Perspective

Children in Pakistan are dying! Who is Responsible?

Nimra Mumtaz[1], Rabiya Rasheed[2], Saima Gill[3], Nasir Islam Bhatti[4]

[1-3]MBBS Student; [4]Director Airway Service, Johns Hopkins University School of Medicine.

Abstract:
Child mortality is a serious global issue with more than two thirds of neonatal deaths caused by conditions that are preventable and can be treated by simple interventions. Diarrhea is among the most common causes for neonatal mortality and poor WASH (Water and Sanitation Hygiene) is the biggest cause of diarrhoeal cases (90%). In Pakistan urbanization, industrialization, acute water shortage and population explosion adversely affect water quality. Furthermore, Pakistan faces the threat of acute water crisis due to climate change. This problem needs to be addressed. The child mortality rate can be reduced by focusing on optimisation of the direct interventions for diarrhoea. Also, improvement of WASH strategy, promotion of nutrition, vaccination, provision of properly treated water, ORT (Oral Rehydration Therapy), mass education and collaboration among departments would be effective. Together we can overcome these barriers to improve the child mortality rate.

Corresponding Author | Nimra Mumtaz **Email:** nimramumtaz98@kemu.edu.pk

Key Words: Child mortality, Diarrhea, Water, WASH

Introduction:

Children in Pakistan are dying! Pakistan has a high NMR and child death rate. Why is it so?

Neonatal mortality rate (NMR) is defined as total number of deaths during the initial twenty-eight days of life per thousand live births (LBs) in a given year. It is an important indicator of overall physical health of a community. Greater is the NMR, poorer is the quality of life in that community. Likewise, under five mortality rate is also important. It is the probability of dying by age 5 per 1000 live births[1].

In 2019, 2.4 million neonatal deaths were reported all over the world and, the mean NMR was 17[2]. The rates are not same everywhere. Most of the countries with the highest NMR fall in the region of Sub-Saharan Africa. South Asia also has high child mortality as well as NMR[3].

The condition is bad in Pakistan too. According to UNICEF report, in 2018 Pakistan was ranked number one among the countries with the worst NMR, even exceeding the war-torn countries like Central African Republic and Afghanistan[4]. The current NMR in Pakistan is 41 deaths per 1000 live births while the under-five mortality rate is 67.2 deaths per 1000 live births. Although the trend shows a decrease in mortality from 1990(140 per 1000 LBs) to 2019(67.2 per 1000 LBs), it is still high[5].

If one looks for the causes of deaths among neonates, one will find that more than two thirds of these deaths were caused by conditions that were preventable and could have been treated by simple interventions[6].

This article focuses on the factors that mainly contribute to increased child mortality rate in Pakistan and discusses the appropriate strategic measures that would prove highly effective in preventing these deaths if implemented with care.

Discussion:

After looking at the high child mortality rate, the first question that comes to one's mind is "What are the causes that lead to child mortality in the first place?" It

