

# The Contribution of Public Health Technicians to Epidemic Response and Community Health Safety

Yahya Hifth Allah Hakami<sup>1</sup>, Hassan Mohammad Tohary<sup>2</sup>, sirajfahad Mohammed hakami<sup>3</sup>, ziyad mouse hakami<sup>4</sup>, Mousa Omar Hakami<sup>5</sup>, Othman Musawi Hakami<sup>6</sup>, Ibrahim Mohammed Hakami<sup>7</sup>, Ahmad Ibrahim hadi Hakami<sup>8</sup>, Ahmed Mohammed Qaba Ahmed<sup>9</sup>, Awagi Msawa Mohammed Hakami<sup>10</sup>

<sup>1</sup>Technician-Public Health, Muzhira Primary Health Care Center

<sup>2</sup>Technician Public health, National Tuberculosis control program in jazan

<sup>3</sup>Technician-Public Health, Madaya Primary Health Care Center

<sup>4</sup>Technician-Public Health, Madaya Primary Health Care Center

<sup>5</sup>Technician-Public Health, Muzhira Primary Health Care Center

<sup>6</sup>Technician-Public Health, Prince Abdul Mohsen Hospital

<sup>7</sup>Technician-Public Health, Alasamla Primary Health Care Center

<sup>8</sup>Technician-Public Health, Almarabi Primary Health Care Center

<sup>9</sup>Technician Public Health , Central Sector Administration - Jazan Health Cluster

<sup>10</sup>Technician-Public Health, Alasamla Primary Health Care Center

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## ABSTRACT

Although community health workers (CHWs) are crucial to resource-limited health systems, little is known about their pandemic preparedness role. Community Health Workers (CHWs) enhanced access to health services and products, communicated health concepts with cultural sensitivity, and alleviated strain on formal healthcare systems prior to pandemics. Community Health Workers (CHWs) informed and organized communities, enhanced surveillance systems, and mitigated health service deficiencies during pandemics. Community Health Workers (CHWs) have demonstrated proficiency in these roles and previous initiatives; therefore, we advocate for their increased utilization in pandemic preparedness. Practical strategies include training and employing Community Health Workers (CHWs) to disseminate One Health information to vulnerable populations before outbreaks, consolidating them into a reserve health corps for public health emergencies, and formalizing agreements and strategies to facilitate CHW early involvement in response initiatives. Community Health Workers (CHWs) already contribute to pandemic preparedness, thus expanding their duties and responsibilities is a sensible way to boost pandemic and community resilience.

**Keywords:** Public Health, safety, technicians, Epidemiology

## INTRODUCTION

Disasters are unplanned events that pose big risks to people's health, the economy, or the government and require extra safety measures that go beyond normal procedures or resources. One example of this kind of event is a large-scale outbreak of an infectious disease. It's important to note that these disease outbreaks seem to be happening more often (1). cholera, Ebola, Lassa fever, Middle East respiratory syndrome, Nipah, Rift Valley fever, and yellow fever have all happened. One way to lessen the effects of tragedies is to make people more prepared for them(2).

Society stands to benefit much from a well-coordinated medical response to a pandemic. Most will likely concur that a comprehensive and coordinated medical response to a pandemic is preferable than a precautionary strategy, due to the potentially significant impacts of these chemicals on essential infrastructure and the broader ecosystem. Nonetheless, even if there is near consensus that human interests should take precedence over the broader environment, this does not prevent society from comprehending the actual risks involved and assessing if any measures can be implemented to alleviate these perceived dangers. To effectively prepare for and respond to pandemics, investments should be made in collaboration with the recipient country, rather than through bilateral or multilateral aid or private philanthropic contributions, which present disadvantages such as elevated transaction costs, earmarking, short-term focus, and encroachment on sovereignty. Government-established objectives should be promptly and adaptively achieved utilizing these funds. (3).

Even with these advancements, global pandemic preparation still faces many obstacles and has many holes. There has been a lack of consistency in the rate of progress toward IHR implementation, and numerous nations still have not achieved the most fundamental standards for compliance (4,5). A number of issues have been brought to light by recent epidemics, the most prominent of which being the Ebola crisis in West Africa in 2014. These include problems with basic healthcare accessibility, contact tracing, quarantine and isolation procedures, and non-health sector readiness, such as worldwide coordination and response mobilization (6,7). These differences are especially apparent in settings with limited resources and have led to issues during relatively isolated outbreaks. They have serious ramifications for what might happen in the event of a full-fledged global pandemic. In order to manage outbreaks and improve community health safety, this review aims to analyze and highlight the function and contribution of public health technicians, particularly Community Health Workers. In order to enhance CHWs' role in the Ebola response and general community health improvement, policy measures and systemic adjustments that provide training, resource allocation, accreditation, and professional recognition are recommended.

