

health kits to mitigate acute gastroenteritis in Gaza

introduction

Acute Gastroenteritis is a viral infection resulting in inflammation of the lining of the stomach and intestines, resulting in vomiting, abdominal pain and constant diarrhea. It is caused by a group of viruses called noroviruses where its transmission is spread from person to person or ingestion of contaminated food and drink. Specifically in Gaza, clean water remains scarce and there are rising levels of outdoor defecation. These conditions make the spread of infectious diseases inevitable.

stats and statistics

- 346,000 reported cases of diarrhoea, 105,465 were of children under 5, this is 25 times what was reported before the conflict.
- In Gaza today, on average, there is only one shower for every 4500 people and one toilet for every 220
- less than 4% of fresh water is drinkable and the surrounding sea is polluted by sewage.

why this is a problem

Gaza is one of the most densely populated regions in the world, with approximately 6,100 people per square kilometer. This extreme population density leads to inadequate sanitation facilities and insufficient clean water supplies, creating significant challenges in maintaining hygiene. These conditions facilitate the transmission of diseases such as acute gastroenteritis.

The health implications are particularly severe for Gaza's vulnerable populations, including those with weakened immune systems, the elderly, and children. These groups are especially susceptible to gastroenteritis, exacerbating the disease's impact. Furthermore, food insecurity is a major issue in Gaza, and acute and prolonged diarrhea from gastroenteritis significantly worsens malnutrition and poor health in children, increasing their risk of death.

Leaving gastroenteritis untreated further introduces secondary diseases and complicates their management, overwhelming an already strained healthcare system. Addressing these challenges is critical to improving public health and the overall quality of life in Gaza.

social desirability

We believe that these hygiene kits would be incredibly beneficial as the majority of the kit can be self-administered, therefore patients would not be restricted in what they are able to use or not. Also, the kit contains crucial elements needed to solve the problems of dehydration and unclean water (such as the water purification tablets and rehydration solutions) which would be vital for all those in Gaza. The only area in which there may be some social adversity, could be due to the Rotarix vaccine, as it would have to be administered to very young children – which some parents may reject. Additionally, the vaccine would have to have healthcare professionals administering it which may be harder to do. However, that being said, the Rotarix vaccine has been implemented in Gaza since May 2016, so those present would have had previous exposure to the vaccine therefore we expect that there would not be much protest against it

Distribution & implementation

Our way of efficient distribution would be due to the technology interventions we would input within refugee camps in Gaza such as drones to deliver our health kits to remote/inaccessible areas and implementing mobile clinics for immediate health assessment as well as medical assistance to those who may need it. Reactivation of the water desalination plant and water wells throughout Gaza will help mitigate the viral diarrheal outbreaks. To implement this plan, we intend to collaborate with the World Health Organization (WHO), leveraging their expertise and resources. The WHO has successfully created emergency health kits to combat cholera in the past, demonstrating their capability to support our initiative and make our plan feasible and aid more than 100,000 children under age 5 with acute gastroenteritis.

our solution & why

We aim to combat acute gastroenteritis in Gaza by developing comprehensive health kits containing essential components to alleviate and manage the symptoms of this disease. These health kits will be carefully designed to address the needs of those affected by acute gastroenteritis, ensuring they receive both immediate relief and long-term support. We decided to go with health kits for many compelling reasons

affordability & availability

Producing and distributing health kits is cost-effective compared to setting up permanent healthcare facilities in every remote or conflict-affected area. This allows for broader reach with limited resources.

accessibility

Health kits are compact and easy to transport, making them ideal for distribution in refugee camps and remote areas. This ensures that aid can reach those in need quickly and efficiently.

usability

Health kits are designed to be user-friendly, allowing individuals or caregivers to administer treatments without needing extensive medical training. This is particularly important in Gaza where there is limited healthcare

proven efficacy

Health kits have been successfully used in various emergency situations worldwide. Organizations like the World Health Organization (WHO) have extensive experience in deploying these kits to combat diseases like cholera and other diarrheal illnesses.

what are the limitations?