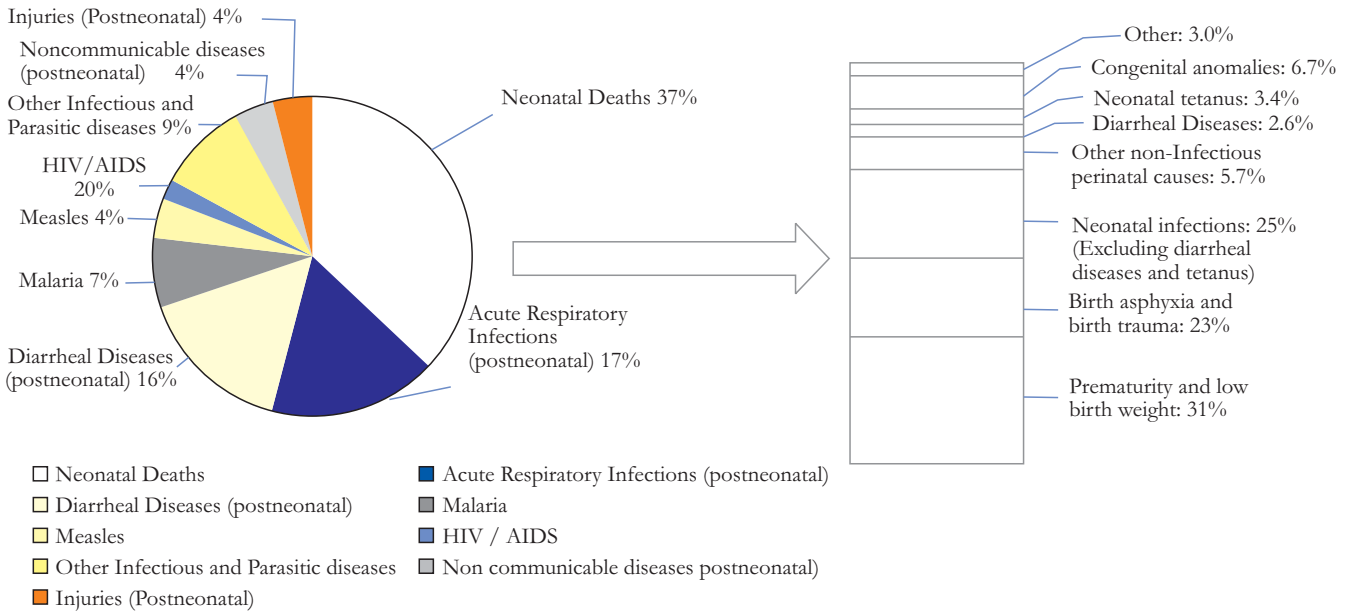

Figure 1: *Major contributors of neonatal deaths and under 5 mortality*

has been found that the causes of more than 80% of neonatal deaths are premature birth, birth complication and infectious diseases like pneumonia and sepsis. For infants and children, infectious diseases are the main cause of death. Figure 1 shows causes of neonatal deaths as well major contributors for under 5 mortality[7].

So, infectious diseases are an important cause of death among children that can be prevented. In low and middle-income countries, among infectious diseases, diarrhoea is one of the most common causes for mortality. About 2.2 million deaths of children, mostly under age 5, were reported with the global disease burden of diarrhoea exceeding 4 billion[8]. Now our main focus would be on diarrhoea, its source of transmission and techniques effective for its treatment and prevention.

Polluted Water-the Main Source of Transmission of Diarrhoea:

In low-income countries, the main source of transmission of agents causing diarrhoea among young children is polluted water. Water is contaminated with many bacterial, viral, and protozoal pathogens causing diarrhoeal diseases[9]. In this way, polluted water causes the death of a number of children each year. Thus, a myriad of preventable deaths and diseases in young children and infants occur due to inadequate water and sanitation hygiene (WASH) claiming the lives of approximately 6000 children per day.

Young children are especially swift to fall prey to diseases caused by unsafe water and poor sanitation such as diarrhoea, malaria etc. This is because of weaker immune system of children as compared to adults. To make the matter worse, immune system of such young children is further compromised with each episode of diarrhoea leaving those poor children vulnerable to other life-threatening illnesses indirectly claiming millions of lives yearly[10].

Why do People use Polluted Water?

After establishing that polluted water is the main culprit for transmission of the disease, one might think that provision of safe water would solve the problem right away. But there are a lot of hurdles that make it difficult. Now we would discuss the factors that compel people to use polluted water.

The main cause for consumption of polluted water is the scarcity of fresh water. Fresh water forms only 2.5% of the total earth's water and approximately 30% of it is ground water[11]. This already small percentage of fresh water is further polluted by industrial and domestic sectors. Furthermore, this situation is worsened by population explosion leading to poor quality of water supply.[12] In developing countries, the water related problems become more intense as they not only lack resources and face financial restraints but also mismanage available resources.

