Knowledge And Utilization of Information Technology for Disease Surveillance Among Public Health Practitioners in Obio-Akpor LGA, Port Harcourt

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Abstract

The study assessed Knowledge and Utilization of Information Technology for Disease Surveillance among public health practitioners in Obio-Akpor LGA Port Harcourt. A sample of 267 health workers was used for the study. Descriptive research design was used for the study. The study used four research questions with one hypothesis. One research instrument was used to collect the data. The instrument was subjected to a reliability testing using test-retest method. The data collected was Pearson Product Moment Correlation and reliability coefficient of 0.89 was obtained showing that the instrument is reliable. The research questions were answered using descriptive statistics of percentage, mean and charts while the hypothesis was tested using Pearson Product Moment. The results revealed that; 15.5% of the respondents were between the age of 20 – 30years, 35.3% were between 31 – 40years, 27.4% were between 41 – 50years while 19.8% were between 51years and above, 61.4% of the respondents had B.Sc., 22.5% had M.Sc. while 16.1% had PhD. The study further revealed that the Information Technology tools used for Disease Surveillance among public health practitioners in Obio-Akpor LGA were mobile app, web-based surveillance system amongst others, the level of knowledge of information technology tools and systems for disease surveillance among public health practitioners in Obio-Akpo LGA was moderate at 53.1%, the level of utilization of information technology tools in Disease Surveillance among public health practitioners in Obio-Akpor LGA was moderate at 53.8% and that the challenges militating against the use of Information Technology tools used for Disease Surveillance among public health practitioners in Obio-Akpor LGA include, network issues, low budgets, lack of trainings among others. The study concluded that Knowledge and Utilization of Information Technology for Disease Surveillance among public health practitioners in Obio-Akpor LGA Port Harcourt is moderate. Therefore, training should be conducted to ensure all health care workers have the required skills to use the Information Technology for Disease Surveillance.

INTRODUCTION

Disease surveillance are critical components of public health efforts to prevent and control the spread of infectious diseases (Keller et al., 2019). Timely and accurate monitoring of disease patterns and early detection of outbreaks can enable swift response and containment measures, saving lives and mitigating the impact on communities. In recent years, the information technology has emerged as a powerful tool in enhancing disease surveillance by harnessing the potential of data-driven technologies, analytics, and artificial intelligence (Oyebanji et al., 2021).

The utilization of information technology for disease surveillance among public health practitioners is crucial for effective public health interventions. Public health practitioners play

a vital role in disease surveillance, outbreak detection, and response to prevent the spread of infectious diseases (Isere et al., 2015). Countries with functional Integrated Disease Surveillance and Response (IDSR) systems are expected to use standard case definitions to identify and report notifiable diseases, analyze data for outbreak investigations, and implement appropriate responses (Isere et al., 2015). Moreover, the involvement of disease intervention practitioners in outbreak investigations contributes significantly to public health preparedness and response efforts (Cope et al., 2018). In the context of global infectious disease surveillance, various systems like the Global Public Health Intelligence Network, HealthMap, and EpiSPIDER have been instrumental in processing event-based outbreak information to improve public health interventions (Keller et al., 2019).

Additionally, the use of information technology tools such as mobile apps and web-based surveillance systems has been highlighted as effective tools for epidemic surveillance and response, aiding in monitoring disease trends globally (Mohanty et al., 2019). Efficient outbreak response operations require coordination among different stakeholders, with clinicians focusing on diagnosis and treatment while health departments undertake surveillance and contact tracing activities (Abbas et al., 2015). Furthermore, the establishment of Public Health Emergency Operations Centres (PHEOCs) has been crucial in enhancing the efficiency of outbreak response activities and enabling the control of disease outbreaks (Oyebanji et al., 2021).

Aim and Objectives of the Study

The study is aimed at investigating Knowledge and Utilization of Information Technology for Disease Surveillance among public health practitioners in Obio-Akpor LGA Port Harcourt. The specific objectives are to;

1. identify Information Technology tools used for Disease Surveillance among public health practitioners in Obio-Akpor LGA.
2. determine the level of knowledge of information technology tools and systems for disease surveillance among public health practitioners in Obio-Akpo LGA.

Hypothesis of the Study

$H0_1$: there is no significant relationship between level of Knowledge and Utilization of Information Technology for Disease Surveillance among public health practitioners in Obio-Akpor LGA Port Harcourt.

