Sustainable Practice Implementations Potential Impact to Global Health

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Simone Herron

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Advisor

Sean M. Ferguson, Department of Engineering and Society

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Developing countries generally do not have the same level of accessible healthcare for their citizens that many developed countries have (Peters et al., 2008). Those that are in a lower socioeconomic status in these countries are even more effected by this disparity. Low- and middle-income countries (LMICs) have a much lower allotment dedicated towards their healthcare expenditures in comparison to higher income countries. This causes those in LMICs to be more likely to face out of pocket healthcare costs. This further negatively impacts the financial burden on those that are already economically disadvantaged. In February of 2020 the United States declared Brazil a developed country (Notice of Determinations, 2020). Despite this declaration Brazil still has a lower quality of healthcare than many other developed countries; therefore, exploring approaches that can improve Brazil's healthcare situation will still provide insight that can be used to benefit other LMICs. Aravind Eye Care System and the notion of 'Buen Vivir' could potentially be model frameworks that can be used to enhance some of the healthcare aspects currently in need of improvements in LMICs such as vaccine coverage. Ortiz & Neuzil (2019) mentions how the availability of some vaccines in LMICs is subpar in comparison to more wealthy countries; however, with the creation of protocols based on the needs and resources of the individual LMICs this could potentially be improved. The exploration of innovative sustainable strategies inspired by the unique problems Brazil and other LMICs face can strengthen the healthcare systems in these countries.

Challenges in Brazil

Brazil is unique among its LMIC counterparts in that it has a universal healthcare system established (Massuda et al., 2018). It is meant to make healthcare more accessible for those who

may otherwise be at a disadvantage; however, it is not without its flaws. Brazil's healthcare system is funded through taxes and donations (França et al., 2016). Though the funding for healthcare has increased slightly in the last decade it is still not on the same level as the funding other countries with universal healthcare systems have. As of 2012, the Brazilian healthcare system covered less than half the costs related to healthcare Brazilians faced. Brazil has recognized there was a healthcare problem in the past and taken steps to mitigate the issues they were having (Barros & Bertoldi, 2008). The Brazilian Unified Health System, known in Brazil as SUS, was established over three decades ago. Through SUS, certain non-profits and private healthcare organizations are contracted to provide services to those in need at no direct cost to the patient. The later established Family Health Program, known as PSF, devised a plan that they hoped would provide the groundwork for establishing a closer connection between the Brazilian medical community and the patients they were serving. A team of medical professionals would conduct at home checkups for those in vulnerable populations. The drawback to both of these programs: the services were free; however, the medicine was not always. Due to the limited healthcare budget in Brazil, out of pocket health related charges are still necessary for some which is a hinderance to some citizens seeking care (Massuda et al., 2018). As a result of this, many lower income Brazilians still spend a significant portion of their incomes on medication (Barros & Bertoldi, 2008). One study mentioned by Barros and Bertoldi even noted Brazil was one of the countries with the greatest number of residents with a health-related costs to income ratio deemed 'catastrophic' out of almost 60 countries reviewed. This illustrates that though past measures were a step in the right direction, there is still a major need for improvement in order for all residents to have protocols in place that truly fit their needs and financial capability.

Brazil has many facets of their healthcare that could be explored. In the 2000's Brazilian women's care was showing signs of better practices being implemented to improve the health outcomes for women of child bearing age, pregnant women, and unborn children (França et al., 2016). Prenatal appointment attendance had increased as well as contraceptive usage though there were regional differences that could be contributed to economic status variations between areas. Mullachery et al. (2016) pointed out that though it is still present, the gap between the usage of healthcare services between higher income and lower income Brazilians has decreased. It also brought to light that though primary care is now more accessible, it created new problems in that some systems are over the capacity of patients they are able to handle. Many of those healthcare areas are slowly improving, but are still in need of further efforts to make them more on par with other developed country healthcare statistics.

However, Brazil's vaccine coverage is an anomaly, in comparison to many other LMICs, that is in need of exploration. Many LMICs have poor plans in place for handling the mass distribution of vaccines (Ortiz & Neuzil, 2019). A great deal of manpower is needed for the vaccine operation to run smoothly for everything from the obtaining of the vaccine to the administration and all the steps in-between; therefore, adequate plans are essential for proper distribution. Various diseases have strains that can mutate requiring some vaccines to need updating multiple times a year which poses a problem for countries that already have limited manpower on the vaccine distribution front. Ortiz & Neuzil also alluded to a lack of knowledge surrounding the negative effects vaccines protect against as a potential contributor to why vaccine strategies are difficult to successfully execute in LMICs.