If we talk about conditions in Pakistan, ground water is the basic source of supply. Population explosion, urbanisation, industrialisation and acute shortage of water with increased utilisation of water for various purposes have led to a decline in water quality[13]. In such developing countries, the poor infrastructure regarding water sanitation and supply further deteriorates the water quality by allowing leakage and mixing up of sewage and drinking water[14].

Even in some areas, people do not have water directly piped to their homes. Fetching clean drinking water in the distant parts of the country requires the natives to cover long distances on foot, thus increasing the likelihood of water contamination during transport and storage[15]. The situation becomes dire in desert areas with rain as the major water source. Humans and animals sometimes have to share the same pond water[16]. Moreover, open defecation is still practiced in some rural areas and contributes to contamination of water[17].

Climate change is further augmenting the acute water crisis in Pakistan. Floods cause damage to infrastructure such as gutters and drains causing sewage and polluted water to spill into water bodies. Polluted flood water pools, not having outlets to drain, become standard ground for growth of pathogens causing water borne diseases. This leads to wide outbreaks of water borne illnesses. Secondarily, floods lead to overcrowding of affected masses and poor hygiene control, facilitating the oro-fecal spread of gastrointestinal pathogens causing subsequent disease outbreaks[18]. Additionally, Pakistan is listed among the countries which are going to face shortage in the renewable water resources by 2030[19].

Moreover, Pakistan government has allocated less budget to water and sanitation sectors, as compared to that of health and education sectors, merely amounting to 0.26% of total GDP in 2013[20]. Thus due to regional and political conflicts and natural disasters such as droughts, earth quacks and floods; millions of people are in emergency need of improved sanitation and safe drinking water.

What have Others done for Diarrhoeal Control?

Diarrhoeal spread can be prevented by some simple measures. Many countries have adopted effective measures that reduced their child mortality rates. We are taking the example of Bangladesh among low-income countries, where NMR was reduced from 52 to 28 per thousand live births during 1993-2014. They made it possible by ensuring vaccine coverage for preventable diseases, providing effective treatment facilities for diarrhoea and respiratory infections, implementing Integrated Management of Newborn and Childhood Illnesses (IMNCI) and ensuring the delivery of interventions for newborns. Also, socioeconomic conditions were improved. Adoption of use of ORT (Oral rehydration therapy) and zinc brought a remarkable change. Safe drinking water was made available for the people. To deal with shortage of healthcare personnel, telemedicine was introduced[21].

What Can We Do to Control Diarrhoea?

In Pakistan, mortality rates among children can be reduced by taking specific measures. As per WHO estimates, 94% of diarrhoeal diseases can be prevented through modifying the environment, which includes not only increasing the availability of safe drinking water but also improving hygiene and sanitation. The importance of clean water can be estimated by the fact that Sustainable development goal (SDG-6) developed by WHO and UNICEF also focuses on clean water and improved sanitation for all by 2030. These are crucial to maintain a healthy lifestyle[22].

Some of the ways to tackle the problem have been highlighted in table 1.

Water treatment:

This method is so important for provision of clean water that it deserves special attention. There are various methods for water treatment. Some of them are discussed below:

1. Boiling: This method kills most of the water-borne infectious agents. It can be easily practiced in homes. It also prevents the contamination of water after it has been collected[26].

2. Chlorination: It is a popular way for water treatment. It helps in disinfecting water. It has been adopted worldwide to decrease epidemics of infectious diseases and makes drinking water safe. It has been mentioned in the United Nation's International Children Emergency

