017/12/SAFE_STROKE_MALTA.pdf

Kuzmina, E., Goral, M., Norvik, M., & Weekes, B. S. (2019). What influences language impairment in bilingual aphasia? A meta-analytic review. *Frontiers in Psychology*, *10*, 445.

Lekoubou, A., Gleichgerrcht, E., McGrattan, K., Bachman, D., Adams, R.J., & Bonilha, L. (2015). Aphasia in multilingual individuals: The importance of bedside premorbid language proficiency assessment. *Eneurologicalsci, 1,* 1, 1-2.

Mead, G. E., Sposato, L. A., Sampaio Silva, G., Yperzeele, L., Wu, S., Kutlubaev, M., … Rabinstein, A. A. (2023). A systematic review and synthesis of global stroke guidelines on behalf of the World Stroke Organization. *International Journal of Stroke*, *18*(5), 499–531.

Ministry for Education and Employment. *Country Report Malta (2) - Education.* 2014, education.gov.mt/en/resources/Documents/Policy%20Documents/Country_Report_M alta_E N.pdf

National Aphasia Association (n.d.). *Aphasia Statistics.* Retrieved from *www.aphasia.org/aphasia-resources/aphasia-statistics/*

Norvik, M., & Goral, M. (2022). Assessment Challenges in Acquired Aphasia in Multilingual Individuals. *In Multilingualism across the Lifespan* (1st ed., Vol. 1, pp. 189–208). Routledge.

O'Halloran, R., Worrall, L., & Hickson, L. (2009). The number of patients with communication-related impairments in acute hospital stroke units, *International*

Journal of Speech-Language Pathology, 11:6, 438-449, DOI:10.3109/17549500902741363

Papathanasiou, I., & Coppens, P. (2022). *Aphasia and related neurogenic communication disorders.* Jones & Bartlett Learning

Paradis, M., & Libben, G. (2014). *The Assessment of Bilingual Aphasia*. Hoboken: Taylor and Francis

Rohde, A., Doi, S. A., Worrall, L., Godecke, E., Farrell, A., O'Halloran, R., … Wong, A. (2022). Development and diagnostic validation of the Brisbane Evidence-Based

Language Test. *Disability and Rehabilitation*, *44*(4), 625–636. Rohde, A., McCracken, M., Worrall, L., Farrell, A., O'Halloran, R., Godecke, E., … Doi, S. A. (2020). Inter-rater reliability, intra-rater reliability, and internal consistency of the Brisbane Evidence-Based Language Test. *Disability and Rehabilitation*, *44*(4), 637– 645.

Richardson, J. D., & Dalton, S. G. (2022). Assessment of language impairment and function. *Handbook of Clinical Neurology*, 185, 175–193.

Shulman, K. I. (2000). Clock-drawing: Is it the ideal cognitive screening test? *International Journal of Geriatric Psychiatry*, *15*(6), 548–561.

The Directorate for Health Information and Research (DHIR). (2021).

The University of Malta. Department of Maltese. (2021). *The State of the Maltese Language* National *Survey* [Data set]. The National Statistics Office. Retrieved from http://www.kunsilltalmalti.gov.mt/file.aspx?f=343

Wallace, S. J., Isaacs, M., Ali, M., & Brady, M. C. (2023). Establishing reporting standards for participant characteristics in post-stroke aphasia research: An international e-Delphi exercise and consensus meeting. *Clinical Rehabilitation*, *37*(2), 199–214.

Wilson, S. M., Eriksson, D. K., Schneck, S. M., & Lucanie, J. M. (2018). A quick aphasia battery for efficient, reliable, and multidimensional assessment of language function. *PloS one*, *13*(2), e0192773. https://doi.org/10.1371/journal.pone.0192773

World Health Organization (WHO). (2001). *International classification of functioning, disability and health: ICF.* Geneva, Switzerland: Author. World Health Organization (n.d.). WHODAS.2.0 translation package. https://terrance.who.int/mediacentre/data/WHODAS/Guidelines/WHODAS%202.0%20Tr anslation%20guidelines.pdf

World Stroke Organization (WSO). (2023). https://www.world-stroke.org/world-strokedaycampaign/about-stroke/impact-of-stroke. *Impact of Stroke*. (n.d.).

Social Trust and Support for Social Welfare Spending in the United States: Evidence from the General Social Survey

by

Matthew Tarpey, Ph.D, *Pittsburg State University*

The relationship between social trust and general support for the welfare state has received significant scholarly attention, while the relationship between social trust and support for the specific social welfare policies that comprise the welfare state remains understudied. This imbalance in the scholarly literature is problematic given that past research demonstrates that voters' abstract attitudes about policy are weakly related to their attitudes about specific policies and because general measures of welfare state support do not allow us to understand heterogeneity in the effect of social trust on policy attitudes across different areas of policy. This paper uses data from the U.S. General Social Survey for the period 1973 to 2022 to evaluate the effect of social trust on support for specific types of social welfare spending. The results of my analysis indicate that the impact of social trust on social welfare spending attitudes is conditional on the type of spending. While social trust is a significant predictor of support for several types of social welfare spending—including assistance to Blacks, Welfare, and mass transportation—it is insignificantly or negatively related to support for other areas of social welfare spending, including support for spending on health and Social Security, which are the two largest areas of the American welfare state.

Key Words: Public opinion, social welfare policy, social trust

Social welfare spending in the United States has grown precipitously over the last century and now represents a sizeable percentage of the United States Federal Budget (Landers et al., 2021). Moreover, social welfare policy has become an important political issue in the United States and other democracies (Pierson, 1996)**.** As the importance of social welfare policy has increased in the United States and other advanced democracies, research in the social sciences has begun to examine the causes and consequences of social welfare policy. Due to the theoretical relevance of public opinion in the development and adoption stages of the policymaking process, a large and growing line of research has focused on trying to understand the structure of public attitudes on social welfare policy. While much of this literature has examined social welfare attitudes in the United States (e.g., Hasenfeld and Rafferty, 1989),

researchers have also conducted studies in other democracies and comparative analyses of social welfare attitudes across democracies (e.g., Jordan, 2013).

Research on social welfare policy attitudes has identified a variety of factors that influence voters' policy attitudes. For example, studies find that economic self-interest, ideology, and demographic factors, to name a few, play a significant role in structuring social welfare policy attitudes (Hasenfeld & Rafferty, 1989). More recently, scholars have begun investigating the role that trust plays in shaping views on social welfare policy. Much of this research has examined the theoretical expectation that political trust will enhance support for social welfare policy (Garritzmann et al., 2023). A limited number of studies have also analyzed the impact of interpersonal trust on social welfare policy attitudes. This research finds that greater social trust corresponds with a larger welfare state and greater support for the welfare state (Bergh & Bjørnskov, 2011; Daniele & Geys, 2015).

However, research on the relationship between social trust and support for the welfare state has only evaluated the impact of trust on *general* or *abstract* support for social welfare spending. More precisely, social trust has been demonstrated to influence the extent to which voters *generally* think that the government should increase the number of social benefits and services without reference to a specific type of social welfare policy. The use of abstract or general measures of support for social welfare policy is problematic as past research finds that abstract views on government spending differ markedly from attitudes on specific types of spending (Free and Cantril, 1967; Grossmann & Hopkins, 2015). Furthermore, existing studies are limited in that they do not allow us to assess the impact of social trust on support for specific areas of the welfare state, even though the theoretical relevance of social trust varies across different areas and programs in the welfare state.

This paper examines the impact of generalized social trust on support for specific types of social welfare spending among the American electorate. Using data from the General Social Survey conducted in the United States for the period 1973 to 2022, I find that the effect of social trust on support for social welfare spending varies between different areas of social welfare policy. For certain areas of the welfare state, such as government assistance to Blacks and Welfare, trust in others increases support for social welfare spending. Moreover, the substantive impact of social trust on support for spending in these areas rivals the impact of other theoretically relevant explanatory variables (e.g., demographic variables). However, on other social welfare policy issues, such as Social Security and health, the impact of social trust on policy attitudes is either statistically and substantively insignificant or signed in the opposite direction. These findings qualify the results of past studies that find that social trust improves support for the welfare state. More specifically, the findings presented here suggest that we should only expect declines in social trust to erode support for certain areas of the social welfare state. Moreover, the results suggest that decreases in social trust might enhance support for certain types of social welfare spending. Therefore, declining social trust could incentivize a recomposition of the policies that comprise the welfare state rather than simply incentivizing a smaller welfare state.

Public Attitudes on Social Welfare Policy

An extensive interdisciplinary literature in the social sciences has studied the determinants of public support for social welfare policy. These studies have employed a variety of empirical and theoretical approaches to examine attitudes toward social welfare policy across a variety of different contexts. For example, scholars have relied on a variety of theoretical approaches to explain welfare attitudes, including economic, psychological, and sociological perspectives (Cusack, 2006; Feldman & Steenberg,

2001; Jacoby, 2006). Studies have also used a variety of empirical approaches, ranging from experimental studies to cross-sectional and longitudinal analyses of observational data (Epstein et al., 2014; Rudolph & Evans, 2005). Finally, while a considerable proportion of these studies were conducted in the American context, studies have also examined social welfare policy attitudes in other countries or compared attitudes across countries (Breznau, 2010; Rudolph & Evans, 2005).

The literature on social welfare policy attitudes has identified a variety of factors that shape voters' attitudes on social welfare policy issues. For example, several studies have investigated the impact of economic self-interest on voters' attitudes toward social welfare policy. This research, using a variety of measurements, finds that economic self-interest is an important determinant of voters' attitudes toward social welfare policy. For example, Owens and Pedulla (2014) demonstrate that becoming unemployed or experiencing a decline in income increases support for social welfare programs among voters in the United States. Similarly, Jaeger (2006) uses panel data from Canada to study social welfare attitudes and finds significant support for the expectation that self-interest impacts beliefs about whether the government should be responsible for social welfare policy. Finally, Cusack et al. (2006) use a cross-national sample of advanced democracies and find that exposure to labor market risk increases support for government redistribution of income. Researchers have also analyzed the impact of self-interest on support for specific social welfare policies. For example, Epstein et al. (2014) use data from surveys fielded in Arkansas, Kentucky, and Texas and find that low-income voters are more supportive of Medicaid.

Researchers have also examined the impact of attitudinal variables on attitudes toward social welfare policy. For example, Feldman and Steenbergen (2001) find that

humanitarian values lead voters in the U.S. to endorse more modest social welfare policies, while egalitarian values lead voters to favor a more expansive social welfare state to promote equality. Similarly, Breznau (2010) uses survey data from Australia, Bulgaria, Finland, the Netherlands, and Poland and finds that voters who value greater equality are more supportive of social welfare policies. Further, research shows that values become more influential in shaping political attitudes as income increases (Enke et al., 2023) and that values can moderate the impact of income on political behavior (Feldman, 1982). Studies also find that general ideological orientations shape attitudes toward social welfare policy. For example, Jacoby (2006) finds that, independent of the effect of core values on social welfare policy attitudes, mass partisanship and general ideological orientation shape preferences on specific areas of social welfare spending. More specifically, he finds, consistent with theoretical expectations, that voters who identify as liberal or as Democrats are more supportive of spending to help the needy and minority groups than conservative or Republican voters.

Finally, research demonstrates that various demographic factors impact attitudes on social welfare policy. For example, survey research from the United States shows that Blacks are significantly more supportive of social welfare spending than Whites (Gilliam & Whitby, 1989). Further, both American and comparative politics research shows that women are generally more supportive of social welfare spending than men (Alvarez & McCaffery, 2003; Shorrocks & Grasso, 2020). However, research on the impact of age finds that its relevance varies significantly across specific types of spending (Fullerton & Dixon, 2010).

Trust and Social Welfare Attitudes

Research has also examined the impact of various forms of trust on attitudes toward social welfare policy. The majority of research on trust and social welfare attitudes has examined the effect of political trust on social welfare policy attitudes. Political trust is argued to increase support for social welfare spending because trustworthy governments are more likely to design and implement social welfare policies that are effective in achieving their intended objectives (Hetherington, 2005). Studies of American and comparative public opinion, using both individual and aggregate data, find mixed support for the argument that political trust can increase support for social welfare policies across a variety of contexts (Garritzmann et al., 2023; Goubin & Kumlin, 2022; Rudolph & Evans, 2005). For example, Goubin and Kumlin (2002) show that political trust enhances support for horizontal redistribution policies using panel data from Norway. Rudolph and Evans (2005) show that political trust enhances support for some types of social welfare policies using panel data from the United States, although it has a much larger effect among conservative voters than liberal voters. However, some earlier research on this topic found little support for an individual-level relationship between social trust and general support for the welfare state (see Svallfors, 2002).

More recently, scholars have begun examining the relationship between social trust and support for social welfare policy. These studies typically conceptualize trust as an expectation that people will behave honestly and cooperatively (Daniel & Geys, 2015). Social trust is believed to shape attitudes toward social welfare policy because of the moral hazard problem that exists with many social welfare policies. More specifically, recipients of the resources provided by social welfare policy can misuse the resources, which can undermine the provision of the public good. If voters expect

their fellow citizens to act honestly, then the perceived risk of resources provided to beneficiaries being misused is mitigated. Therefore, voters who possess greater social trust should be more confident in the ability of social welfare policies to deliver their intended effects and, thus, more supportive of social welfare policies.

Consistent with the theoretical expectation that trust will foster greater support for social welfare policy, recent studies have demonstrated a significant relationship between social trust, support for the welfare state, and the size of the welfare state. First, Daniele and Geys (2015) use survey data from the 2008-2009 European Social Survey to study the relationship between voters' general levels of trust and their general support for the welfare state. Their measure of social trust is an ordinal variable that comes from responses to the following question: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please tell me on a score of 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted." Their measure of support for the welfare state is an ordinal variable ranging from 0 ('Decrease taxes and social spending a lot') to 10 ('Increase taxes and social spending a lot') created with responses to the following questions: "Many social benefits and services are paid for by taxes. If the government had to choose between increasing taxes and spending more on social benefits and services, or decreasing taxes and spending less on social benefits and services, which should they do?" Their analysis finds a positive relationship between social trust and general support for increasing the size of the social welfare state. Second, Bergh and Bjørnskov (2011) examine the effect of aggregate social trust on the size of the actual welfare state. Using aggregate data from 77 countries, they find that countries with higher historical levels of aggregate social trust have larger welfare states on average.