Brazil had reached high vaccine coverage in the 2000's; however, in recent years rates have been declining (César et al., 2020). In Brazil vaccines are able to be obtained free of charge by some; however, some residents simply do not wish to receive it. This is partially due to the deceptive information presented by some cohorts against vaccinations. César et al. mentioned most of the vaccines that saw a decrease in doses administered were targeted for children; however, that doesn't mean other populations are not affected by the decreased overall vaccine coverage as well. With less people getting vaccinated it gives a larger opportunity for outbreaks to occur which can evolve into a national or even global problem. Other reasons also play into the hesitancy surrounding vaccine uptake. According to Andrade et al. (2017), one study found one of the main reasons older Brazilians decided against getting the influenza vaccine was concern over potential negative outcomes from vaccine uptake. The study also highlighted that those older individuals that already frequently used health services were more likely to get the influenza vaccine than others. Those areas in Brazil that were less developed also observed lower rates of influenza vaccine uptake in older people as well. This would make sense given the fact that in Brazil vaccines are generally administrated at localities that provide primary care. This study pointed out that financial burden is not the inherent factor impacting influenza vaccine coverage to those older people with a lower economic status since it is free to them. However, this doesn't mean finances could not still be a contributing factor impacting accessibility as Andrade et al. noted other aspects should also be taken in account when analyzing accessibility. Since traveling to a designated vaccination locality is needed for vaccine uptake by the individual, there must be a mode of transportation involved. Transportation is not always free and depending on how far the individual is from the vaccination site, it can put some at an even greater disadvantage financially.

Interventions

All of the notions presented above lead to the question of what can be done to better the situation surrounding these healthcare disparities in Brazil. A push for local innovation could potentially help progression towards better healthcare measures for those that are currently at a disadvantage. Many other countries have experienced shortages in certain vaccines over the past few years (Rey-Jurado et al., 2018). Given that two Brazilian companies are the main contributors to over 80% of Brazil's vaccine stock having more local companies produce vaccines could lower the risk of a shortage ever occurring in Brazil. Jimenez & Roberts (2019) emphasized how the methods that spark innovation in North America are not always translatable to South America because they do not take in account the difference in culture and society. They argue that trying to implement the methods of developed countries in developing countries may drown out the perspectives of the residents and lead to solutions that are not the most effective for their country. They also highlighted that many current innovation initiatives stress growth rather than solutions that will be sustainable long term. Jimenez and Roberts advised a 'Buen Vivir' framework that emphasized a community forward approach may be better suited to the needs of Latin American countries to account for a broader range of viewpoints that are not reflected in developed country innovation strategies. In this framework people are regarded as a united front rather than individually, therefore solutions would be derived that would benefit the collective society. People are regarded as reliant on one another, so with this notion solutions would be designed so that those in need would have their needs met because it would theoretically benefit everyone.

Returning to the issue of mistrust that is impacting vaccine uptake, with more localized innovation it may give those with hesitancy reason to believe that these solutions were created to help, not harm them. If the whole vaccine process, from creation to distribution, was centralized in Brazil it may give some more reason to believe the vaccines are safe since other community members were directly involved in the process. New plans could be reworked into existing programs. If PSF worked vaccine immunization plans into their home checkups, it would alleviate the transportation issue faced by those in the vulnerable population that cannot easily travel to vaccination sites. This would also align with the Jimenez & Roberts (2019) framework promoting solutions with a collective benefit. This new approach could be better for all because the higher vaccine coverage, the higher the chance herd immunity will be achieved. There would be a lesser amount of people that need to be treated due to disease infection; therefore, this could also function as cost mitigation for the health system as well since immunization services would most likely be less expensive than life saving services.

Aravind Eye Care System in India may also be a useful model that can be implemented to help alleviate some of the health disparities in Brazil. India, like Brazil, is another country that is no longer considered a developing country by the United States as of 2020 (Notice of Determinations, 2020). India has faced problems in terms of healthcare disparities in the past as well. Aravind Eye Care System was an innovative solution established in 1976 to mitigate some of the disparities that were faced by Indians that were less financially secure (Williams & Woodson, 2012). In India, cataracts is a major health issue in general; however, it impacts the lower income population to an even greater degree than those with higher incomes (Le et al., 2016; Williams & Woodson, 2012). Aravind devised a strategy that allows those that could not pay to still receive eyecare services while those that could afford it obtained more conveniences

with their services. It is a prime example of what Williams and Woodson would categorize as a trend seen in some lower income countries where establishments not associated with the government develop strategies to aid localities that are underprivileged economically.

There are many tactics Aravind employed that allowed their operation to be substantiable even to the present day (Le et al., 2016). They deviated from the standard methods of healthcare in many developed countries and optimized a plan that accounted for their circumstances. In essence, Aravind employed aides that allowed their sparse supply of surgeons to prioritize their time doing surgeries. The surgeons no longer had to do tasks that didn't necessarily require their skill set which allowed them to operate on more patients while the aides assumed the other tasks and care optics that surgeons would commonly be found doing in developed countries. Operating procedures were also optimized so that surgeons could perform back-to-back surgeries with minimal down time in between each patient allowing more patients in a one-day span. Though their optimization method may not pass health regulations in many developed countries, Aravind's surgery complication rates did not significantly exceed those in developed countries. This exemplifies why developed countries techniques are not always the most effective techniques to use to address concerns in developing countries. In developed countries, changing personal protective equipment between different patients is standard practice. However, for in developing countries where resources are more limited, as long as patient health is not sacrificed, forgoing standard protocols may prove to be beneficial overall.