### **Definition of Public Health Technicians**

The use of community health workers (CHWs), lay individuals taught to assist with health service communication or delivery, is one option for extending health services at the sub-national level, particularly in underserved or remote locations (8). Although CHWs rarely hold official professional or paraprofessional qualifications or have completed university education, they are usually trained in the context of health interventions to undertake specific healthcare-related duties (9). CHWs have long been used to fill gaps in healthcare systems, improve community health initiatives, and reduce the risk of infectious diseases like tuberculosis, pneumonia, and malaria. As a result, their importance in primary healthcare systems has garnered a lot of attention. Nonetheless, despite their community-level establishment, CHWs are usually underutilized in the response to infectious disease epidemics (10).

The role of health workers and the health workforce in enhancing the health and well-being of populations extends far beyond the clinical care offered to individuals. Historically, medical and nursing education and training emphasize the prevention, treatment, and management of disease; the eradication of illness; and the enhancement of bodily, mental, and spiritual functioning. Medical and nursing practice includes several public health tasks, such as disease surveillance, illness control (both communicable and non-communicable diseases), research, assessment, and the prevention of diseases and injuries(11). The health workforce's responsibilities encompass primary prevention through the mitigation of known disease risks, vaccination, and the delivery of diagnostic, curative, and treatment services, as well as tertiary prevention by offering rehabilitative and palliative care to avert further decline or mortality. Besides these direct functions, the health staff enhances public health and preventative capabilities as outlined in the health promotion recommendations. The health workforce inspires, motivates, cultivates, advocates for, and oversees pertinent research, knowledge management, and policy formulation. This pertains to health literacy and education, equitable access to information and healthcare, personal and civic competencies, active citizenship, healthy physical and living conditions, and the cultivation of social capital. The health workforce tackles various risk determinants, including poverty, social isolation, and the promotion of healthy behaviors. The health workforce promotes and values cultural variety, establishing a basis for the capability and social well-being crucial for health(12).

### **History of community health research**

Sociology and public health have a long history of studying community contexts and health effects. The "Chicago School" of sociology, which emerged in the early 1900s, placed a strong emphasis on neighborhood-centered study through the lens of urban ecology. A key premise in this school is the idea of local social dysfunction as proposed by Shaw and McKay (1942). Although Shaw and McKay focused on delinquency, they created a whole paradigm that clearly links community dynamics to other outcomes, including health. Community social dysfunction is the result of a community's organization failing to preserve the shared values among its members and enforce effective social standards. Social control is the capacity of a social unit to self-regulate in line with desired values, hence facilitating shared goals instead of imposed ones (13).

Individuals' aspirations frequently encompass residing in communities characterized by economic stability, superior educational institutions, sufficient housing, protection from predatory crime, and general cleanliness. The capacity to achieve such objectives is associated with both formal, intentional efforts to obtain social control via institutional mechanisms and informal role connections established for different goals (14).

According to Shaw and McKay, crime is not an isolated event. Their study showed that there is a link between communities and health. In Chicago neighborhoods with a lot of poverty, unstable housing, and falling apart homes, there are higher rates of child death, delinquency, crime, low birth weight, tuberculosis, physical abuse, and other things that hurt people's health. In a pivotal investigation, (15) utilized the concept of social disorganization to examine mental health, contending that more disordered locations exhibited elevated rates of mental illness hospitalization. Shaw and McKay, in conjunction with Faris and Dunham, noted that despite the influx of various demographic groups, consistently high rates of adverse outcomes persisted within the same

neighborhoods throughout time. Referred to as "emergent properties," the sociologists of the Chicago School concluded that communities exhibit persistent characteristics that surpass the specific traits of the distinct ethnic groups residing inside them. The Chicago School paradigm is pertinent to contemporary issues due to its theoretical focus on the characteristics of locations rather than individuals.