While these studies provide compelling evidence of a relationship between trust and support for the welfare state, they are limited in several respects. First, although Bergh and Bjørnskov (2011) draw a direct connection between social trust and expressed support for the welfare state, their measure of support for the social welfare state asks respondents about their abstract support for the welfare state rather than their support for the specific policies that comprise the welfare state. This measure is problematic as research on public opinion shows that general preferences for government spending do not correspond closely to preferences for specific government programs or areas of policy (Free and Cantril, 1967; Grossmann & Hopkins, 2015). For example, the American electorate tends to endorse conservative positions on spending in the abstract but favors most specific types of government spending (Grossmann & Hopkins, 2015). Therefore, the fact that social trust enhances public support for the abstract idea of the welfare state does not necessarily imply that it will engender the same change in support for specific social welfare policies.

The focus on general support for the welfare state also presumes that the effect of social trust on social welfare policy attitudes is constant or similar across different areas of the welfare state. This is problematic as general measures do not allow us to examine heterogeneity in the effect of social trust on policy attitudes across different areas of social welfare policy. Therefore, it does not allow us to understand how changes in social trust might impact the composition of the social welfare state. Furthermore, the focus on general welfare state support is problematic as we should expect the relevance of social trust for social welfare policy attitudes to vary across areas of policy as the degree of moral hazard and, hence, the need to trust recipients of welfare benefits varies significantly across different areas of social welfare policy. For example, welfare programs that make direct cash transfers to recipients require

significantly more social trust than programs that provide a specific resource (e.g., health care treatments), as the recipient of the program has a greater ability to use the resources for ends that are not consistent with the aims of the program.

Data and Methods

This paper uses data from the General Social Survey for the period 1973 to 2022 To examine the relationship between social trust and specific support for social welfare policy. The General Social Survey is a nationally representative survey of Americans that asks respondents a variety of questions pertaining to life, society, and politics (Davern et al., 2024). While the survey contains a set of questions that have been asked consistently across the different years that the survey has been administered, some of the questions used in this analysis occur less frequently. Therefore, the time frame of the analysis varies between different dependent variables in the analysis presented in this paper.

To measure the independent variable of interest for my analysis, *Social Trust,* I use responses from the following question: “Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" Respondents in the survey were asked to select one of the following possible responses: “Can't trust," “Depends," and “Can trust.” This variable is coded as an ordinal variable such that 0 indicates a response of “Can't trust," 1 indicates a response of “Depends," and 2 indicates a response of “Can trust." Non-responses and "Do not Know/Cannot Choose" responses are coded as missing. Since research finds that social capital influences trust in government (Keele, 2007), I also included measures of respondents’ level of political trust as a control. More specifically, I included measures of trust in the legislative branch, *Trust in the Legislature,* and the executive branch of the federal government, *Trust in the Executive,* as controls.

I also used responses to questions asked on the General Social Survey to measure demographics and other control variables. First, *Partisanship* is coded on a 0 to 6 scale where zero indicates the respondent is a Strong Democrat and six indicates the respondent is a Strong Republican. *Ideology* is coded on a 0 to 6 scale where zero indicates the respondent is extremely liberal and six indicates the respondent is extremely conservative. *Age* indicates the age of the respondent in years*. Female* is coded as one if the respondent is female and zero if not. *Income* is an ordinal variable coded 0-12 that measures family income*. Education* is an ordinal variable ranging from 0 to 20 that measures the highest year of schooling completed*.* I also include two dichotomous variables, *White* and *Black,* to account for the impact of race on attitudes.

To measure support for social welfare policies, I used multiple questions included in the General Social Survey that ask respondents about their preferences with respect to spending on specific areas of social welfare spending. The General Social Survey asks respondents questions about their preferences for government spending in certain areas of social welfare policy (e.g., education, health care, etc.). Some of these questions ask about specific federal programs (e.g., Social Security), while some questions ask about specific areas of government spending (e.g., health) that encompass many different programs (e.g., Medicare, Medicaid, etc.). Respondents in the survey are presented with the following specific prompt and question: “We are faced with many problems in this country, none of which can be solved easily or inexpensively. I'm going to name some of these problems, and for each one I'd like you to name some of these problems, and for each one I'd like you to tell me whether you think we're spending too much money on it, too little money, or about the right amount. First (READ ITEM A) . . . are we spending too much, too little,

or about the right amount on (ITEM)". I created the following variables using the following items included after the aforementioned prompt: *Childcare* using responses to “assistance for childcare,” *Drug Addiction using responses to* “Dealing with drug addiction,” *Welfare* using responses to “Welfare,” *Health* using responses to “Improving & protecting the nation’s health,” *Education* using responses to “Improving the nation's education system,” *Assistance to Blacks cans* using responses to “Improving the conditions of Blacks,” and *Social Security* using responses to “Social Security," and *Mass Transportation* using responses to “Mass Transportation.” Responses to this question are coded zero if respondents answer, "too little money," 1 if they answer, "about the right amount," and two if they answer, "too much money."

Empirical Analysis

To examine the relationship between *Social Trust* and support for social welfare spending, I conducted multiple regression analyses with the aforementioned dependent variables. Each of the models in my analysis includes *Social Trust* as an independent variable, each of the aforementioned control variables, and fixed effects for years. All of the models presented in this analysis are estimated using robust standard errors. Further, I used Ordinary Least Squares linear regression analysis to ease the interpretation of the results. Results from Ordered Probit models provide substantively similar results for all the dependent variables in the analysis.

Tables 1 and 2 in the Appendix display the results from the multivariate models of the effect of *Social Trust* on support for increasing spending for each of the aforementioned areas of social welfare policy. Looking at the Tables, we see that the effect of *Social Trust* on support for increasing spending is only significant for four of the eight dependent variables. More specifically, the results show a statistically significant impact of *Social Trust* on *Assistance to Blacks, Welfare, Social Security,*

and *Mass Transportation*. The effect of *Social Trust* is signed in the theoretically expected direction for *Assistance to Blacks, Welfare,* and *Mass Transportation,* but not *Social Security*. As such, individuals who are more trusting of others are more likely to favor higher levels of spending on *Assistance to Blacks, Mass Transportation,* and *Welfare.* While increases in *Social Trust* are positively associated with support for *Education*, this effect is not statistically significant at standard levels of analysis.

The effect of *Social Trust* on *Welfare, Assistance to Blacks,* and *Mass Transportation* is modest in substantive magnitude, although the effect is still comparable to other determinants of preferences for social welfare spending (e.g., demographics). For example, a one-unit increase in *Social Trust* increases *Assistance to Blacks* by 0.0363 on average. This amounts to about a 4.9% standard deviation increase in *Assistance to Blacks* for every standard deviation increase in *Social Trust*. This effect is larger than the impact of *Females* and *Income* but about half the size of the impact of *Partisanship* and *Ideology*, for which a standard deviation increase leads to approximately 9% and 14% of a standard deviation decrease in *Assistance to Blacks,* respectively. *Social Trust* has a similar impact on support for *Mass Transportation,* with a one-unit increase in *Social Trust* increasing *Mass Transportation* by about 0.0301 on average. This amounts to about a 4.5% standard deviation increase in *Mass Transportation* for every standard deviation increase in *Social Trust*. This substantive effect is larger than most of the control variables and comparable to the effect of *Partisanship,* for which an increase of one standard deviation increases *Mass Transportation* by about 5.9% of a standard deviation. However, the effects of *Education* and *Ideology* are about twice as large. A one-unit increase in *Social Trust* increases *Welfare* by approximately 0.016 on average. This amounts to approximately a 1.9% standard deviation increase in *Welfare* for every

standard deviation increase in *Social Trust.* This effect is significantly smaller than the impact of other major determinants of *Welfare*, such as *Partisanship* and *Ideology.*

The effect of *Social Trust* on *Drug Addiction, Health,* and *Childcare* is negative but statistically insignificant. However, the effect of *Social Trust* on support for *Social Security* is negatively and statistically significant. As such, greater distrust of others is associated with increased support for Social Security. The effect of *Social Trust* on *Social Security* is modest in substantive magnitude, with a one-unit increase in *Social Trust* decreasing *Social Security* by -0.0323 on average. This amounts to approximately a 5% standard deviation decrease in *Social Security* for every standard deviation increase in *Social Trust*. While any theoretical explanation of this unexpected effect is necessarily post hoc, there are several possible theoretical explanations for the negative impact of *Social Trust*. It could be that individuals with low trust in others anticipate that people will not save for retirement, hence creating a need for the government to force people to do so through the Social Security program. Further, trust in others might be viewed as less relevant for attitudes about Social Security as the transfer of funds in the program is typically funded predominantly through one's own contribution to the program rather than from general tax revenue.

These results provide partial support for the theoretical expectation that social trust enhances support for the welfare state. For each of the three types of spending above, respondents who are more trusting of others are more likely to favor increases in spending. Further, for *Mass Transportation* and *Assistance to Blacks,* the substantive impact of *Social Trust* rivals the impact of other major determinants of social welfare attitudes, such as *Ideology* and *Partisanship*. Although these effects support the theory that social trust creates greater support for the welfare state, the effect of social trust is signed in the opposite direction for the majority of dependent

variables in the analysis. Therefore, the impact of social trust on support for social welfare policy is conditional on the type of social welfare policy.

Conclusion

This paper analyzed the relationship between interpersonal trust and support for social welfare spending in the American context. Past research argues that social trust bolsters support for social welfare spending as it reduces the perceived risk of misuse of social welfare programs. Analysis of data from the General Social Survey for the period 1973 to 2022 provided partial support for this theoretical expectation. First, consistent with past research on this topic, my analysis demonstrates that greater social trust does increase support for social welfare spending for several areas of social welfare policy. Specifically, the analysis presented in this paper demonstrated a positive and statistically significant relationship between interpersonal trust and support for spending on mass transportation, welfare, and assistance to Blacks. Although the impact of changes in interpersonal trust on social welfare spending preferences is modest, the substantive impact of social trust rivals the impact of other important determinants of social welfare policy preferences, such as demographic variables.

However, the results of my analysis are inconsistent with the theoretical arguments of research on trust and social welfare policy attitudes for several types of spending preferences. More specifically, the effect of social trust was null or incorrectly signed for spending on childcare, drug addiction, health, Social Security, and education. These findings qualify the conclusions of past studies in several respects. First, although low social trust corresponds to lower support for social welfare programs, it does not undermine support for Social Security or health spending, which constitute the overwhelming majority of social welfare spending in the United States.

Therefore, it is unlikely that decreases in social trust would have substantial consequences for the size of the American welfare state. Further, given the negative relationship between social trust and support for Social Security spending, low levels of social trust could impact the composition of the welfare state by increasing public support for some areas of the social welfare state but decreasing it for other areas. Finally, the results demonstrate the impact of social trust, in terms of substantive magnitude and direction, varies between different areas of social welfare policy. Future research on the topic should further investigate the heterogeneity of the effect of social trust on social welfare policy attitudes due to the specifics of social welfare policy, such as the design of policies.

References

Bergh, A. and Bjørnskov, C. (2011). Historical Trust Levels Predict Current Welfare State Size. *Kyklos*, 64(1):1–19.

Breznau, N. (2010). Economic equality and social welfare: Policy preferences in five Nations get access Arrow. *International Journal of Public Opinion* Research, 22(4):458–484.

Cusack, T., Iversen, T., and Rehm, P. (2006). Risks at work: The demand and supply sides of government redistribution get access arrow. *Oxford Review of Economic Policy*, 22(3):365–389.

Davern, Michael; Bautista, Rene; Freese, Jeremy; Herd, Pamela; and Morgan, Stephen L.; General Social Survey 1972-2024. [Machine-readable data file]. Principal Investigator Michael Davern; Co-Principal Investigators Rene Bautista, Jeremy Freese, Pamela Herd, and Stephen L. Morgan. Sponsored by the National Science Foundation. NORC ed. Chicago: NORC, 2024: NORC at the University of Chicago [producer and distributor]. Data accessed from the GSS Data Explorer website at gssdataexplorer.norc.org.

Daniele, G. and Geys, B. (2015). Interpersonal trust and welfare state support. *European Journal of Political Economy*, 39:1–12.

Epstein, A. M., Sommers, B. D., Kuznetsov, Y., & Blendon, R. J. (2014). Low-Income Residents In Three States View Medicaid As Equal To Or Better Than Private Coverage, Support Expansion. *Health Affairs*, 33(11):2041–2047.

Enke, B., Polborn, M., & Wu, A. A. (in press). Morals as Luxury Goods and Political Polarization. *Journal of the European Economic Association.*

Feldman, S. (1982). Economic Self-Interest and Political Behavior. *American Journal of Political Science*, 26: 446-466

Feldman, S. & Steenbergen, M. R. (2001). The Humanitarian Foundation of Public Support for Social Welfare. *American Journal of Political Science*, 45: 658–677.

Free, L. A. and Cantril, H. (1967). The Political Beliefs of Americans: A Study of Public Opinion. New Brunswick, NJ: Rutgers University Press.

Fullerton, A. S., & Dixon, J. C. (2010). Generational Conflict Or Methodological Artifact? Reconsidering the Relationship between Age and Policy Attitudes in the U.S., 1984–2008. *Public Opinion Quarterly*, 74(4), 643–673.

Garritzmann, J. L., Neimanns, E., and Busemeyer, M. R. (2023). Public opinion towards welfare state reform: The role of political trust and government satisfaction. *European Journal of Political Research*, 62(1):197–220.