The methods Aravind used even boosted the local economy to a degree due to the additional employments allowing money to return to the community (Le et al., 2016). The surgeries on those that would not have been able to afford it otherwise also increased the

patient's ability to earn money for themselves by alleviating a disability that was hindering their earning potential. Aravind's general strategy was proven to be adaptable to other hospitals as well (Williams & Woodson, 2012). Case in point, the Tilganga Institute of Ophthalmology adopted Aravind's framework to evolve new tactics to address their patients' needs themselves. Both facilities have evolved to address and account for not just the services their patients need, but the products as well. They recognized the demand for sustainable priced intraocular lenses and were able to create a plan to produce them affordably. They looped in other local companies as well, such as Aurolab, to stay sustainable (Le et al., 2016). Aurolab is an Indian provider of affordable medical tools and medicines whose partnership allowed Aravind to minimize their costs spent on these supplies. The Narayana Institute of Cardiac Sciences has also implemented Aravind's methodology and customized it to meet the needs of patients with heart related problems proving it can be applicable outside of the eyecare realm of healthcare as well. Though Aravind's methods may not be best for all avenues of healthcare, it does provide a solid framework for how other localities facing issues with their health systems might meet needs of those that can not afford their current healthcare practices.

The problems currently faced in regards to Brazil's healthcare system are complex; however, with all the aforementioned frameworks and ideologies in mind, there are methods that could potentially be applied to reduce some of the disparities currently seen. Looking at Brazil's programs using Aravind's framework can help identify areas where more sustainable elements could be introduced. Currently one of the main issues with SUS is that only certain medicines are able to be obtained for free which leaves lower income people who need them at a disadvantage. Since Jimenez and Roberts framework prioritized the need for inclusivity in design, it would work well with Aravind's methods to design a solution to meet the needs of those disadvantaged.

Aravind created a partnership with a medical instrument and medicine producer in the area to alleviate this potential roadblock for them. If nonprofits in Brazil created a similar partnership with local medicine producers, this problem could potentially be eliminated in Brazil. Of course, there are other elements that have to be factored in as well. Aravind is not involved with the Indian government, while nonprofits that provide medical services and medicines in Brazil are contracted by the government through SUS. Given that Brazil has had a low healthcare budget in the past, it may be best to pivot away from fully relaying on government funded operations in order to help those that are currently at a disadvantage with the existing programs in place. If more nonprofits were encouraged to be created using the framework Jimenez & Roberts (2019) discussed that promoted sustainable practices, the nonprofits may not need the government contracts to stay afloat. Using Aravind as inspiration, designing a nonprofit that provides free medicines to those that couldn't pay while incentivizing those that could by introducing an added benefit could be a feasible approach. A plan like this would encourage continued local innovation and potentially help stabilize the economy by providing employment to many and allowing funding to go to other areas where it is needed without putting the health of citizens at risk. Some of Aravind's optimization methods could also be transferable to Brazil's situation as well. Aravind would reuse PPE to save time, nonprofits in Brazil could potentially give larger supplies of non-addictive medicines when patients have chronic conditions to save time. This would theoretically allow the patients to not have to return for care for the same condition as often and the pharmacies to not have to refill the same medication as often.

Applying Sustainable Practices in LMICs for Improvement to Healthcare

Both the Aravind and the 'Buen Vivir' frameworks could potentially be helpful to designing programs in other LMICs as well since many also have limited healthcare funding similar to Brazil. By designing organizations that prioritize sustainability, some of the health disparities currently faced in these countries could be alleviated. As previously mentioned, some solutions are not transferable from one locality to another if they have vastly different problems and/or ways of life. However, that does not mean that some foreign ideologies could not still be successfully implemented in new atmospheres. Solutions in LMICs have to account for the needs of the community in order for them to work since there are generally internal issues exasperating their problems. When certain voices don't have a say in policy making, problems that do not necessarily affect the entire community may be overlooked. By analyzing problems using a collective collaborative approach it may be easier to identify where certain groups, such as low-income community members, are not benefiting from established programs and systems.

Of course, the information presented in this paper does not cover the full scope of the aspects contributing to the disparities seen in the healthcare system in Brazil and other LIMCs. The information and discussion presented is limited to my own capacity; I am not Brazilian nor do I speak Portuguese. I have attempted to familiarize myself with Brazil's healthcare dilemma though research; however, research does not always paint as accurate of a portrayal of situations as people that are directly affected by the situation. Native Brazilians may be able to shed light on important considerations and factors I failed to take in account due to my limited knowledge of the culture and lifestyle in Brazil. A more refined evaluation of my suggestions would need input from native Brazilians familiar with policies currently in place in regards to the Brazilian Healthcare System in order to highlight gaps in my knowledge.

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