METHODOLOGY
This study adopted the descriptive survey design. The study population comprise all health workers in Health facilities in Obio/Akpor local government area. As at the time of the study, a pilot study revealed that there are 800 health workers in the facilities. The sample size of 267 health workers were selected from the total population of 800 health workers in Health facilities. The instrument for data collection was a self-structured questionnaire developed by the researcher. The questionnaire will be divided into two (2) parts. The first part was made of personal data while the second part was made of items designed to measure Knowledge of Information Technology for Disease Surveillance among public health practitioners. In order to get a concrete result, the researcher administered the instrument by herself to the health workers and collected after it has been filled by the health care workers. Descriptive statistics was used as data analysis method. Hence, measure of central tendency statistics (mean), simple percentage and charts will be used to answer the research questions.

Result

Table 4.1 percentage of demographic data

Age	
20 – 30	15.5%
31 – 40	35.3%
41 – 50	27.4%
51 and above	19.8%
Educational qualification.	
B.Sc	61.4%
M.Sc	22.5%
PhD	16.1%
Type of employment	
Full time	68.5%
Part time	31.5%
Years of experience	
>1	15.5%
1 – 5	37.3%
6 – 10	27.4%
<11	19.8%

The result in table 4.1 shows that 15.5% of the respondents were between the age of 20 – 30years, 35.3% were between 31 – 40years, 27.4% were between 41 – 50years while 19.8& were between 51years and above, 61.4% of the respondents had B.Sc, 22.5% had M.Sc while 16.1% had PhD, 68.5% of the respondents were full time staff while 31.5% were part time staff, 15.5% of the respondents had less that 1 year work experience, 37.3% had 1 – 5years working experience, 27.4% had 6 – 10years working experience while 19.8% had more that 11years working experience.

Research Question 1: what are the Information Technology tools used for Disease Surveillance among public health practitioners in Obio-Akpor LGA?
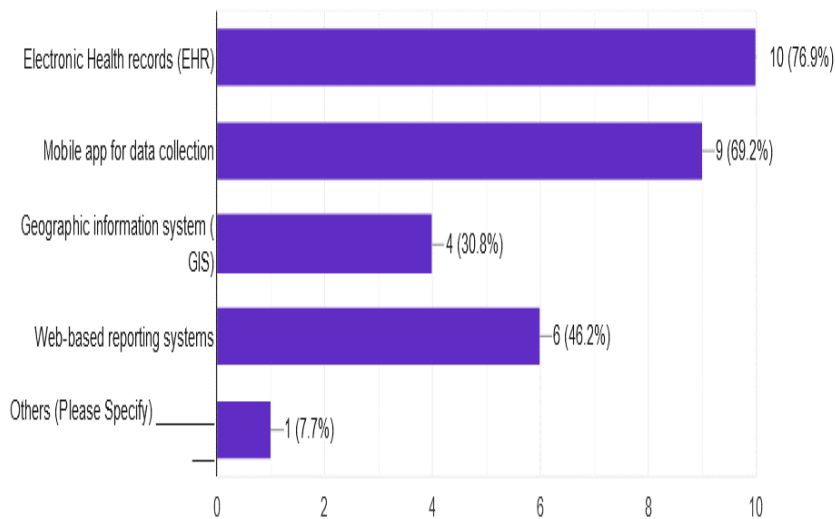
Fig. 1 revealed that 76% of the respondents agree that electronic health records is an Information Technology tools used for Disease Surveillance, 69.2% said mobile apps are Information Technology tools used for Disease Surveillance, 30.8% said GIS is an Information Technology tools used for Disease Surveillance, 46.2% said web-based reporting systems are Information Technology tools used for Disease Surveillance and while 7.7% said other tools are also used for Information Technology tools used for Disease Surveillance.