Gilliam, F.D., & Whitby, K. J. (1989). Race, Class, and Attitudes Toward Social Welfare Spending: An Ethclass Interpretation. *Social Science Quarterly,* 70(1), 88.

Goubin, S. and Kumlin, S. (2022). Political Trust and Policy Demand in Changing Welfare States: Building Normative Support and Easing Reform Acceptance? *European Sociological Review,* 38(4):590–604.

Grossmann, M. & Hopkins, D. A. (2015). Ideological Republicans and Group Interest Democrats: The Asymmetry of American Party Politics. *Perspectives on Politics*, 13(1):119–139.

Hasenfeld, Y. and Rafferty, J. A. (1989). The Determinants of Public Attitudes toward the Welfare State. *Social Forces*, 67(4):1027–1048.

Hetherington, M. J. (2005). Why Trust Matters: Declining Political Trust and the Demise of American Liberalism. Princeton University Press.

Jacoby, W. G. (2006). Value Choices and American Public Opinion. *American Journal of Political Science,* 50(3):706–723.

Jaeger, M. M. (2006). What Makes People Support Public Responsibility for Welfare Provision: Self-interest or Political Ideology? A Longitudinal Approach. *Acta Sociologica,* 49(3):321–338.

Jordan, J. (2013). Policy feedback and support for the welfare state. *Journal of European Social Policy*, 23(2):134–148.

Keele, L. (2007). Social Capital and the Dynamics of Trust in Government. *American Journal of Political Science*, *51*(2), 241–254

Landers, P., Lynch, K.E., Tollestrup, J., Falk, G., and Boyle, C.F. (2021) Federal Spending on Benefits and Services for People with Low Income: FY2008-FY2020. *Congressional Research Service.*

Owens, L. A. & Pedulla, D. S. (2014). Material Welfare and Changing Political Preferences: The Case of Support for Redistributive Social Policies*. Forces*, 92(3):1087–1113.

Pierson, P. (1996). The New Politics of the Welfare State. *World Politics*, *48*(2), 143–179.

Rudolph, T. J. & Evans, J. (2005). Political Trust, Ideology, and Public Support for Government Spending. *American Journal of Political Science,* 49(3):660–671.

Shorrocks, R., & Grasso, M. T. (2020). The attitudinal gender gap across generations: Support for redistribution and government spending in contexts of high and low welfare provision. *European Political Science Review*, *12*(3), 289–306.

Svallfors, S. (2002). Political trust and support for the welfare state: Unpacking a supposed relationship, in B. Rothstein and S. Steinmo (eds.), Restructuring the Welfare State: Political Institutions and Policy Change, New York: Palgrave-Macmillan, 184-205.

Appendix

Table 1

Social Trust and Support for Social Welfare Policies

	(1)	(2)	(3)	(4)
	Assistance to Blacks	Drug Addiction	Welfare	Health
Social Trust	0.0363*** (6.40)	-0.00176 (-0.33)	0.0155** (2.62)	-0.00687 (-1.40)
Age	-0.00220*** (-7.09)	0.000312 (1.03)	-0.00104** (-3.07)	-0.00174*** (-6.34)
Female	0.0593*** (5.81)	0.0601*** (6.14)	0.0140 (1.28)	0.0831*** (9.25)
Income	-0.00877*** (-4.20)	0.00490* (2.46)	-0.0427*** (-18.01)	0.00220 (1.23)
Black	0.467*** (17.85)	0.0856** (3.25)	0.182*** (5.75)	0.112*** (4.71)
White	-0.126*** (-5.11)	-0.00311 (-0.13)	-0.0904*** (-3.30)	0.0548* (2.52)
Trust in Executive Branch	0.0142 (1.67)	0.00806 (0.99)	0.0122 (1.32)	-0.0120 (-1.60)
Trust in Legislative Branch	0.0503*** (5.40)	0.0158 (1.77)	0.0387*** (3.81)	-0.0103 (-1.27)
Ideology	-0.0713*** (-17.73)	-0.00997* (-2.52)	-0.0765*** (-17.27)	-0.0569*** (-15.88)
Partisanship	-0.0362*** (-12.60)	-0.0217*** (-7.92)	-0.0479*** (-15.77)	-0.0441*** (-17.48)
Education	0.0170*** (8.97)	-0.0110*** (-5.90)	0.00411* (2.05)	-0.00232 (-1.38)
Constant	1.236*** (28.05)	1.611*** (37.21)	1.463*** (30.42)	1.874*** (48.76)
N	16868	17484	17610	17752
t statistics in parentheses ="* p<0.05 ** p<0.01 *** p<0.001"				

Table 2

Social Trust and Support for Social Welfare Policies

	(5)	(6)	(7)	(8)
	Social Security	Childcare	Education	Mass Transportation
Social Trust	-0.0329*** (-7.66)	-0.00610 (-0.97)	0.00316 (0.64)	0.0301*** (6.58)
Age	-0.00122*** (-5.21)	-0.00294*** (-8.71)	-0.00485*** (-17.31)	0.00139*** (5.53)
Female	0.117*** (15.15)	0.0811*** (7.42)	0.0767*** (8.61)	-0.0331*** (-4.04)
Income	0.00343* (2.05)	0.000734 (0.30)	0.00763*** (4.20)	-0.00365* (-1.99)
Black	0.197*** (10.53)	0.0961*** (4.36)	0.142*** (6.58)	0.00398 (0.21)
White	0.0771*** (4.54)	-0.00448 (-0.23)	0.0599** (3.03)	-0.00664 (-0.40)
Trust in Executive Branch	-0.0473*** (-7.49)	-0.00615 (-0.70)	-0.0155* (-2.05)	0.0136* (2.00)
Trust in Legislative Branch	-0.0104 (-1.50)	-0.0107 (-1.07)	-0.00441 (-0.53)	-0.0155* (-2.06)
Ideology	-0.0170*** (-5.61)	-0.0467*** (-10.54)	-0.0426*** (-11.84)	-0.0410*** (-12.42)
Partisanship	-0.0277*** (-12.89)	-0.0390*** (-11.70)	-0.0342*** (-13.45)	-0.0186*** (-7.86)
Education	-0.0265*** (-18.40)	-0.00529** (-2.61)	0.00949*** (5.74)	0.0279*** (18.50)
Constant	1.845*** (49.81)	2.020*** (44.56)	1.554*** (40.06)	1.031*** (26.20)
N	24484	12314	17873	23748
t statistics in parentheses ="* p<0.05 ** p<0.01 *** p<0.001"				

Epidemiological Trends and Demographic Disparities in Primary and Secondary Syphilis: A Ten-Year Analysis (2013-2022)

by

Fahmida Rashid and Praphul Joshi, Sam Houston State University

Syphilis is a disease that tends to be a major concern for human health since, if left untreated, it can cause severe complications that include brain damage, hearing loss, and even death. This study examined the prevalence and demographic distribution of syphilis in the United States for ten years, from 2013 to 2022, using data from the CDC's NCHHSTP AtlasPlus tool. According to the data, the annual rise in syphilis incidence is an alarming 13.47%. In 2022, 44,309 instances were reported in males compared to 14,652 in females. The top three states with the largest numbers are South Dakota, New Mexico, and Arkansas. Particularly concerning South Dakota, where there are 84.3% instances per 100,000 residents. In this study data from 2013 to 2022 revealed that almost 10% of the variations in syphilis cases (n=200) may be attributed to time, indicating that the disease has been getting worse every year. Age-wise, those in their late 20s to mid-30s are the ones who are experiencing it most. Additionally, compared to other groups, Black or African American people and men who have sex with men (MSM) experience far higher rates. These results highlight the importance of creating health programs that impact both individual and systemic issues that affect everyone's health, such as financial hardship, literacy, and healthcare access. Researchers should investigate these issues, work harder to prevent them from happening and change some rules so that everyone has a fair shot at good health.

Keywords: Syphilis, sexually transmitted diseases (STI), Public health, Epidemiology, Demographic disparities, Trend Analysis

Introduction

Syphilis remains a significant public health challenge, with rising incidence rates and persistent demographic disparities. It is a sexually transmitted infection (STI) caused by a bacteria called Treponema pallidum (Tuddenham et al., 2022). It can spread through primary, secondary, latent, and tertiary stages. If left untreated, it can lead to some severe health problems like brain damage, hearing loss, vision loss, congenital disabilities, and even death (CDC, 2023). These issues can add up financially, with an estimated $247 million in medical costs just in the U.S. in 2022 (Chesson et al., 2021). These costs encompass direct medical expenses, such as diagnosis and treatment, as well as indirect costs related to lost productivity and long-term health complications.

Globally, Syphilis prevalence varies significantly due to healthcare access (Chen et al., 2023), economic factors, and public health strategies (Kenyon et al., 2016)

In high-income countries with universal healthcare systems syphilis screening and treatment services are widely available, leading to lower incidence rates. In contrast, low- and middle-income countries (LMICs) continue to struggle with higher rates due to inadequate healthcare infrastructure and limited access to diagnostic and treatment services (Rifqian et al., 2024).

Recent studies have highlighted the disparities in syphilis prevalence between high-income countries with robust healthcare systems and LMICs facing healthcare challenges. For instance, a review on congenital syphilis emphasizes that mother-to-child transmission remains a significant issue worldwide, particularly in regions with limited access to prenatal care (Gilmour et al., 2023).

Additionally, research indicates that sub-Saharan Africa and Latin America have the highest age-standardized incidence rates of sexually transmitted infections, including syphilis, underscoring the need for improved public health interventions in these areas (Zheng et al., 2022; Fu et al., 2022).

Several other factors can also increase the risk of syphilis, such as Unprotected sex and multiple sexual partners. The frequency of having syphilis could be increased if one already has another sexually transmitted infection (STI), like HIV (Schmidt et al., 2019). Men who have sex with men (MSM) are particularly more vulnerable to syphilis cases (Zhang et al., 2019). According to the CDC, untreated syphilis in a pregnant woman can lead to severe outcomes, including stillbirth and neonatal death (Blencowe et al., 2011).

This study aims to comprehensively analyze the epidemiological trends and demographic disparities in primary and secondary syphilis in the United States from 2013 to 2022. Specifically, it seeks to quantify annual changes in syphilis incidence, identify high-risk demographic and geographic groups, and assess the impact of healthcare access on disease prevalence. The findings will help inform targeted public health interventions aimed at reducing syphilis transmission and improving healthcare accessibility for vulnerable populations.

Methodology

Data for this study were obtained from the Centers for Disease Control and Prevention's (CDC) National Center for HIV, Viral Hepatitis, STD, and T.B. Prevention (NCHHSTP) AtlasPlus, covering the years 2013 to 2022 (CDC, 2024). This retrospective, descriptive epidemiological study analyzed trends and demographic disparities in primary and secondary syphilis. The extracted data included the annual number of reported cases, gender, age, race, sexual orientation, and geographic distribution.

Descriptive statistics were used to summarize the dataset, including measures of central tendency and dispersion. Trend analysis was conducted using a linear regression model to assess the relationship between the year and the number of syphilis cases. The annual percentage increase (13.47%) was calculated by the average trend per year (Total amount of cases/Number of years). A simple linear regression analysis was performed and included confidence intervals and p-values to determine statistical significance. The coefficient of determination (R^2) was used to assess model fit, and a p-value <0.05 was considered statistically significant.

The distribution of syphilis cases by demographic groups, specifically the 25-34 age group, Black/African Americans, and Men who have Sex with Men (MSM), was analyzed to identify significant disparities. Geographic analysis focused on states with the highest incidence rates in 2022, calculating rates per 100,000 population for comparison. The total sample size for trend analysis was derived from annual state-level reports, encompassing multiple observations across the ten-year study period. Although 200 individual data points were included in the final model, they represented aggregated cases across multiple demographic and geographic variables. Data analysis was conducted using SPSS, ensuring accuracy and reliability. The study adhered to ethical guidelines by using publicly available data without access to personal identifying information.

Result

Geographic distribution analysis identified South Dakota, New Mexico, and Arkansas as having the highest infection rates, with South Dakota reporting 84.3 cases per 100,000 population (Figure 1). The number of syphilis cases has increased by approximately 13.47% annually (Figure 2). The simple linear regression analysis, with a total sample size of 200, indicated that 9.93% of the variability in syphilis cases could be

explained by the year (2013-2022), showing a moderate positive relationship between the year and the number of cases ($r = 0.993$, $p \leq 0.05$).

In 2022, the total number of reported syphilis cases was significantly higher in males (44,309) compared to females (14,652) (Figure 3). Figure 4 shows the 25-34 age group exhibited a steeper increase in syphilis cases compared to other age groups. Demographic analysis showed that in Figure 5, Black/African Americans accounted for the highest percentage of syphilis cases at 37.77%, and Native Americans are at the lowest percentage (1.28%). White and Hispanic/Latino groups have a similar percentage of having Syphilis disease. On the other hand, Asians have a low percentage (2.22%). In comparison, Men who have Sex with Men (MSM) represented 41.37% of the cases (Figure 6).