- ✗ A healthcare professional must administer the vaccine and it must be stored at 2 – 7 °C
- ✗ As this is a kit offering relief from the symptoms of gastroenteritis, it cannot act as a solution to the root cause of the problem. Although the kit may be able to improve the mortality rate average of those that have acute gastroenteritis, or alleviate the severity of symptoms, it cannot reduce the number of cases of acute gastroenteritis in Gaza as that would require deeper infrastructural change
- ✗ This kit offers a short-term solution and is a one-time treatment. Due to the nature of the distribution of the kit, it would be difficult to follow up on those that have taken medication, or regulate any side effects.
- ✗ As this kit is mainly self-administered, there is a large risk of human error and miscalculation when taking the various medications. Although we have attempted to minimize this risk by including instruction booklets, we cannot guarantee instructions will be carried out correctly, and civilians will not be aware of how any other medications they take or their medical history may interact with the medications in the kit.

insight into testing efficacy

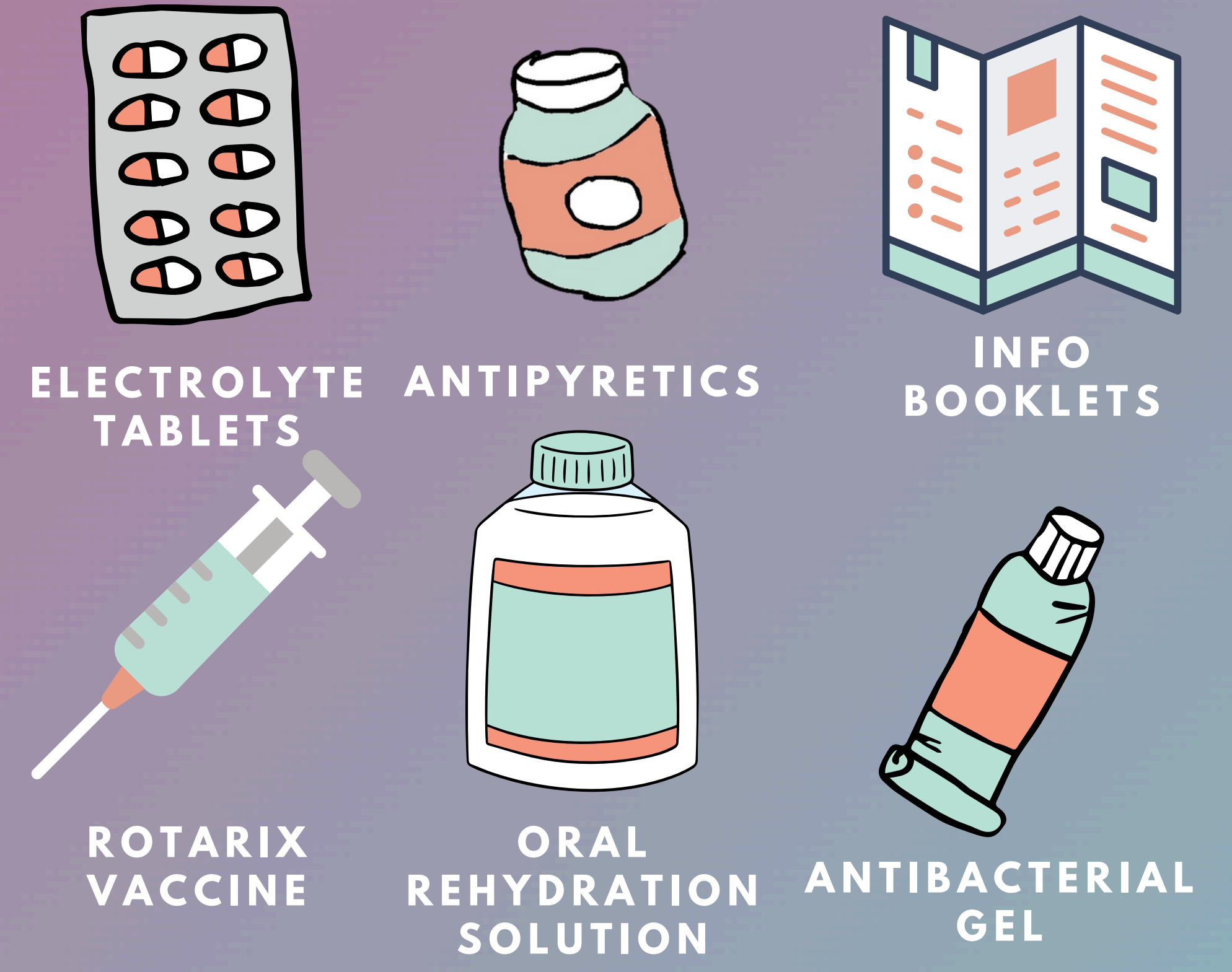
To ensure the kits alleviate symptoms of gastroenteritis, data on mortality rates of those with gastroenteritis would be gathered, to examine if a significant decrease has been achieved.