Research Question 2: What is the level of knowledge of information technology tools and systems for disease surveillance among public health practitioners in Obio-Akpo LGA?
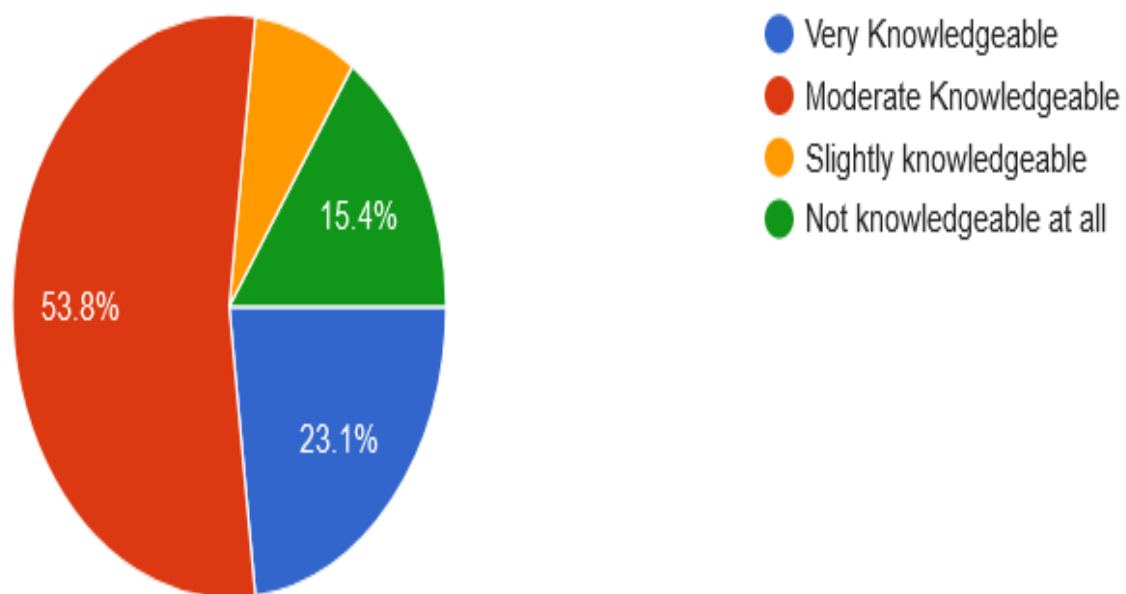

Fig. 4.2 revealed that 23.1% of the respondents are very knowledgeable of information technology tools and systems for disease surveillance, 53.8% are moderately knowledgeable, 7.7% are slightly knowledgeable while 15.4% are not knowledgeable at all.

Test of Hypothesis

Hypothesis 1: there is no significant relationship between level of Knowledge and Utilization of Information Technology for Disease Surveillance among public health practitioners in Obio-Akpor LGA Port Harcourt.

Table 4.3 Correlation analysis on Knowledge and Utilization of Information Technology for Disease Surveillance among public health practitioners.

			Knowledge	Utilization
Spearman's rho	Knowledge	Correlation Coefficient	1.000	.81**
		Sig. (2-tailed)	.	.000
		N	267	267
	Utilization	Correlation Coefficient	.81**	1.000
		Sig. (2-tailed)	.000	.
		N	267	267

Table 4.5: reveals a correlation coefficient of 0.81. This coefficient shows that there is a relationship between level of Knowledge and Utilization of Information Technology for Disease Surveillance among public health practitioners in Obio-Akpor LGA Port Harcourt. The Spearman's rho table reveals p value of 0.000 and a sig. value of 0.01. Hence, since the sig value ($p = 0.000 < 0.01$) is lesser than 0.01 alpha therefore, the null hypothesis is rejected meaning there is a relationship between level of Knowledge and Utilization of Information Technology for Disease Surveillance among public health practitioners in Obio-Akpor LGA Port Harcourt.

Discussion

The study revealed that the Information Technology tools used for Disease Surveillance were EHR, GIS, Mobile apps amongst others. The findings of the study is in accordance with other researches that has demonstrated the significant role of IT tools in improving disease surveillance, early outbreak detection, and response effectiveness. For instance, Carneiro & Mylonakis (2019) discuss the value of Google Trends as a web-based tool for real-time disease outbreak surveillance, aiding in establishing suitable web search query proxies for diseases. Moreover, the integration of big data and artificial intelligence (AI) has proven crucial in managing pandemics like COVID-19 (Bragazzi et al., 2020), assisting in processing vast amounts of data from public health surveillance, epidemic monitoring, and trend forecasting to enhance decision-making. Mobile health technologies, such as smartphone apps like AfyaData-Karimuribo et al. (2017) and FeverTracker (Bhowmick et al., 2021), are instrumental in disease surveillance by enabling instant data digitization, integration, and downstream processing. Additionally, the adoption of digital health platforms like DHIS2 in disease surveillance systems has been found to promote quicker and more precise reporting of surveillance data (Reynolds et al., 2022). In the realm of infectious disease surveillance, web-based participatory surveillance systems like Influenzanet et al. (2014) have been suggested to address limitations in existing surveillance systems by leveraging Web 2.0 tools to improve data collection and

reporting. Furthermore, the establishment of national public health surveillance systems, as exemplified in Jordan (Sheikhali et al., 2016), underscores the significance of mobile information technology in amalgamating diverse data sources for enhanced data collection, reporting, and analysis.