Table 1: *Public Health Measures for Control of Diarrhoea*

1. HYGIENE	Good hygiene practices like washing hands can help prevent diarrhoeal diseases[22].
2.VACCINATION	Effective against several diarrhoeal agents such as Rotavirus[23].
3. ORAL REHYDRATION THERAPY	A cost effective and supportive treatment in decreasing the diarrhoea associated mortality.[21]
4. FOOD PROTECTION	Includes washing, cooking and covering the food to protect it from flies[24].
5.WASH IMPROVEMENT	It would reduce the risk of transmission of water borne diseases[8].
6.WATER TREATMENT	There are several ways to do so such as chlorination, filtration and boiling water.
SOCIAL MEASURES:	
7. ENDING OPEN DEFECATION	To prevent water contamination and oro-fecal transmission of pathogens, open defecation should be put to an end[17].
8. EDUCATING FAMILIES	Campaigns, aiming at educating the families to adopt such practices along with highlighting their importance and effectiveness, are required to bring a positive change in the society[22].
POLITICAL MEASURES:	
9. COLLABORATION AMONG DEPARTMENTS:	Integrated approach where different sectors and departments collaborate with each other to tackle the problem is more effective[17].
10. REVAMPMENT OF HEALTH BUDGET	Includes allocation of more health budget and acquisition of significant donor funding
11. DATA COLLECTION	Data about the quality of water in different areas and its effects on health needs to be collected for better policy making[25].

Funds Report that this method has helped in reducing the diarrhoea rate by 29%[27]. Unfortunately, the agencies in Pakistan had been focusing more on the quantity of water than the quality due to its increased demand. Lack of awareness, trained people, equipment, techniques and control worsen the situation[28].

3. Filteration: Filters can be used to remove impurities from water. It provides safe drinking water[26].

In addition to above mentioned strategies to combat diarrhoea related deaths, neonatal deaths can be reduced by delivery of maternal and neonatal care by community health workers such as trained lady health workers[29].

Conclusion:

Among many causes for high NMR in Pakistan, diarrhoea is very important. Provision of safe water and practising good hygiene would decrease the disease burden and reduce NMR. For developing effective strategies to combat the situation, there is a need to take measures on community and governmental level. There is a need for greater funding and political attention if we want to achieve this goal.

References:

1. WHO/GHO. Indicator Metadata Registry List [Internet]. Geneva (CH): WHO [cited on 2020 Oct 31]. Available from: https://www.who.int/data/gho/indicator-metadata-registry.
2. UNICEF. Neonatal Mortality-UNICEF DATA [internet]. New York (US): UNICEF; 2020 Sep [cited;2020 Oct 31]. Available from: https://data.

unicef.org/topic/child-survival/neonatal-mortality/.