Figure 1

Syphilis 2022 All Age Groups/Ethnicities Both Sexes| US Map State Level

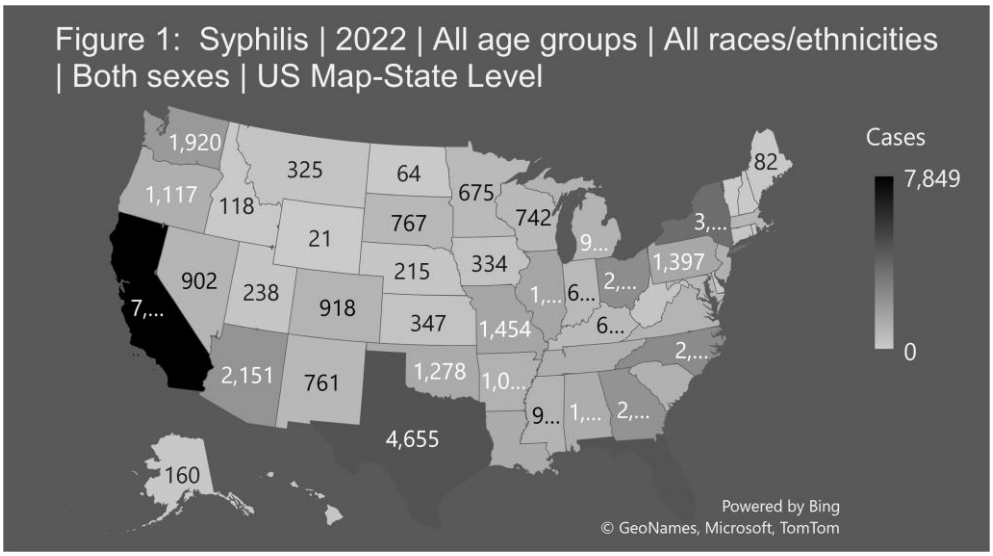


Figure 1
Syphilis 2022

Figure 2
Syphilis Cases Per Year

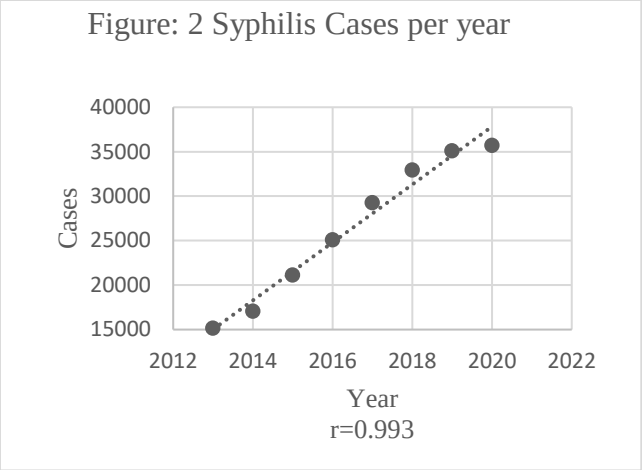


Figure 3
Gender Distribution 2022

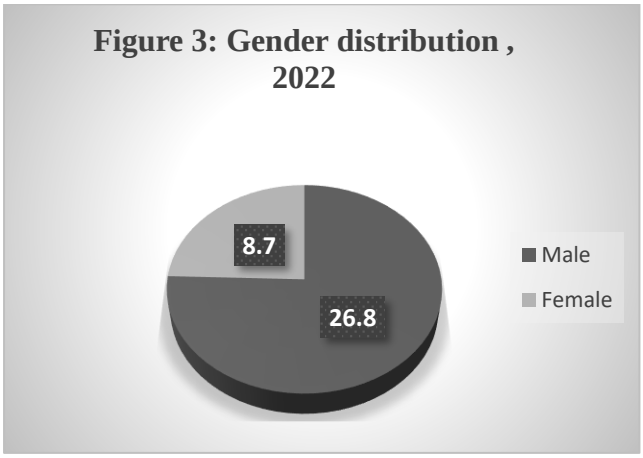


Figure 4
Case By Year and Age 'Year' and 'Age Group

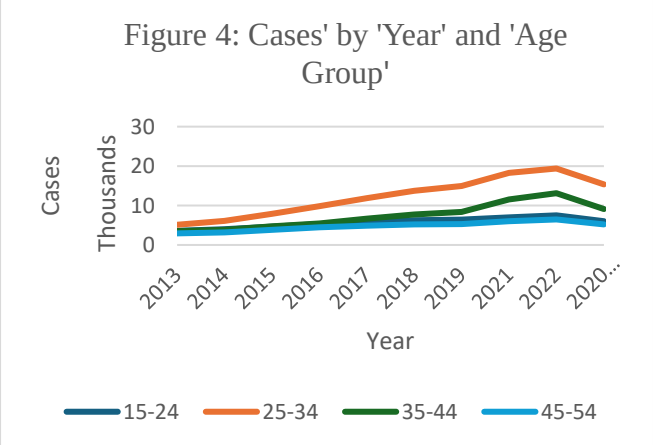


Figure 5

Primary and Secondary Syphilis All Races/Ethnicities United States

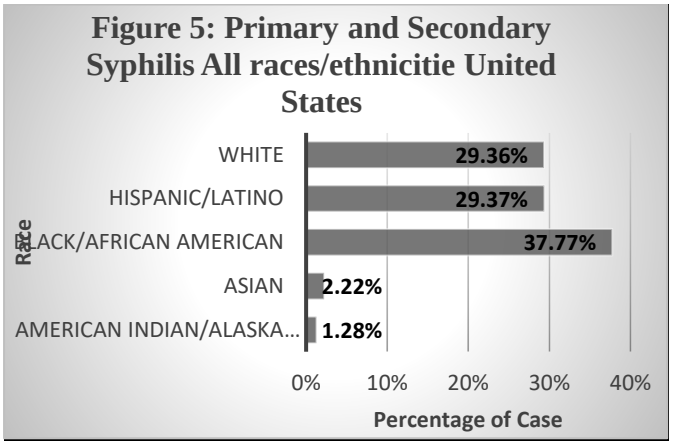
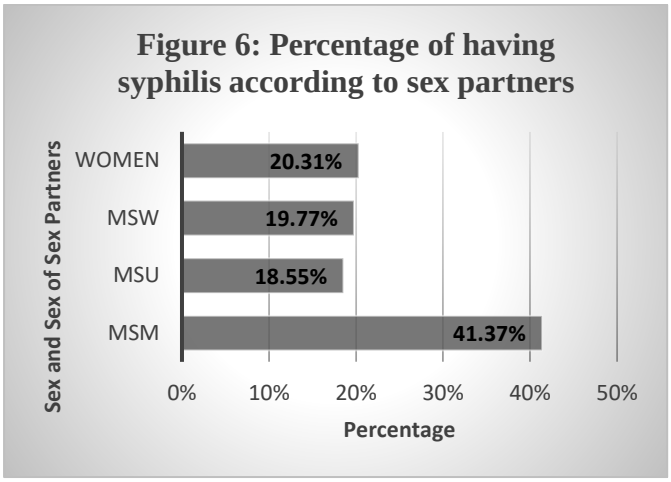


Figure 6

Percentage of Having Syphilis According to Sex Partner



Discussion

The findings of this study highlight a concerning upward trend in the incidence of primary and secondary syphilis in the United States from 2013 to 2022, with an average annual increase of 13.47%. This rise is consistent with other studies that have reported increasing syphilis rates over recent years (Poor et al., 2024). Despite advancements in diagnostic and treatment methods, this trend underscores the ongoing public health challenge posed by syphilis. The significantly higher number of

cases in males compared to females aligns with existing literature that indicates a greater prevalence of syphilis among men, particularly among Men who have Sex with Men (MSM) (Tsuboi et al., 2021). This suggests a need for targeted prevention strategies within male populations, especially MSM.

The simple linear regression model's finding that nearly 10% of the variability in syphilis cases is explained by the year highlights a steady, statistically significant increase over time, suggesting that current intervention efforts may be insufficient (Smolak et al., 2018). The steeper increase in the 25-34 age group calls for focused educational and prevention programs for this demographic. This age group has been identified in prior research as being at higher risk for syphilis, likely due to higher rates of sexual activity and lower rates of healthcare access (Fang et al., 2010).

The disproportionately high percentages of syphilis cases among Black/African Americans (37.77%) and MSM (41.37%) reflect critical demographic disparities that are well-documented in the literature (Mayer et al., 2014). These disparities highlight broader issues of social inequality and access to healthcare, emphasizing the necessity for comprehensive public health strategies that address both individual behaviors and structural determinants.

A recently published paper, notes that the trends in syphilis mortality in the U.S. are alarming, with a notable rise from 2015 to 2020. There were 925 syphilis-related deaths during this time, and 30% of these deaths listed syphilis as the underlying cause. The age-adjusted syphilis mortality rate also went up by an average of 9.51% annually over these five years (Barragan et al., 2023).

One limitation of this study is the absence of the most recent data from 2023 to 2024, which limits the ability to capture the full scope of syphilis trends in more recent years. The unavailability of this data restricts the analysis and could affect the overall

interpretation of syphilis prevalence. Additionally, missing, and underreported data across certain states and demographics may contribute to an underrepresentation of certain populations, making it challenging to draw precise conclusions for all groups. These data gaps emphasize the importance of continuous surveillance and reporting to ensure a comprehensive understanding and effective response to the syphilis epidemic.

However, the use of the CDC's NCHHSTP AtlasPlus tool is a reliable and comprehensive data source that provides detailed, high-quality information on syphilis incidence and demographic distribution. The longitudinal data spanning a decade (2013-2022) offers valuable insights into the trends and patterns of syphilis, allowing for robust analysis of how the epidemic has evolved. This reliable data source strengthens the validity of the findings and supports the need for targeted public health interventions.

The implications of these results are significant. The consistent rise in syphilis cases and the demographic disparities observed suggest that current public health interventions are not adequately addressing the needs of the most affected populations. There is a clear need for enhanced surveillance, targeted prevention efforts, and policies that address the social determinants of health contributing to the spread of syphilis. Continued research and adaptive public health strategies are essential to effectively curb the syphilis epidemic and reduce its impact on vulnerable populations. Achieving equitable health outcomes will require a multifaceted approach that includes education, improved access to healthcare, and interventions tailored to high-risk groups.

Conclusion

The findings of this study demonstrate the need for action to address the syphilis epidemic, which is becoming severe and disproportionately harming specific populations. An important warning sign that the United States is not managing STIs effectively enough is the fact that more individuals are passing away from syphilis. Advising individuals to exercise caution is not enough; we must address poverty, inadequate education, and discriminatory access to healthcare. The administration agrees that there is not a one-size-fits-all approach to solving this. Public health experts and policymakers need to look at all the reasons why people are developing this life-threatening disease and produce an intervention that addresses and reduces these issues on a personal and societal level.

References

Barragan, N. C., Wickramasekaran, R. N., Sorvillo, F., Smith, L. V., & Kuo, T. (2023). Current trends in syphilis mortality in the United States, 2015–2020. *Venereology*, *2*(2), 59-64. https://doi.org/10.3390/venereology2020005

Blencowe, H., Cousens, S., Kamb, M., Berman, S., & Lawn, J. E. (2011). Lives Saved tool supplement detection and treatment of syphilis in pregnancy to reduce syphilis related stillbirths and neonatal mortality. *BMC Public Health*, *11*(Suppl 3), S9. https://doi.org/10.1186/1471-2458-11-s3-s9

Chen, T., Wan, B., Wang, M., Lin, S., Wu, Y., & Huang, J. (2023). Evaluating the global, regional, and national impact of syphilis: Results from the global burden of disease study 2019. *Scientific Reports*, *13*(1). https://doi.org/10.1038/s41598-023-38294-4

Chesson, H. W., & Peterman, T. A. (2021). The estimated lifetime medical cost of syphilis in the United States. *Sexually Transmitted Diseases*, *48*(4), 253–259. https://doi.org/10.1097/olq.0000000000001353

Centers for Disease Control and Prevention. Syphilis—CDC detailed fact sheet. Available at: https://www.cdc.gov/std/syphilis/stdfact-syphilis-detailed.htm. Accessed 21 June 2024.

Centers for Disease Control and Prevention. NCHHSTP AtlasPlus. https://www.cdc.gov/nchhstp/about/atlasplus.html. Accessed 21 June 2024.

Centers for Disease Control and Prevention. 2022 U.S. Syphilis Cases Reach Highest Numbers Since the 1950s. Available at: https://www.cdc.gov/nchhstp/newsroom/2024/STI-Surveillance-Report-2022.html. Accessed 21 June 2024.

Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance 2020. Atlanta: U.S. Department of Health and Human Services, 2022. Available at: https://www.cdc.gov/std/statistics/2020/2020-SR-4-10-2023.pdf. Accessed 21 June 2024.

Fang, L., Oliver, A., Jayaraman, G. C., & Wong, T. (2010). Trends in age disparities between younger and middle-age adults among reported rates of chlamydia, gonorrhea, and infectious syphilis infections in Canada: Findings from 1997 to 2007. *Sexually Transmitted Diseases*, *37*(1), 18-25. https://doi.org/10.1097/olq.0b013e3181b617dc

Fu, L., Sun, Y., Han, M., Wang, B., Xiao, F., Zhou, Y., Gao, Y., Fitzpatrick, T., Yuan, T., Li, P., Zhan, Y., Lu, Y., Luo, G., Duan, J., Hong, Z., Fairley, C. K., Zhang, T., Zhao, J., & Zou, H. (2022). Incidence trends of five common sexually transmitted infections excluding HIV from 1990 to 2019 at the global, regional, and national levels: Results from the global burden of disease study 2019. *Frontiers in Medicine*, *9*. https://doi.org/10.3389/fmed.2022.851635

Gilmour, L. S., & Walls, T. (2023). Congenital syphilis: A review of global epidemiology. Clinical Microbiology Reviews, 36(2). https://doi.org/10.1128/cmr.00126-22

Kenyon, C. R., Osbak, K., & Tsoumanis, A. (2016). The global epidemiology of syphilis in the past century – A systematic review based on antenatal syphilis prevalence. *PLOS Neglected Tropical Diseases*, *10*(5), e0004711. https://doi.org/10.1371/journal.pntd.0004711

Mayer, K. H., Wang, L., Koblin, B., Mannheimer, S., Magnus, M., Rio, C. D., Buchbinder, S., Wilton, L., Cummings, V., Watson, C. C., Piwowar-

Manning, E., Gaydos, C., Eshleman, S. H., Clarke, W., Liu, T., Mao, C., Griffith, S., & Wheeler, D. (2014). Concomitant socioeconomic, behavioral, and biological factors associated with the disproportionate HIV infection burden among Black men who have sex with men in 6 U.S. cities. *PLoS ONE*, *9*(1), e87298. https://doi.org/10.1371/journal.pone.0087298