The study revealed that majority of the respondents had moderate knowledge of information technology tools and systems for disease surveillance. According to the findings, overall, about three-quarters (75.2%) of respondents had average level of knowledge of notifiable diseases and IT core functions. Across all cadres, Clinical officers, Nurses and Medical officers exhibited good knowledge. Toda et al, (2018) conducted a survey of health care staff in rural Kenya and found that about 82% of them had a high level of awareness on the notifiable diseases assessed. The results of this study, which show a moderate level of awareness about IDSR, corroborate the findings of Nakiire et al, (2019) in Uganda, who found that about 82% of respondents in the survey were knowledgeable about the components and functions of IDSR. According to Nnebue et al, (2012), under-reporting is caused by a lack of awareness of notifiable diseases. Approximately 89% of those polled were conscious of notifiable diseases. The results of a related study in Nigeria, Osagiede et al, (2020) contradict those of the current study. It was discovered that 62% of respondents had no awareness of disease surveillance and response in an integrated manner. According to a survey of allopathic practitioners Phalkey et al., (2015), about 47% of study participants could name at least one function of disease surveillance, with only 1% unable to name the functions of disease surveillance as identified by the World Health Organization.

Conclusion

Public health surveillance reporting is crucial for timely detection and response to disease outbreaks. With support from governments and other strategic partnerships such as the Global Health Security Agenda and World Health Organization, many countries have made good progress in improving public health surveillance systems. Surveillance reporting indicators therefore continue to improve especially through adoption of electronic systems. In this study, we have demonstrated that training on the use of surveillance reporting platforms has some role to play in improving the reporting indicators. However, there are other additional and equally important challenges that affect surveillance reporting systems and a systematic evaluation of the surveillance system must be conducted regularly in order to identify and address them. The study also conclude that challenges such as inadequate funding, limited laboratory capacity, data management issues, and operational barriers is essential to enhance the utilization of IT tools for disease surveillance , ultimately improving public health outcomes.

Recommendations

Recommendations for Enhancing the Use of Information Technology Tools in Disease Surveillance:

1.   Updated Guidelines: Public health authorities should consider adopting updated guidelines for evaluating public health surveillance systems to ensure they meet current standards and requirements. Regular reviews and revisions of guidelines can help enhance the effectiveness and efficiency of surveillance systems.

2.   Data Flow Optimization: Emphasis should be placed on optimizing data flow, system operations, case definitions, and reporting channels to streamline the surveillance process and ensure timely and accurate data collection and dissemination. Improving data flow can enhance the overall surveillance and response capabilities.

3.   Comprehensive System Design: Public health leaders should focus on designing, developing, and implementing comprehensive systems that integrate staff, resources, and information systems to conduct infectious disease surveillance and response effectively. A well-integrated system can improve coordination and communication among stakeholders.

4.   Timely Data Sharing: Public health surveillance data require timely sharing to ensure coordinated and effective risk management for public health response. Establishing mechanisms for timely data sharing can facilitate rapid response to disease outbreaks and enhance situational awareness.

5.   Training and Capacity Building: Investing in training programs and capacity building initiatives for healthcare workers and surveillance personnel is essential to ensure proficiency in utilizing IT tools for disease surveillance and response. Continuous training can enhance skills and knowledge in utilizing technology for public health purposes.

6.   Utilization of Novel Technologies: Leveraging novel technologies, such as real-time reporting tools and contact-tracing data analysis, can provide valuable insights for disease monitoring and response efforts. Public health authorities should explore and adopt innovative technologies to strengthen surveillance capabilities.

7.   Enhanced Data Management: Improving data management processes, including data collection, analysis, and reporting, is crucial for optimizing the use of IT tools in disease surveillance. Implementing robust data management practices can enhance the quality and reliability of surveillance data.

8.   Community Engagement: Engaging community health workers and local communities in the surveillance process can improve the timeliness of disease detection and reporting. Community involvement can enhance surveillance coverage and facilitate early response to outbreaks.

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