3. Watkins K. The State of the World's Children 2016: A Fair Chance for Every Child. UNICEF. 3 United Nations Plaza, New York, NY 10017; 2016.
4. UNICEF. World is failing newborn babies, says UNICEF [Internet]. New York (US): UNICEF; 2018 Feb 20 [cited;2020 Oct 31]. Available from: https://www.unicef.org/media/media_102677.html.
5. UNICEF. Indicator profiles-Pakistan [internet]. New York (US): UNICEF [cited 2020 Oct 31]. Available from: https://data.unicef.org/country/pak/.
6. El-Saharty S, Ohno N. South Asia's quest for reduced maternal mortality: what the data show. World Bank Group. Retrieved November. 2015; 29:2017.
7. Mathers C. The global burden of disease: 2004 update [Internet]. World Health Organization; 2008 [cited;2020 Oct 31] Available from: https://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_part2.pdf?ua=1.
8. Prüss-Ustün A, Bartram J, Clasen T, Colford Jr JM, Cumming O, Curtis V, et al. Burden of disease from inadequate water, sanitation and hygiene in low-and middle-income settings: a retrospective analysis of data from 145 countries. Tropical Medicine & International Health. 2014;19(8):894-905.
9. Kosek M, Bern C, Guerrant RL. The global burden of diarrhoeal disease, as estimated from studies published between 1992 and 2000. Bulletin of the world health organization. 2003;81(3):197-204.
10. Unicef. Child survival fact sheet: Water and sanitation. UNICEF: New York, NY, USA. 2018.
11. USGS. Where is Earth's Water? [Internet]. Reston (VA): U.S. department of the Interior. U.S. Geological Survey;2016 [cited;2020 Oct 31]. Retrieved from: http://water.usgs.gov/edu/earthwherewater.html
12. Huang GH, Xia J. Barriers to sustainable water-quality management. Journal of Environmental Management. 2001;61(1):1-23.
13. Soomro M, Khokhar M, Hussain W, Hussain M. Drinking water Quality challenges in Pakistan. Pakistan Council of Research in Water Resources, Lahore. 2011.
14. Patoli AA, Patoli BB, Mehraj V. High prevalence of multi-drug resistant Escherichia coli in drinking water samples from Hyderabad. Gomal Journal of Medical Sciences. 2010;8(1):23-26.
15. World Health Organization. Rapid assessment of drinking-water quality: a handbook for implementation. World Health Organization; 2012.
16. Anadoulo agency. Contaminated water accounts for 40 pct of all deaths in Pakistan, kills 100,000 a year[internet]. Karachi[PK]: Daily Sabah; 2018 Jan 19 [cited 2020 Oct 31]. Available from: https://www.dailysabah.com/asia/2018/01/19/contaminated-water-accounts-for-40-pct-of-all-deaths-in-pakistan-kills-100000-a-year.
17. Government of Pakistan and UNICEF Pakistan. The situation analysis of children in Pakistan [internet]. Islamabad (PK): UNICEF Pakistan; 2017 Sep [cited 2020 Oct 31]. Available from: https://www.unicef.org/pakistan/reports/situation-analysis-children-pakistan
18. Aghababian RV, Teuscher J. Infectious diseases following major disasters. Annals of emergency medicine. 1992;21(4):362-7.
19. Aziz JA. Management of source and drinking-water quality in Pakistan. EMHJ-Eastern Mediterranean Health Journal. 2005;11(6):1087-1098.
20. WHO. Country Highlights-Pakistan GLAAS 2013/2014 [Internet]. Geneva (CH): WHO; 2016 Jan 6 [cited 2020 Oct 31]. Available from: https://www.google.com/url?sa=t&source=web&rct=j&url=http://www.who.int/water_sanitation_health/monitoring/investments/pakistan-6-jan-16.pdf&ved=2ahUKEwiPkfv_otLsAhWDiVwKHUHNDLAQFjADegQICxAI&usg=AOvVaw1iY0XJNHQPhagKdTryHrdl
21. World Health Organization. Success factors for women's and children's health: Bangladesh. 2012.
22. Phaswana-Mafuya N, Shukla N. Factors that could motivate people to adopt safe hygienic practices in

the Eastern Cape Province, South Africa. African health sciences. 2005;5(1):21-8.

23. Bernadeta Dadonaite and Hannah Ritchie. Rotavirus vaccine – an effective tool that prevents children dying from diarrhea [Internet]. England and Wales: Global Change Data Lab; 2019 Aug 22 [cited: 2020 Oct 31]. Available from: https://ourworldindata.org/rotavirus-vaccine#:~:text=In%20high%2Dincome%20countries%2C%20rotavirus,of%20severe%20diarrhea%20cases%2C%20respectively
24. Sheth M, Obrah M. Diarrhea prevention through food safety education. The Indian Journal of Pediatrics. 2004;71(10):879-82.
25. Raza M, Hussain F, Lee JY, Shakoor MB, Kwon KD. Groundwater status in Pakistan: A review of contamination, health risks, and potential needs. Critical Reviews in Environmental Science and Technology. 2017;47(18):1713-62.
26. Clasen TF, Alexander KT, Sinclair D, Boisson S, Peletz R, Chang HH, et al. Interventions to improve water quality for preventing diarrhoea. Cochrane database of systematic reviews. 2015;10(1):1-176.
27. UNICEF. Effectiveness of WASH interventions in reducing diarrhea morbidity: Evidence base: water, sanitation and hygiene interventions. New York: UNICEF; 2009.
28. Aziz JA. Report Submitted to The Asian Development Bank as Part of Water Resources Strategy Study, ADB, TA 3130 PAK; 2002.
29. Soofi S, Cousens S, Turab A, Wasan Y, Mohammed S, Ariff S, et al. Effect of provision of home-based curative health services by public sector health-care providers on neonatal survival: a community-based cluster-randomised trial in rural Pakistan. The Lancet Global Health. 2017;5(8):796-806.