Mehdi Poor, N. K., AlDabal, L. M., Bashiri, S., Alneaimi, E., Almarri, A. A., Bayoumy, A. M., Omer, S. H., Dsouza, C. L., & Moosa, M. (2024). Syphilis and beyond: A comprehensive analysis of associated infections and comorbidities in a five-year retrospective study in the United Arab Emirates (2018-2022). *International Journal of Sexually Transmitted Diseases*, *1*(2), 19–28. https://doi.org/10.14302/issn.2994-6743.ijstd-24-5006

Rifqian, N., & Reza Hidayat, M. (2024). Prevalence, management, and outcome of cervical cancer in low income countries: A comprehensive systematic review. *Journal of Advanced Research in Medical and Health Science (ISSN 2208-2425)*, *10*(6), 46-54. https://doi.org/10.61841/8hhj5m18

Schmidt, R., Carson, P. J., & Jansen, R. J. (2019). Resurgence of syphilis in the United States: An assessment of contributing factors. *Infectious Diseases: Research and Treatment*, *12*. https://doi.org/10.1177/1178633719883282

Smolak, A., Rowley, J., Nagelkerke, N., Kassebaum, N. J., Chico, R. M., Korenromp, E. L., & Abu-Raddad, L. J. (2018). Trends and predictors of syphilis prevalence in the general population: Global pooled analyses of 1103 prevalence measures including 136 million syphilis tests. *Clinical Infectious Diseases*, *66*(8), 1184-1191. https://doi.org/10.1093/cid/cix975

Tsuboi, M., Evans, J., Davies, E. P., Rowley, J., Korenromp, E. L., Clayton, T., Taylor, M. M., Mabey, D., & Chico, R. M. (2021). Prevalence of syphilis among

men who have sex with men: A global systematic review and meta-analysis from 2000–20. *The Lancet Global Health*, *9*(8), e1110-e1118. https://doi.org/10.1016/s2214-109x(21)00221-7

Tuddenham, S., Hamill, M. M., & Ghanem, K. G. (2022). Diagnosis and treatment of sexually transmitted infections. *JAMA*, *327*(2), 161. https://doi.org/10.1001/jama.2021.23487

U.S. Department of Health and Human Services. Sexually Transmitted Infections National Strategic Plan for the United States: 2021–2025. Washington, DC. 2020. Available online: https://www.hhs.gov/sites/default/files/STI-National-Strategic-Plan-2021-2025.pdf Accessed 22 June 2024.

Zhang, Y., Wu, G., Lu, R., Xia, W., Hu, L., Xiong, Y., Xie, J., Yu, Q., & Ye, M. (2019). What has changed HIV and syphilis infection among men who have sex with men (MSM) in Southwest China: A comparison of prevalence and behavioral characteristics (2013–2017). *BMC Public Health*, *19*(1). https://doi.org/10.1186/s12889-019-7730-0

Zheng, Y., Yu, Q., Lin, Y., Zhou, Y., Lan, L., Yang, S., & Wu, J. (2022). Global burden and trends of sexually transmitted infections from 1990 to 2019: An observational trend study. *The Lancet Infectious Diseases*, *22*(4), 541-551. https://doi.org/10.1016/s1473-3099(21)00448-5

Assessment of Eating Habits and Dietary Patterns in Elderly Individuals from Low Socioeconomic Backgrounds. Implication for Community Leaders

by

Israel Msengi, Tarleton State University, Clementine Msengi, Lamar University

Low socioeconomic status elderly individuals often face nutritional barriers due to limited access to fresh, healthy foods due to financial constraints, reduced income, difficulty reaching grocery stores, lack of transportation, and reliance on cheaper, less nutritious processed foods, which can lead to malnutrition and increased risk of chronic diseases. Understanding the nutritional needs of elderly individuals is crucial for promoting health and well-being in this demographic. Adequate nutrition plays a key role in mitigating the physiological, biological, and psychological changes associated with aging. This cross-sectional descriptive study examined the dietary patterns and eating habits of low socioeconomic elderly adults aged 60 and above in a Southeastern Texas County who receive meals through a "Meals on Wheels" service. A total of 65 senior citizens residing in various senior housing units participated in the study. Dietary patterns and eating habits were assessed using the structured "Diet and Eating Habits" (DEH) questionnaire. Researchers delivered some of the questionnaires to “Meals on Wheels" coordinators, who then distributed them during meal deliveries.The majority of participants (87.7%) reported having at least one health issue, with a higher prevalence among females (73.7%). Hypertension (80%) and diabetes (44%) were the most common conditions. Participants exhibited a mix of healthy and unhealthy behaviors, frequently consuming fruits, vegetables, and water while also having a significant intake of starches, sweets, and fats. Their dietary patterns showed both alignment with and divergence from recommended guidelines for older adults. While high consumption of vegetables (85.4%), fruits (76.6%), and water (91.8%) matched recommendations for a nutrient-dense diet and hydration, the notable intake of starch (60.4%), sweets (54.5%), and fats (52.2%) conflicted with guidelines to limit unhealthy fats and added sugars.

Key Words: *Dietary patterns, eating habits, Baby Boomers, Low socioeconomic status, Community leaders*

Introduction

Low socioeconomic status elderly individuals often face nutritional barriers due to limited access to fresh, healthy foods due to financial constraints, reduced income, difficulty reaching grocery stores, lack of transportation, and reliance on cheaper, less

nutritious processed foods, which can lead to malnutrition and increased risk of chronic diseases (United Health Foundation, 2024). Understanding the dietary patterns and eating habits of older adults, particularly those in socioeconomically disadvantaged groups, is crucial for reducing or delaying health challenges associated with poor nutrition, unhealthy eating habits, and the aging process (Zoragoza-Marti et al., 2020).

Aging is an inevitable, natural process that affects all individuals. This process involves various behavioral, social, physical, psychological, socioeconomic, and genetic factors that can negatively impact the nutritional status of older adults (United Health Foundation, 2024). Older adults are particularly vulnerable to poor nutrition, as they are more likely to experience nutritional deficiencies compared to individuals in other age groups (Senee, Ishnoo, & Jeewon, 2022). Over time, the physiological, biological, and psychological changes that affect all body systems shaped by factors such as life events, illness, socioeconomic status, poor nutrition, and genetics can profoundly influence the health and well-being of older adults (Institute for Quality and Efficiency in Health Care [IQWiG], 2020; Kourkouta, Ouzounakis, et al., 2016).

Despite the challenges associated with aging, life expectancy in the U.S. has risen significantly over time, thanks to advancements in healthcare, nutrition, hygiene, and overall living standards (Kourkouta, Ouzounakis et. al., 2016). According to the CDC National Center for Health Statistics (2024), life expectancy at birth in the U.S. rose from 76.4 years in 2021 to 77.5 years in 2022. People reaching age 65 can expect an additional 18.9 years of life on average (20.2 years for women and 17.5 years for men). As life expectancy increases, the elderly population grows, which can strain

Social Security systems, drive up healthcare costs, affect workforce dynamics, and raise concerns about maintaining quality of life in later years.

Demographics of the Elderly Population in the United States

From 2021 to 2022, the U.S. saw a significant growth in the population of adults aged 65 and older, with an increase of over 1.9 million people (United Health Foundation, 2024). Currently, with a population exceeding 339 million, 17.3% (57.8 million) of individuals are aged 65 or older (U.S. Census Bureau, 2022). Among this group, 31.9 million are women, while 25.9 million are men. This marks a 34% increase (14.7 million) since 2012, compared to a 2% increase in those under 65 years old (Administration for Aging and Administration for Community Living [AoA & ACL], 2024). According to the report, a higher percentage of older men (68%) are married compared to older women (47%). Of those living in the community, 59% reside with a spouse or partner. The median income for older men is $29,740, while for older women, it is $24,630. The proportion of adults aged 65 and older is set to increase as the final cohort of baby boomers reaches 65 in 2030 (United Health Foundation, 2024). As the older American population grows and becomes more diverse, it is essential to prioritize factors that influence their health and well-being, including economic conditions, social connectedness, nutrition, and access to healthcare (United States Census Bureau, p23-212, 2014; Wells & Dumbrell, 2006; United Health Foundation, 2024)

Demographics of the Elderly Population in Texas and Southeast Texas

The elderly population in Texas is growing rapidly, reflecting a broader national trend as the baby boomer generation ages (Texas Health and Human Services Commission [(THHSC), 2023]. As of the latest data, nearly 15% of Texas's population is aged 65 or

older, a percentage expected to increase significantly in the coming decades (THHSC, 2023). This demographic shift presents both challenges and opportunities for the state, including increased demand for healthcare services, housing options, and community resources tailored to seniors. The elderly in Texas are diverse, with a rich blend of cultural backgrounds, including significant Hispanic and African American populations, which can influence health needs and preferences (THHSC, 2023). Many older Texans live in urban areas, but rural regions also have large aging populations, often facing limited access to healthcare and social services (THHSC, 2023). As the state's elderly population continues to grow, addressing their needs for support services, affordable healthcare, and social engagement will be essential to ensuring a high quality of life for Texas seniors.

Economic Conditions of Older Americans

Although the income of older adults in the United States is relatively stable through Social Security, it varies significantly due to factors such as age, health, educational background, work history, and geographic location. The financial security of older adults in the U.S. is becoming an increasing concern, especially for those without sufficient retirement savings or additional sources of income. According to the (AoA & ACL, 2024), the median income for individuals aged 65 and older was $29,740, with men earning a median of $37,430 and women $24,630. However, this figure can fluctuate depending on whether the household is composed of a single person or a couple.

For many elderly Americans, Social Security is the largest source of income, accounting for more than half of their total income. It is the primary or even the only

source of income for many in this demographic. Earnings from employment are the second-largest source, contributing 19.3% of total income, followed by pensions and retirement account income at 17.2% (U.S. Census Bureau, 2022). The Supplemental Security Income (SSI) program is most commonly utilized by the lowest-income households, while pension and retirement income, property income, and earnings are more prevalent among higher-income groups.

Another important source of income for some older adults is wages from employment. Many continue working beyond the traditional retirement age, often in part-time or flexible roles. For example, in 2023, more than eleven million Americans aged 65 and older were either working or actively seeking work (AoA & ACL, 2024).

Poverty Among Older Adults

Poverty rates among older Americans are often higher than those in the general population. According to AoA and ACL, 2024, a significant proportion of older Americans live near or below the poverty line. For instance, in 2022, 5.9 million Americans aged 65 and older lived below the poverty level, while an additional 2.7 million had incomes at or just above it. Many older adults rely heavily on Supplemental Security Income (SSI), a federal program designed to assist those with very low incomes and limited assets (AoA & ACL, 2024). Several factors contribute to the elevated poverty rates among elderly Americans:

Gender and Racial Income Disparities: Older women, particularly women of color, often have lower incomes than their male counterparts. This is partly due to a lifetime of wage inequality, caregiving responsibilities, and lower workforce participation. For example, a report from the Federal Reserve Bank of Dallas (Crockett,

2024) notes that Black and Hispanic older adults generally have lower median household incomes than their White counterparts.

Educational Disparities: Low educational attainment negatively impacts economic prosperity. As the global economy increasingly favors knowledge-based industries, higher education has become essential for social mobility (Carnevale, Strohl, et al., 2018). Older individuals with higher education levels typically experience higher incomes in retirement. The percentage of older adults who completed high school in 1970 was 28%, while by 2022, that figure had risen to 89% (AoA & ACL, 2024). However, individuals who lack access to higher education or work in lower-paying jobs throughout their lives may experience lower incomes in retirement (AoA & ACL, 2024).

Cost of Living and Healthcare: The income of older adults is also affected by the cost of living. Those residing in high-cost areas, such as urban environments, are especially vulnerable. Affordability influences access to essential resources, including healthy foods. In 2021, approximately 11.2 million adults aged 65 or older spent 30% or more of their household income on housing costs, with nearly half of these individuals spending 50% or more (Joint Center for Housing Studies of Harvard University, 2023). Over 40% of Black and Hispanic older adult households were cost-burdened, compared to 30% of White households. Regarding healthcare, individuals aged 65 and older incurred out-of-pocket healthcare costs averaging $7,540 in 2022, a 47% increase from 2012 (AoA & ACL, 2024).

The America's Health Rankings (2024) senior report reveals several notable trends in Texas regarding the health and well-being of older adults. Food insecurity

among adults aged 60 and older decreased by 18%, dropping from 18.1% in 2017-2018 to 14.9% in 2020-2021. However, poverty rates for adults aged 65 and older rose by 16%, increasing from 10.6% in 2019 to 12.3% in 2022. Additionally, early deaths in Texas saw a positive decline, with the rate of deaths among adults aged 65-74 decreasing by 14%, from 2,439 to 2,106 deaths per 100,000 people between 2021 and 2022.

Health Challenges Among Older Adults

The elderly population in the United States faces numerous health challenges stemming from physiological changes that occur with aging (U.S. States Census Bureau, 2014). These challenges include mobility issues, vision impairment, and a variety of age-related diseases.

This aging demographic exhibits a broad range of health problems, many of which are influenced by dietary factors (Ortman, Vekoff, & Hogan, 2014). Regardless of age, dietary habits and other lifestyle practices, such as physical activity levels, significantly influence overall wellness and the aging process. When these lifestyle factors combine with the natural changes of aging, they often lead to health complications (Grady, 2011). For example, a high intake of dietary fat is linked to cancers of the colon, pancreas, and prostate in older adults. Similarly, atherogenic risk factors, including hypertension, elevated blood fats, and glucose intolerance, contribute to the development of coronary heart disease (Grady, 2011).

Degenerative diseases such as cardiovascular and cerebrovascular disease, diabetes, osteoporosis, and cancer are prevalent diet-related conditions among the elderly (Grady, 2011). Additionally, elevated serum cholesterol, a risk factor for coronary heart

disease, is common in this population (Ortman, Vekoff, & Hogan, 2014). Other contributing factors include the high cost of nutrient-rich foods such as vegetables, fruits, whole grains, nuts, and seeds. Consequently, many older adults suffer from decreased immune function, cognitive decline, and vision deterioration (Ortman, Vekoff, & Hogan, 2014).