In the beginning, studies of health also looked at where people lived. People all over the world know about the study that Goldberger and his friends did on pellagra in Southern villages. Researchers did a groundbreaking study on family income and the frequency of pellagra (16). They discovered that a person's health and the ease with which they could obtain nutritious meals in their community were related to their risk of contracting pellagra. They discovered how many people were undernourished and how towns and individuals obtained food. In addition to the various farming practices employed in the neighboring farmlands, this data displayed the quantity of supermarkets and locally produced foods in each town. Villages with limited access to nutritious food were found to have "less effective as a protective factor than in other comparable areas with superior food availability" when family wealth was present. It was among the first pieces of evidence demonstrating that group and individual health dangers interact (17). Goldberger's work was influential and carried on a long tradition of studies that looked at the ecological environment of health that started in the early 1800s, despite the fact that it went against current epidemiological tendencies (18). (19) States that "Epidemiology, a population science, is fundamentally ecological in the original biological context of organisms within a multilevel interactive environment."

### **Responsibilities of Public Health Technicians**

#### **Surveillance and Monitoring**

Community Health Workers (CHWs) play a variety of responsibilities in their surveillance operations, which can be divided into four basic, though not fully different, functions: (1) community involvement; (2) data gathering; (3) screening, testing, and treating patients; and (4) health education and promotion (20).

#### **Contribution during Epidemics**

Broad spectrum of physical, psychological, and social consequences of public health crises must be managed by internists. A public health emergency or the consequent mass hysteria could endanger patients. Furthermore, internists could be asked to serve as emergency doctors in situations when emergency rooms are packed or not accessible. Interns have to be ready to treat diseased as well as exposed persons. Since various organ systems may be affected—e.g., pneumonia from influenza, sepsis from typhoidal tularemia, and meningitis from inhalational anthrax—comprehensive testing are absolutely essential. Websites abound in information on prevention and treatment among the Food and Drug Administration (FDA), the Department of Health and Human Services, the National Library of Medicine, and the Centers for Disease Control and Prevention (CDC)(21).

Prophylaxis should be administered to those who are exposed, but not to those who are very sick. To prevent infection, administer prophylaxis to those who have been exposed. Because patients could claim to have been exposed, establishing exposure is challenging. In the event of a major outbreak, public health professionals may establish makeshift vaccination and prophylactic stations. Nonetheless, a lot of individuals come to clinics for preventative care. Sort those that were dealt with during a major attack or pandemic. Given the limited resources and qualified staff, internists will have to prioritize who should receive treatment, particularly in emergency situations. It might be difficult to know when and how to implement rationing therapies, especially in crowded environments. Despite meeting the needs of each patient, internists' main duty in public health emergencies is to serve the public (22).

Although explicit criteria remain undeveloped and rationing decisions are contentious, specific groups, including critical persons (e.g., healthcare workers, police, firefighters, and others vital in addressing a public health crisis), ought to be prioritized. Critical individuals are required to avert additional casualties and fatalities, as well as to mitigate the transmission of contagious infections and address mental health repercussions. Public health crises can lead to a substantial rise in mental health issues, including anxiety, sadness, and post-traumatic stress disorder(23-26). Evidence indicates that individuals who observe, hear, or read about a disaster may also be impacted (27). In the absence of adequate mental health professionals following a crisis, internists are frequently compelled to manage patients' mental health issues(28-30). Treat comorbidity exacerbations. Excessive environmental stresses may aggravate comorbidities such as cardiovascular and respiratory problems (31). Furthermore, during public health emergencies, people with certain chronic conditions (including diabetes and chronic obstructive pulmonary disease) may have limited access to maintenance medications(32).

In Saudi Arabia, public health technicians are essential to environmental health, health promotion, and disease prevention. They support water quality, food safety, and the prevention of infectious diseases. Research on the particular responsibilities and difficulties faced by public health professionals in Saudi Arabia is, nevertheless, scarce(33).

### **Impact on Community Health Safety**

The recommendations below have a high chance of having a long-term impact. Integrate Community Health Workers with National Community Health Worker Registries. Incorporate Community Health Workers (CHWs) into national human resources for health registries run by the Ministry of Health (MOH). Community Health Workers cannot be effectively supported in responding to pandemics or providing critical services unless Ministries of Health are aware of their identities and locations. These registers are critical for aiding current Community Health Workers and discovering and correcting coverage gaps in the aim of universal health coverage.

Set minimum practice standards to ensure that Community Health Workers (CHWs) receive the skills and information they require to offer high-quality care to patients, foster trust, and be legally recognized for the critical role they frequently serve. As with other legal occupations, Community Health Workers (CHWs) have to be involved in decision-making and be represented on panels keeping an eye on their working conditions and output<sup>3</sup>. Improve Transparency and Strategy shown to improve access to care and, hence, equity is guaranteeing that care given by Community Health Workers (CHWs) is rendered without imposing point-of-care user fees. Support ongoing skill development. Provide Community Health Workers with ongoing education covering critical clinical and nonclinical competencies as well as knowledge needed to provide total community health care, thereby including curative therapies. Give Community Health Workers what they need. Incorporate into national forecasts and supply chains the medical and non-medical supply needs of Community Health Workers—personal protective equipment and required medications—into planning, quantification, distribution, and funding (34).