Furthermore, data could be collected in the form of questionnaires to those that have used any of the components of the health kit to examine whether civilians found it to be useful, clear and precise in its effect to mitigate gastroenteritis.

Rigorous quality control of each component of the kit. This is to ensure consistency in all products within the kit to prevent defects and ensure maximum efficacy.

However it is important to note that within the current conflict, it may be rather difficult to gather reliable and accurate data or to ask civilians to complete questionnaires.

GastroRelief: sketch & components



In each of our kits, we have the capacity to treat up to 100 patients. The kit is divided into 2 main components – the Initial Response response and the community kit.

INITIAL RESPONSE

- Anti-diarrhoea medications such as Loperamide (Imodium A-D) or bismuth subsalicylate (Pepto-Bismol) to reduce symptoms. -Imodium: contains Loperamide - an ingredient that works to gently slow the digestive system into a normal rhythm. Your body can then absorb more fluids, with less fluid in the intestines and leading to a normal stool consistency. -Bismuth subsalicylate: It works by protecting your stomach and the lower part of your food pipe from stomach acid.
- Imodium only treats diarrhoea whilst the bismuth subsalicylate also can treat indigestion and nausea. Pepto Bismol should only be used by people 12 years or older, whilst the Imodium can be used in children as young as 2 years
- Electrolyte tablets: These are crucial in helping to rehydrate patients. Electrolytes balance the amount of water in the body and balance the body's pH level. If a patient has too little electrolytes, then this can lead to a mineral efficiency, therefore by restoring the correct electrolyte levels, more nutrients can be taken into the body.
- Oral rehydration solution: For children, if they have gastroenteritis, they should be given an oral rehydration solution to replace lost fluids and electrolytes
- Antipyretics and pain relievers: Gastroenteritis is known to be quite painful – due to the inflammation of the stomach – so to reduce and alleviate the pain, the kit will include medications such as paracetamol or ibuprofen (suitable for both adults and children)

COMMUNITY KIT

- 100 bottles of water purification tablets (by producing a chlorine-based solution, the tablets are effective against many types of bacteria thus reducing the risk of catching certain types of gastroenteritis)
- 100 booklets written in multiple different languages (primarily Arabic and English). By having a thorough booklet detailing what each of the medications are, when and how they should be used, it will mean that patients infected will be able to understand the kits by themselves which is crucial especially if there is a lack of healthcare professionals.
- 100 bottles of Rotarix vaccine. This vaccine contains a weakened form of rotavirus to help protect children against gastroenteritis caused by the virus. -This vaccine has been proven to be incredibly effective in Gaza – between 2016 and 2020 rotavirus vaccinations resulted in a 55% decrease in all causes of diarrhoea (in Gaza).



meet the team

- Sumaya Salisbury: Chemistry, Biology, Psychology
-> Team leader: Poster art, researched distribution and solutions
- Salam Yonis: Chemistry, Biology, Psychology
->Research tester: researched insight into efficacy and limitations
- Lema Nasir: Chemistry, Biology, Psychology
->Analyst: researched and confirmed statistics and underlying problems
- Ramisa Lashkor: Chemistry, Biology, Maths
->Lead researcher: initiated and implemented health kits and contents and social desirability