Ensuring adequate nutrition for older adults is often challenging. One significant dietary challenge is the lack of well-defined nutritional requirements for the elderly (Ortman, Vekoff, & Hogan, 2014). Since both lean body mass and basal metabolic rate decline with age, the energy requirements per pound of body weight also decrease (Ortman, Vekoff, & Hogan, 2014).

Nutritional Needs and Challenges for Older Adults

Nutrition plays a critical role in the health of individuals over the age of 65 (Wells & Dumbrell, 2006; Bergeron, John et al., 2021). According to the World Health Organization (WHO), nutrition is the intake of food, considered in relation to the body's dietary needs. Good and adequate nutrition, combined with a well-balanced diet and regular physical activity, is crucial for maintaining optimal health (WHO; Insel & Roth, 2023). However, nutritional needs change with age and gender (Clifford & Bellows, 2015). For individuals over 60, adjustments in food and drink choices may be necessary to support optimal health. The percentage of older U.S. adults with poor diet quality rose significantly from 51% to 61%, indicating a decline in diet quality among this group (Long, Zhang et al., 2022).

A study by Bergeron, John, et al. (2021) examined malnutrition-related deaths among adults aged 65 and older across Texas counties. The findings revealed over

25,000 deaths related to malnutrition, with an average of 99.2 deaths per county and 65.6 deaths per 100,000 older adults. Additionally, the study highlighted that an average of 62.4% of residents aged 65 or older have limited access to food stores within one mile, further exacerbating issues of food accessibility and nutritional health. Smith, Mathews, Oliver, et al. (2006) conducted a study investigating the nutritional status of self-neglecting older adults in Texas. The study found that these individuals were particularly at risk for deficiencies in key nutrients, including folate, antioxidants, and vitamin D, which could lead to altered nutritional status. According to Blumberg (2013), older adults often require higher levels of certain vitamins and minerals while needing fewer calories due to reduced energy expenditure. Adopting a nutrient-dense diet that prioritizes whole foods, combined with regular physical activity, can promote health and longevity. In addition, the critical nutritional need for older adults, the U.S. Food and Drug Administration (FDA, 2024) recommends the need to understand nutrition labels in order to make informed dietary decisions.

Home Delivery Meals through "Meals on Wheels America" (MWA)

Access to foods that promote healthy dietary patterns benefits health not only in the present but also across the lifespan. As individuals age, the development of physical and/or cognitive impairments may prompt older adults to seek assistance with daily activities (Fleury Van Wymelbeke-Delannoy et al., 2021). Research highlights a strong link between limited access to nutritious foods and negative health outcomes, a challenge that is particularly significant for aging adults (Gajda, Jeżewska-Zychowicz, & Raczkowska (2021).

Since its start as a demonstration project in 1954 and being formally added by Congress to the Older Americans Act in 1972, Meals on Wheels, along with various other nutrition screening, education, and counseling services, have been offered to adults aged 60 and older (Moran, 2004; MWA, 2024). Serving over 2.4 million older and low-income adults annually, the program relies on professional chefs and volunteers to prepare high-quality meals. These meals, developed by registered dietitian-nutritionists, cater to a wide range of medical and nutritional needs (MWA, 2024). Customizable menus address individual health conditions, allergies, food aversions, medication interactions, and other dietary considerations (MWA, 2024).

According to MWA (2024), approximately one in six older adults in the U.S. faces hunger. In 2022 alone, the Meals on Wheels network provided 250 million meals, delivering not just nutrition but also companionship to homebound seniors, a service that helps reduce healthcare costs (MWA, 2022).

In Texas, 17.5% of seniors, approximately 977,735 individuals, experience limited or uncertain access to adequate food, while 9.8% (546,775 seniors) face a reduced diet variety or quality (MWA-Texas, 2024). Furthermore, 3.5% (194,508 seniors) have reduced food intake, and 10.5% (383,986 seniors) rely on Supplemental Nutrition Assistance Program (SNAP) benefits (MWA-Texas, 2024). Nutritional challenges are further underscored by the fact that 21.2% of seniors consume fewer than one vegetable daily, and 39.5% eat less than one fruit per day, reflecting significant dietary gaps among the elderly population (MWA-Texas, 2024).

Since 1983, Meals on Wheels in Southeast Texas has delivered over 18 million hot noon meals to seniors and homebound disabled adults. The program serves more

than 450,000 meals annually, offering essential nutrition and support to individuals in need throughout the region.

Dietary Patterns and Eating Habits in Older Adults

According to the U.S. Department of Health and Human Services, Healthy People-2030 (2024), a dietary pattern encompasses the entirety of foods and beverages individuals habitually consume, with the various components interacting synergistically to influence overall health. Key elements of a healthy dietary pattern include vegetables of all types, fruits, whole grains, low-fat or fat-free dairy, protein foods, and oils while emphasizing appropriate portion sizes and minimizing added sugars, saturated fats, sodium, and alcohol. Several factors can influence the dietary patterns of older adults. These include socioeconomic status, food prices, marital status, psychological well-being, changes in sensory abilities, access to food, nutrition knowledge, cooking skills, gastrointestinal health, oral health, and medication use. (Senee, Ishnoo, & Jeewon, 2022). In most cases, eating patterns are influenced by local culture and traditions. (Ferreira, Papini, & Corrente (2014). However, eating habits naturally evolve over the lifespan (National Institute on Aging, 2022; Yannakoulia, Mamalaki, et al., 2018; Donini, Savina, & Cannella, 2003). Eating habits can be defined as "conscious, collective, and repetitive behaviors, which lead people to select, consume, and use certain foods or diets in response to social and cultural influences" (Medina, Urbano, Espinoza et al., 2020, p. 1). Poor dietary patterns and eating habits among the elderly can contribute to the development of chronic conditions such as coronary heart disease, atherosclerosis, type 2 diabetes, hypertension, and malnutrition. (Senee, Ishnoo, & Jeewon, 2022).

Popular Diets, Dietary Patterns, and Eating Habits in Southeast Texas

The diet in Southeast Texas reflects the region's diverse cultural heritage, with strong influences from Southern, Cajun, and Mexican cuisines. The food culture revolves around hearty, flavorful dishes often made with local ingredients and traditional cooking techniques. According to the Beaumont Convention and Visitor Bureau (2024), this vibrant culinary tradition includes dishes such as barbecued crabs, brisket, gumbo, crawfish étouffée, tacos, shrimp, and grits, kolaches, and pecan pie, among many others.

While the Southeast Texas diet boasts a rich mix of cultural flavors, it also includes both healthy and less healthy components. Common unhealthy elements include fried foods, barbecue, red meats high in saturated fats and calories, heavy creamy sauces rich in sodium and fat, and processed meats like sausages containing nitrates and high sodium levels. However, adopting a healthier dietary pattern tailored to cultural and personal preferences is possible through moderation, healthier cooking methods, portion control, and increasing the inclusion of fresh vegetables.

Challenges for Older Adults in Maintaining Healthy Dietary Patterns

As individuals age, physiological, psychological, social, and economic changes can significantly compromise their nutritional status, making it harder to maintain healthy eating habits (Insel & Roth, 2023). Several factors can influence dietary patterns and eating habits. Living alone, mobility challenges, and health issues that impair cooking or self-feeding are key contributors. Medication side effects may affect taste or appetite, while limited income can restrict food choices. Sensory changes, such as a diminished sense of taste or smell and difficulties with chewing or swallowing, can also

impact eating habits (Laraia, Leak, et al., 2012; Cunha, Sichieri, et al., 2011). Adapting to a new diet that contrasts with long-held cultural preferences can be especially challenging for older adults, potentially impacting their overall health (Ghosh, Jalli, et al., 2024).

Study Purpose

This study explored the dietary patterns and eating habits of low-income elderly individuals in a southeastern Texas city who received meals from Meals on Wheels America. The study also examined the common food choices provided and how these influenced their eating habits and health outcomes. By analyzing these patterns, the study aimed to identify areas of concern and provide actionable insights for local public health officials, food service organizations, and community leaders.

Methodology

Study Design

This study utilized a cross-sectional descriptive design to assess the dietary patterns and eating habits of senior citizens aged 65 and older residing in senior housing facilities in Southeast Texas. The cross-sectional approach provided an overview of participants' eating behaviors and dietary habits at a single point in time. This design is particularly suited for gathering detailed, descriptive data from a large sample of seniors, offering essential knowledge of their food intake, eating behaviors, and related sociodemographic factors.

Population and Sample

This study focused on a cohort of 100 senior citizens aged 65 and older residing in senior housing facilities in Southeast Texas, who received meal delivery services.

The participants were predominantly from low socioeconomic backgrounds, exhibiting various levels of physical and cognitive health. Most participants were enrolled in the Meals on Wheels America program, which provides home-delivered meals. This group was chosen from a low socioeconomic population that is likely to face challenges related to food access or security, mobility, and nutritional awareness.

The sample size of 100 participants was determined through statistical power analysis, which indicated that this size would yield significant results with a statistical power of 0.96 and an effect size of 1.499. Setting a high statistical power ensures the study is adequately sensitive to detecting meaningful differences in eating habits and dietary patterns, particularly in relation to demographic factors.

Sampling Methods

The participants were selected using a convenience sampling method. This approach was deemed appropriate given the logistical constraints and the targeted population. The convenience sampling approach allowed for the inclusion of participants who were easily accessible and willing to take part in the study. It also ensured a feasible and timely data collection process.

Participants included in this study were senior citizens aged 65 or older who resided in senior housing facilities and received meals through the Meals on Wheels America program. Participants were excluded if they received meals from a service other than Meals on Wheels America, were unable to complete the survey due to severe cognitive or physical impairments, did not use the meal delivery service, or lived outside of low-income housing.

Data Collection Methods

Dietary patterns and eating habits were assessed using a structured "Diet and Eating Habits" questionnaire with questions adapted from two established tools: the “Eating Habits Questionnaire” from the National Cancer Institute (n.d.) and the Eating Pattern Questionnaire from Harder Family Practice (n.d.). The questionnaire includes questions about participants' dietary intake, meal frequency, food preferences, and eating behaviors. Several questionnaire items from these existing instruments were modified to suit the specific context of elderly individuals in meal delivery programs, ensuring their relevance and applicability. The questionnaire contained both Likert scale questions (1 = Always, 2 = Often, 3 = Sometimes, 4 = Rarely, 5 = Never) to measure the frequency of certain dietary patterns and eating habits, as well as yes/no questions to assess specific behaviors, such as "Do you eat fruits or vegetables with every meal?" Some open-ended questions were also included to capture more detailed qualitative information about participants' dietary choices, preferences, and challenges related to food. The questionnaire also gathered demographic information, such as age, gender, and education level.

After obtaining the Institutional Review Board (IRB) approval, the questionnaires were distributed to two local agencies that provide housing and meal services for the elderly. Participants were asked to sign a consent form indicating their willingness to participate in the study. After signing the consent form, participants completed the dietary questionnaire a few days later.

Participant Consent

Participants were fully informed of the study's purpose, procedures, and potential risks through a consent form. Participants were given a few days to review the

questionnaire and prepare any questions, which they could relay to the meal delivery agent during their next visit. The meal delivery agent then conveyed these questions to the researchers for clarification, ensuring participants had the opportunity to address any concerns before agreeing to participate. Answers to questions were conveyed to participants both orally and in writing. Confidentiality was maintained throughout the study, with participants being assured that their personal information would not be shared without their explicit consent. Researchers and meal delivery agents collected completed questionnaires during subsequent meal deliveries or whenever participants were able to complete them. The data collection process was completed within a three-week period.

Data Analysis

Once the data collection process was completed, all data were carefully entered into SPSS v.27 for analysis. The dataset was cleaned to identify and correct inconsistencies, including misspelled entries, missing data, and outliers, thereby ensuring the accuracy and reliability of the data.

Two primary types of statistical tests were performed to analyze the data: descriptive statistics and bivariate statistics. Descriptive statistics were used to summarize the demographic characteristics of participants. Frequencies and percentages were calculated to determine the distribution variables. Bivariate statistics were computed to examine the mean difference between independent and dependent variables. The t-test was specifically used to compare the mean differences between two independent groups, such as gender differences in eating patterns or health

outcomes. The significance level for all tests was set at $p < 0.05$, indicating that any results with a p-value below this threshold were considered statistically significant.

A correlation analysis was conducted to examine how specific eating habits (e.g., frequency of meal consumption, types of food) might influence the prevalence of reported health conditions, such as hypertension and diabetes.

Results

Sample Characteristics

The study sample predominantly consisted of African American participants (89.7%), with Caucasians accounting for 10.3%. Gender distribution was skewed, with females making up 72% of the participants. The average age of participants was 68 years, aligning with the study's focus on older adults. Educational attainment revealed that 68.9% of participants had completed high school, and 11.1% achieved a two-year college degree, which was the highest education level reported. Notably, 76% of participants relied on the *Meals on Wheels America* service, highlighting the critical role of this program in providing nutritional support for older adults in this demographic.

Common Food Groups Consumed

The analysis of dietary patterns revealed a mix of healthy and unhealthy food consumption behaviors among participants. The majority reported regular or frequent consumption of vegetables (85.4%), fruits (76.6%), and water (91.8%), indicating positive dietary habits. However, significant portions of the sample also reported a high intake of less healthy options, such as starch (60.4%), sweets (54.5%), and fats (52.2%). Beverage consumption varied, with coffee consumed by 53.1%, tea by 33.3%,

and soda by 30.4%. Alcohol consumption was infrequent, with only 9.8% reporting regular intake.

Nutritional Quality of the Diet

Although the study did not directly measure caloric or nutrient intake, it was noted that Meals on Wheels America meals typically provide 500-600 calories per serving, contributing to an estimated daily total of 2,000 calories. These meals aim to balance macronutrients, including protein, carbohydrates, and fats, while supplying essential micronutrients, such as vitamins and minerals. Special attention is given to dietary restrictions, such as reduced sodium and sugar content, to meet the specific nutritional needs of older adults.