Assurance that each Community Health Worker is allocated a designated supervisor This is crucial during pandemics when professional procedures change and health and safety risks rise. The examination of summary statistics concerning CHW performance, patient experience assessment, and the provision of support by supervisory professionals improves the implementation of community-based care and the quality of health services offered. Pay Community Health Workers Competitively in Line with the Market to Guarantee Timely and Consistent Payments Reflecting Their Roles Give community health workers the perks they deserve—hazard pay, family leave, overtime pay, sick leave (35).

Community Health Workers should receive compensation that is competitive within the relevant market, disbursed regularly, punctually, and commensurate with their responsibilities. Give them chances to move up in their career, like the chance to become a dedicated CHW boss. At every level, include Community Health Workers in the decision-making process. Invest in complete, non-hierarchical digital data systems and teach people how to use them so that Community Health Workers (CHWs) can record their visits in a standard way and send the information to public sector monitoring, evaluation, and logistics management information systems, such as the health management information system. Community Health Workers, their communities, and their managers must be able to access the data. There must also be tools for clearly visualizing and interpreting the data to make performance management, public accountability, and full monitoring and assessment easier<sup>(3)</sup>. To achieve universal health coverage and avoid overburdening community health workers, it is crucial to specify task distribution and time management among them. Must be thoroughly and formally integrated into the national health system to identify and manage cases, do contact tracing, and send patients to healthcare facilities for timely clinical care. Investments in the improvement of standard community health systems form the fundamental foundation for robust health systems that can efficiently respond to epidemics and pandemics (36).

### **Challenges Faced by Public Health Technicians**

We found three primary issues encountered by Community Health Workers (CHWs) and health systems utilizing CHWs for surveillance: (1) insufficient education and training; (2) inadequate financial and other resources; and (3) logistical and infrastructural obstacles. The utilization of Community Health Workers (CHWs) proved to be highly beneficial, with multiple studies indicating that the efficacy of CHWs' surveillance was equal to or superior to that of conventional surveillance methods. absence of agreement insufficient capability to perform the fundamental Disparities in the allocation of services and the benefits of public health; fragmented decision-making without the necessary data and comprehension; public health duties of evaluation, policy formulation, and service assurance; High turnover rates among leaders, insufficient links with the medical community, organizational disintegration or submersion, issues in intergovernmental ties, insufficient acquisition of essential knowledge pertaining to the comprehensive spectrum of public health requirements, adverse public perception of public health, obstructing essential assistance, and specific issues that excessively restrict the financial resources allocated to public health are all constraints on effective leadership (37).

### **Constraints and Prospective**

There are some issues with the studies on this subject that need to be discussed. The results may not apply to other healthcare professionals in Saudi Arabia and other countries due to the small sample size. To provide a more complete understanding of the roles, issues, and contributions of healthcare professionals, future research should include a larger and more diverse sample. Second, the study relied on participant self-reported data, which could be skewed by social desirability bias. To increase the validity of the findings, a follow-up study can use observations or triangulation with other data sources. Future research should look into the duties, challenges, and contributions of other healthcare professionals, such as doctors, dentists, and allied health workers. Despite these limitations, this study provides valuable insights on the roles, challenges, and contributions of nurses, pharmacists, public health technicians, biomedical specialists, and X-ray technicians in the Saudi healthcare system. The findings can assist policymakers and healthcare organizations develop strategies to support and empower these frontline heroes in their pursuit of excellence in patient care(33).

## CONCLUSION

Nations with deficient health systems, insufficient planning, and inadequate surveillance mechanisms are more prone to suffer severe repercussions from public health emergencies. Enhancing the health system's preparedness is essential to mitigate impacts, address ramifications, and adjust to future public health emergencies. Several potential response strategies encompass guaranteeing health services aligned with population requirements, conducting monitoring and surveillance of post-emergency epidemics, and implementing multisectoral initiatives to involve other sectors in addressing the collateral effects of public health emergencies. Risk assessment, disaster preparedness, and the implementation of digital alarm systems for monitoring and surveillance are viable strategies for alleviating the impacts of future population health emergencies (PHEs).

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