Eating Habits

Meal Frequency and Timing

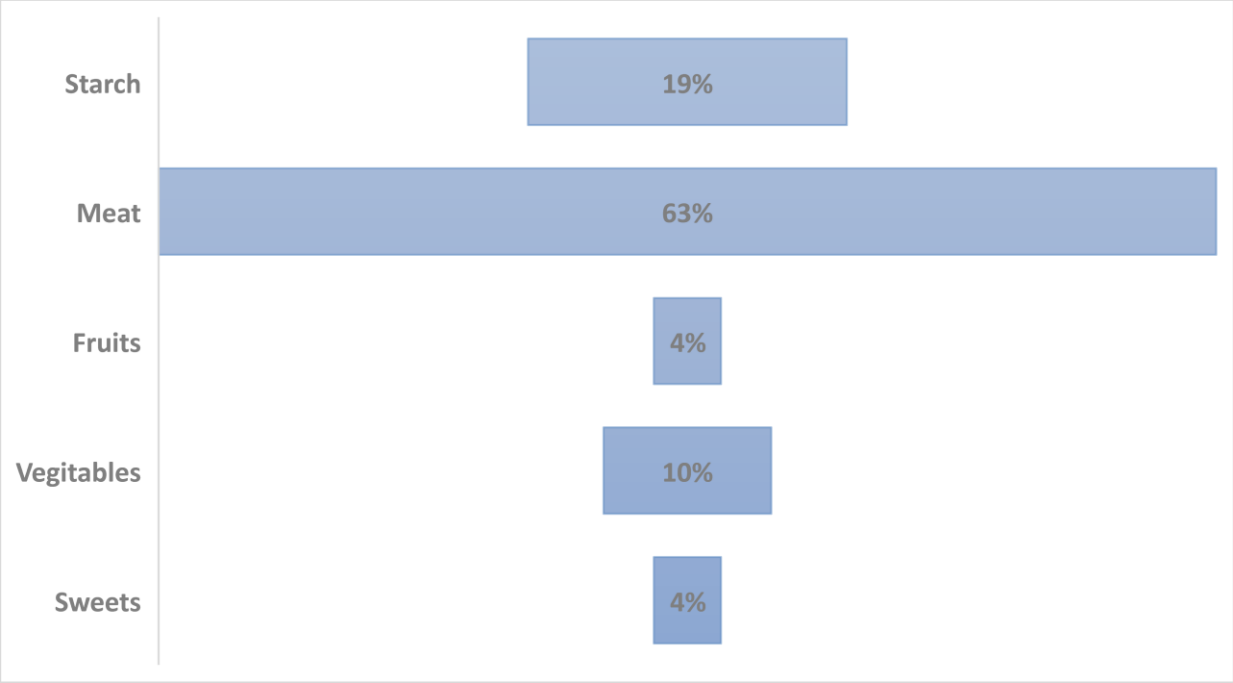
Meal regularity was observed among most participants, with 74% reporting consistent breakfast consumption, 76% receiving lunch on time, and 90% eating dinner regularly. However, brunch was infrequent, with only 58.2% reporting rare or irregular access to it.

Eating Occasions

Solitary eating was the predominant pattern, with 76% of participants eating alone. Social meals were less common, representing only 24% of the group. Dining out was reported by 57.1% of participants, but the frequency varied significantly: 48.4% dined out monthly, 25.8% ate out weekly, and 25.8% reported dining out less than once a month.

The majority of participants (63%) in this study expressed a preference for more meat in their diet, likely reflecting cultural, dietary, or personal tastes.

Figure 1
Percentage of Type of Food Preferred



Food Preparation Practices

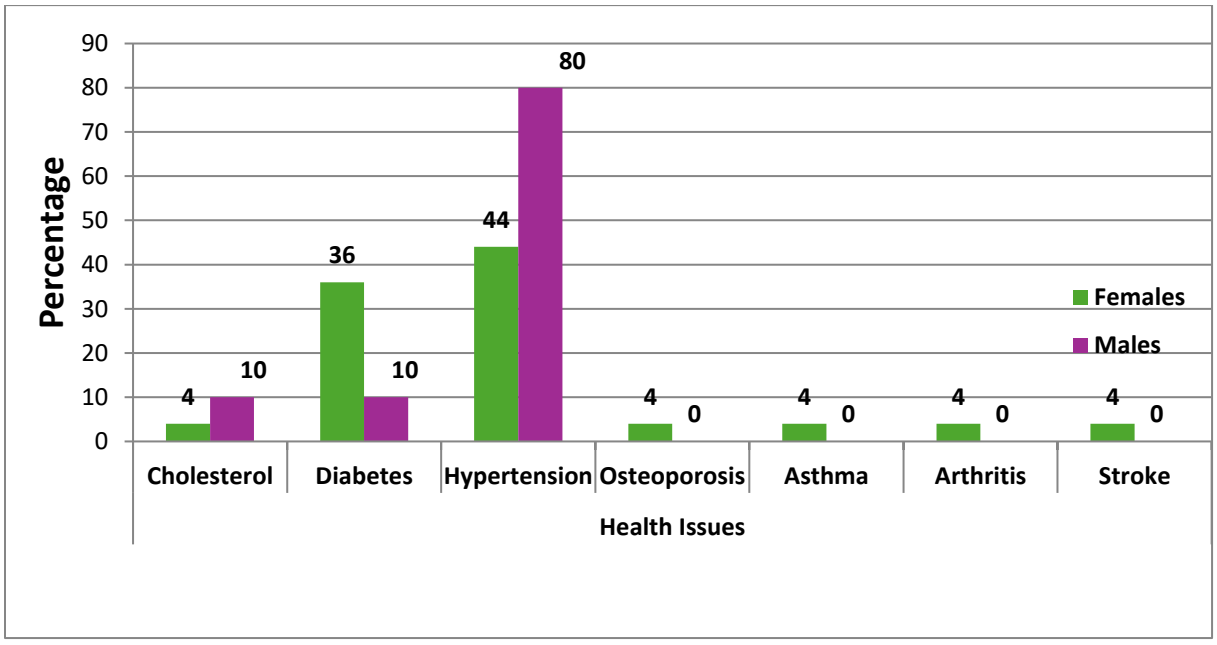
Among participants who occasionally prepared their own meals, a variety of cooking methods were used. Baking was the most common method (64%), followed by frying (58%), steaming (32%), and boiling (28%). Less common practices included poaching (16%) and other methods (2%). Over 50% of low-income elderly residents enrolled in the "Meals on Wheels America" program reported being placed on dietary restrictions by their doctors. These restrictions included low-sodium diets to manage hypertension, low-fat diets to address cholesterol and heart health, and low-sugar diets for diabetes or other metabolic conditions. Additionally, 31.9% of participants identified

other significant personal challenges affecting their ability to maintain proper nutrition. These challenges included financial difficulties limiting access to additional or healthier food options, mobility impairments that restricted shopping or meal preparation, and insufficient meal portions to meet their dietary needs. Many also faced cooking difficulties due to ailments such as arthritis or chronic pain and lacked reliable transportation, further complicating their access to grocery stores or community resources.

Health Issues

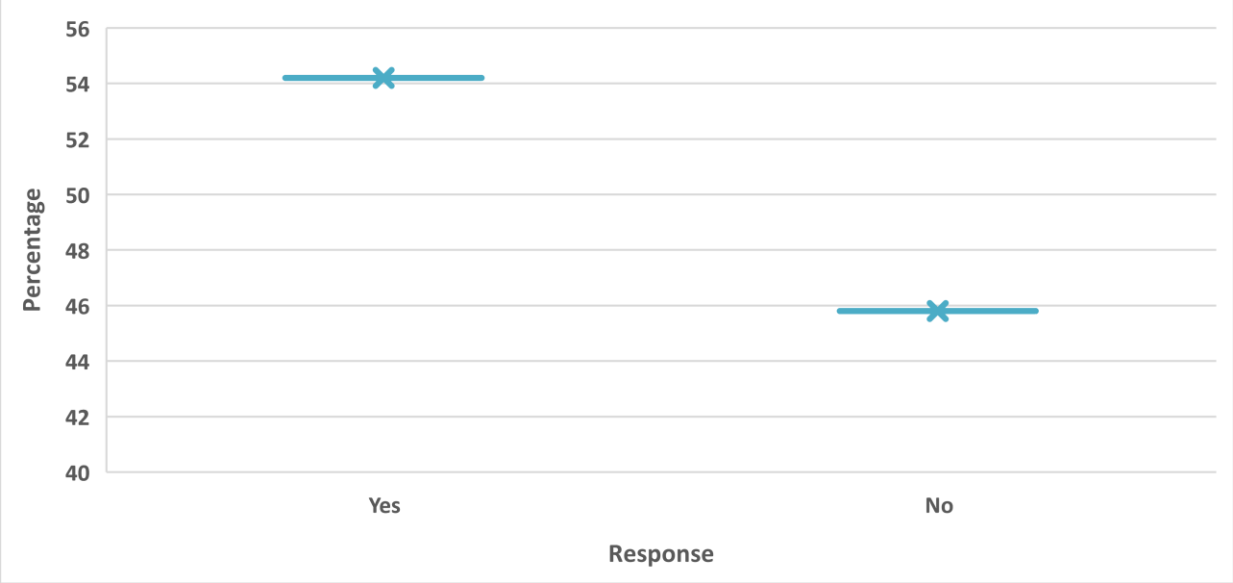
The majority of participants (87.7%) reported having at least one health issue, with a higher prevalence among females (73.7%). The most common condition was hypertension (80%) among males, followed by diabetes (44%) among women.

Figure 2
Proportions of Male and Female with Health Issues



Over half of the participants (54.2%) expressed a desire to change their eating habits. These desired changes included addressing poor eating patterns, increasing opportunities for socialization during and after meals, improving the quality and balance of their daily diet, preparing their own food more frequently, and incorporating regular exercise into their routine to support healthier lifestyles.

Figure 3
Desire to Change Eating Habits



Additional Statistical Analyses

Additional Statistical tests were conducted to explore potential relationships between dietary patterns, gender, and health conditions. An independent samples t-test revealed no significant gender differences in dietary patterns for highly consumed foods (starch, fats, sweets, coffee, and soda) or health conditions (Male: M = 2.7, Female: M = 3.12; t (33) = -0.709, p = .483). Similarly, a chi-square test of independence showed no significant association between dietary patterns and health conditions (X^2 (3, N = 47)

= 2.218, p = .528).

Pearson correlation analysis indicated no significant correlations between health conditions and the consumption of starch (r = -0.132, p = 0.377), sweets (r = -0.180, p = .247). However, soda (r = -0.307, p = .040), and alcohol consumption (r = -.316, p = .047) indicated a significant negative correlation with health issues. These findings suggest that soda and alcohol consumption may be inversely related to reported health conditions, although these correlations were weak.

Discussion

The findings of this study underscore the complex interplay between dietary patterns, health conditions, and sociodemographic factors in older adults who rely on programs like Meals on Wheels America. The demographic composition highlights the disproportionate composition of participants, where a majority were African Americans (89.7%) and females (72%) on such services, pointing to socioeconomic and gender-based vulnerabilities. Participants demonstrated both healthy eating patterns, such as frequent consumption of fruits, vegetables, and water, and unhealthy eating habits, including significant intake of starch, sweets, and fats. These mixed patterns reveal gaps in achieving optimal nutritional quality and the potential for dietary improvements within this population. In Addition, the dietary patterns of the participants revealed both adherence to and divergence from recommended dietary guidelines for older adults. High consumption of vegetables (85.4%), fruits (76.6%), and water (91.8%) aligns with established recommendations promoting a diet rich in nutrient-dense foods and proper hydration. However, a significant intake of starch (60.4%), sweets (54.5%), and fats (52.2%) diverge from the emphasis on limiting added sugars and unhealthy fats. This

mix of healthy and less healthy behaviors reflects a need for tailored nutritional interventions to enhance compliance with dietary guidelines.

Health outcomes indicate a high prevalence of chronic conditions, particularly hypertension (80%) among men and diabetes (44%) among women, consistent with national trends in older adults. Interestingly, the statistical analyses revealed no significant gender differences in dietary patterns or health conditions. There is no correlation between consumption of starch or sweets and reported health conditions. However, a weak significant correlation between consumption of alcohol and soda and reported health issues was observed. This may suggest that other factors, such as access to healthcare, physical activity, or genetic predispositions, may play a more significant role in the health outcomes of this group. In addition, the health conditions reported may have existed before participating in the Meals on Wheels America service.

Additionally, the predominance of solitary eating and infrequent social meals (76%) among participants may contribute to poorer mental and physical health outcomes. Research indicates that social engagement during meals can enhance food intake quality and reduce the risk of depression and isolation, especially among older adults (Insel & Roth, 2023).

Furthermore, the majority of participants favored incorporating more meat into their diet, with 63% expressing this preference. This inclination highlights the popularity of meat as a central component in meals for many elderly individuals who participated in this study, reflecting cultural, dietary, or personal tastes (Beaumont Convention and Visitor Bureau (2024).

This study revealed that over 50% of participants reported being placed on dietary restrictions by their doctors, reflecting the increasing prevalence of medical conditions requiring controlled diets. Common dietary restrictions included low-sodium diets, often prescribed for managing hypertension or heart disease, low-fat diets to address cholesterol and obesity concerns, and low-sugar diets to control diabetes or prediabetic conditions (U.S. Department of Health and Human Services-Healthy People 2030 (n.d.). These medically directed changes indicate a strong emphasis on nutritional interventions as part of broader treatment plans for chronic illnesses.

In addition to these medical constraints, 31.9% of participants disclosed faced significant personal challenges that impacted on their ability to adhere to these dietary recommendations. Financial limitations were a major hurdle, as healthy foods like fresh produce, lean proteins, and low-sodium alternatives often come at a higher cost (Ghalib & Mahmood, 2024). Mobility issues, which could stem from aging, disabilities, or injuries, made shopping for groceries and preparing meals difficult. Some participants also reported experiencing insufficient meals, suggesting food insecurity or an inability to access adequate nutrition. Health-related ailments further complicate meal preparation, as conditions like arthritis, chronic pain, or fatigue hinder the ability to cook. A lack of reliable transportation added another layer of difficulty, restricting access to grocery stores or other food resources. These findings emphasize the need for expanded support services, such as meal customization to meet dietary restrictions, financial assistance programs, and enhanced mobility and transportation solutions to ensure elderly residents can maintain their health and independence (Fleury, Tronchon, et al., 2021).

Implications for Public Health and Community Leaders

The study findings have several implications for public health initiatives and community leadership:

1. **Nutrition Education and Support:** Community leaders and public health officials should collaborate with programs like Meals on Wheels to promote education on balanced diets, reducing the intake of high-fat and high-sugar foods while encouraging the consumption of nutrient-dense options. Capitalize on the desire to change that was reported by participants of this study.
2. **Social Engagement Initiatives:** Given the high rates of solitary eating, programs that foster social interaction, such as community meal gatherings or group cooking classes, should be prioritized. These initiatives could improve nutritional quality and provide mental health benefits.
3. **Targeted Health Interventions:** Public health programs should address the high prevalence of hypertension and diabetes by integrating tailored interventions, such as blood pressure monitoring, diabetes education, and routine health screenings, into food delivery services.
4. **Access to Food Preparation Resources:** For participants who prepare meals, promoting healthier cooking methods, such as baking and steaming, over frying, could positively impact overall dietary quality. Providing affordable tools and resources for healthier food preparation could encourage these practices.

Study Limitations

1. The study did not include seniors who, while not classified as low-income, still received meal services, limiting the scope of the participant group.

2. The sample was convenience-based, with a relatively small and homogenous participant pool that may not represent the broader senior population. For example, the study had a lower proportion of male participants (27.9%) and a limited number of individuals from other ethnic groups. The relatively small sample size limits the generalizability of the findings to broader populations. Future research should include larger, more diverse samples to confirm these results.
3. Data collection relied on self-reported information, which could introduce bias or inaccuracies. Also, data collection did not include objective measures of caloric content, such as dietary logs or health assessments of the meals delivered, which could improve data reliability. Future studies should incorporate detailed nutritional assessments to provide a more nuanced understanding of dietary quality.
4. The study did not assess the potential health impacts of the meals provided by the "Meals on Wheels" service, such as measuring the actual caloric intake or tracking changes in participants' BMI or health status before and after the study. Additionally, it did not evaluate whether participants received meals from other sources, which could influence the study outcomes.

Generalizability of Findings

The sample, predominantly African American and reliant on Meals on Wheels services, limits the generalizability of findings to other populations. Also, the cross-sectional nature of the study precludes establishing causation between dietary patterns and health outcomes. Future research should consider larger, more diverse

cohorts to better understand dietary behaviors across different sociodemographic groups.

Recommendations for Future Research

Longitudinal Studies: Long-term studies tracking dietary patterns and health outcomes over time would help clarify causal relationships between nutrition and chronic conditions in older adults. Such research could identify trends, seasonal variations, or shifts in dietary habits influenced by interventions.

Interventional Studies: Research testing the effectiveness of tailored dietary interventions, such as enhanced meal programs or education campaigns, would provide evidence for best practices in improving nutritional health among older adults. Programs could include incorporating social meal opportunities or cooking classes to assess their impact on health and dietary behaviors.

Conclusion

This study highlights critical nutritional and health challenges faced by low socioeconomic older adults, particularly those reliant on Meals on Wheels America. While participants demonstrated some healthy dietary behaviors, significant gaps remain in achieving optimal nutrition, especially given the high prevalence of chronic health conditions like hypertension and diabetes. Public health efforts should prioritize education and social engagement and target health interventions to address these issues. Despite its limitations, this study provides valuable insights into the dietary patterns and health outcomes of a vulnerable population, emphasizing the need for tailored community-based strategies to improve the quality of life and health outcomes for older adults.

References

Administration on Aging & Administration for Community Living. (2024). *2023 profile of older Americans*. U.S. Department of Health and Human Services. https://acl.gov/sites/default/files/Profile%20of%20OA/ACL_ProfileOlderAmericans2023_508.pdf

Beaumont Convention and Visitor Bureau. (2024). *A-Z: A complete Southeast Texas Cajun food guide*. The Must-Eat Dishes in Beaumont. https://www.beaumontcvb.com/restaurants/south-texas-cajun-eating-guide/

Bergeron, C.D., John, J.M., Sribhashyam, M., Odonkor, G., Oloruntoba, O., Merianos, A.L., Horel, S., & Smith, M.L. (2021). County-Level Characteristics Driving Malnutrition Death Rates among Older Adults in Texas. *Journal of Nutrition, Health and Aging, 23(7),* 862-868. http://dx.doi.org/10.1007/s12603-021-1626-2

Blumberg, J. (1998). Nutritional needs of seniors. *Journal of the American College of Nutrition, 16*(6), 517–523.

Carnevale, A. P., Strohl, J., Ridley, N., & Gulish, A. (2018). *Three educational pathways to good jobs: High school, middle skills, and bachelor's degree*. https://cew.georgetown.edu/wp-content/uploads/3ways-FR.pdf

Centers for Disease Control and Prevention, National Center for Health Statistics, Office of Communication. (2024, March 21). New reports confirm U.S. life expectancy increased while drug overdose deaths remained stable in 2022. *CDC*. https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2024/20240321.htm

Clifford, J., & Bellows, L. (2015). *Nutrition and aging*. Food and Nutrition Series/Health. Colorado State University Extension. https://extension.colostate.edu/docs/pubs/foodnut/09322.pdf

Crockett, A. (2024). Income disparities between white and Hispanic and Black Texans seen from 2005 to 2019. *Federal Reserve Bank of Dallas*. https://www.dallasfed.org/cd/communities/2024/2406

Cunha, D. B., Sichieri, R., de Almeida, R. M. V. R., & Pereira, R. A. (2011). Factors associated with dietary patterns among low-income adults. *Public Health Nutrition, 14*(9), 1579–1585. https://doi.org/10.1017/S136898001000354X

Donini, L. M., Savina, C., & Cannella, C. (2003). Eating habits and appetite control in the elderly: The anorexia of aging. *International Psychogeriatrics, 15*(1), 73–87. https://doi.org/10.1017/S1041610203008779

Ferreira, P. M., Papini, S. J., & Corrente, J. E. (2014). Diversity of eating patterns in older adults: A new scenario? *Brazilian Journal of Nutrition, 27*(1), 67–79. https://doi.org/10.1590/1415-52732014000100007

Fleury, S., Tronchon, P., Rota, J., Meunier, C., Mardiros, O., Van Wymelbeke-Delannoy, V., & Sulmont-Rossé, C. (2021). The nutritional issue of older people receiving home-delivered meals: A systematic review. *Frontiers in Nutrition, 8*, 629580. https://doi.org/10.3389/fnut.2021.629580

Fleury, S., Van Wymelbeke-Delannoy, V., Lesourd, B., Tronchon, P., Maître, I., & Sulmont-Rossé, C. (2021). Home-delivered meals: Characterization of food intake in elderly beneficiaries. *Nutrients, 13*(6), 2064. https://doi.org/10.3390/nu13062064

Gajda, R., Jeżewska-Zychowicz, M., & Raczkowska, E. (2021). Differences in dietary patterns among the Polish elderly: A challenge for public health. *Nutrients, 13*(11), 3966. https://doi.org/10.3390/nu13113966

Ghalib, H., & Mahmood, N. (2024). Understanding healthy eating habits of elderly people in a geriatric center in Kirkuk City: A cross-sectional study. *Cureus, 16*(4), e58801. https://doi.org/10.7759/cureus.58801

Ghosh, R., Jalli, V., Nagalla, B., & Rao, S. F. (2024). Dietary patterns and psychosocial health status among elderly in West Bengal, India. *Cogent Gerontology, 3*(1), 2347620. https://doi.org/10.1080/28324897.2024.2347620

Grady, P. A. (2011). Advancing the health of our aging population: A lead role for nursing science. *Nursing Outlook, 59*(4), 207–209. https://doi.org/10.1016/j.outlook.2011.05.017

Harder Family Practice. (n.d.). *Eating pattern questionnaire*. https://www.harderfamilypractice.com/forms/eating-pattern-questionnaire.pdf

Institute for Quality and Efficiency in Health Care (IQWiG). (2020, September 10). *What happens when you age?* InformedHealth.org. https://www.ncbi.nlm.nih.gov/books/NBK563107/

Insel, P. M., & Roth, W. T. (2023). *Connect core concepts in health, brief edition* (18th ed.). McGraw Hill.

Joint Center for Housing Studies of Harvard University. (2023). *Housing America's older adults*. https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard_JCHS_Housing_Americas_Older_Adults_2023.pdf

Kourkouta, L., Ouzounakis, P., Monios, A., & Iliadis, C. (2016). Nutritional habits in the elderly. *Progress in Health Sciences, 6*(2), 155–159. https://doi.org/10.5604/01.3001.0009.5163

Laraia, B. A., Leak, T. M., Tester, J. M., & Leung, C. W. (2012). Biobehavioral factors that shape nutrition in low-income populations. *American Journal of Preventive Medicine, 52*(2), S118–S126. https://doi.org/10.1016/j.amepre.2011.09.034

Long, T., Zhang, K., Chen, Y., & Wu, C. (2022). Trends in diet quality among older U.S. adults from 2001 to 2018. *JAMA Network Open, 5*(3), e221880. https://doi.org/10.1001/jamanetworkopen.2022.1880

Meals on Wheels America. (2024). *The escalating issue of senior hunger: 2024 national snapshot*. https://www.mealsonwheelsamerica.org/docs/default-source/fact-sheets/2024/the_issue_2024_national_snapshot_fact_sheet.pdf?sfvrsn=c82d8c3b_20

Meals on Wheels American-Texas (2024). *Texas's Aging Population: By Numbers.* https://www.mowsatx.org/sites/mowsatx/files/state-fact-sheet-2024-texas.pdf

Meals on Wheels America. (2022). *Power of a knock: Annual report 2022*. https://www.mealsonwheelsamerica.org/docs/default-source/financials/meals-on-wheels-america-2022-annual-report.pdf?sfvrsn=279e8e3b_1

Moran, M. B. (2004). Challenges in the meals on wheels program. *Journal of the American Dietetic Association, 104*(8), 1219–1221. https://doi.org/10.1016/j.jada.2004.04.033

National Cancer Institute. (n.d.). *Eating habits questionnaire*. https://epi.grants.cancer.gov/diet/shortreg/instruments/lean_eating_questionnaire.pdf

National Institute on Aging. (2022). *What do we know about healthy aging?* https://order.nia.nih.gov/sites/default/files/2022-08/nia-healthy-aging-booklet.pdf

Ortman, J. M., Velkoff, V. A., & Hogan, H. (2014). *An aging nation: The older population in the United States*. Current Population Reports. https://www.census.gov/content/dam/Census/library/publications/2014/demo/p25-1140.pdf

Medina, C. R., Urbano, M. B., de Jesús Espinosa, A., & López, Á. T. (2020). Eating habits associated with nutrition-related knowledge among university students enrolled in academic programs related to nutrition and culinary arts in Puerto Rico. *Nutrients, 12*(5), 1408. https://doi.org/10.3390/nu12051408

Senee, A., Ishnoo, Y. B., & Jeewon, R. (2022). An analysis of the contributors and factors influencing dietary patterns among the elderly population. *Current Research in Nutrition and Food Science, 10*(3). https://doi.org/10.12944/CRNFSJ.10.3.7

Smith, S.M., Mathews Oliver, S.A., Zwart, S.R., Kala, G., Kelly, P.A., Goodwin, J.S., & Dyer, C. B. (2006). Nutritional status is altered in the self-neglecting elderly. *Journal of Nutrition, 136(10):*2534–41. doi: 10.1093/jn/136.10.2534. PMID: 16988122.

U.S. Census Bureau. (2022). *Quick facts*. http://quickfacts.census.gov/qfd/states/00000.html

U.S. Census Bureau. (2014). *P23-212, 65+ in the United States: 2010*. Special Studies Current Population Reports. https://www.census.gov/content/dam/Census/library/publications/2014/demo/p23-212.pdf

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (n.d.). *Access to foods that support healthy dietary patterns*. Healthy People 2030. https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/access-foods-support-healthy-dietary-patterns

Texas Health and Human Services Commission. (2023). *Aging Texas well: Strategic plan for 2024-2025*. https://www.hhs.texas.gov/sites/default/files/documents/aging-texas-well-strategic-plan-2024-25.pdf

United Health Foundation. (2024). *2024 senior report: America's health rankings*. https://assets.americashealthrankings.org/app/uploads/ahr_2024seniorreport_comprehensivereport.pdf

Wells, J. L., & Dumbrell, A. C. (2006). Nutrition and aging: Assessment and treatment of compromised nutritional status in frail elderly patients. *Clinical Interventions in Aging, 1*(1), 67–79.

Yannakoulia, M., Mamalaki, E., Anastasiou, C. A., Mourtzi, N., Lambrinoudaki, I., & Scarmeas, N. (2018). Eating habits and behaviors of older people: Where are we

now and where should we go? *Maturitas, 114*, 14–21. https://doi.org/10.1016/j.maturitas.2018.05.001

Zaragoza-Martí, A., Ruiz-Robledillo, N., Sánchez-SanSegundo, M., Albaladejo-Blázquez, N., Hurtado-Sánchez, J. A., & Ferrer-Cascales, R. (2020). Eating habits in older adults: Compliance with the recommended daily intakes and its relationship with sociodemographic characteristics, clinical conditions, and lifestyles. *Nutrients, 12*(2), 446. https://doi.org/10.3390/nu12020446