MediPIET Summary report of work activities

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Libya, Cohort 5 (2022)

Background

1. About MediPIET

The Mediterranean and Black Sea Programme for Intervention Epidemiology Training (MediPIET) aims to enhance health security in the Mediterranean and the Black Sea region by supporting capacity building for the prevention and control of natural or man-made threats to health posed by communicable diseases. It is a competency-based **in-service two-year fellowship** during which selected fellows conduct projects and field investigations at a MediPIET Training Site in their home country and attend MediPIET modules.

Since mid-2021, MediPIET has been implemented by ECDC as a part of the EU Initiative on Health Security. You can find more information about the programme at: https://www.ecdc.europa.eu/en/training-and-tools/training-programmes/fellowships/medipiet

2. Pre-fellowship short biography

Muhammed obtained his medical degree from the University of Tripoli in 2016. After gaining experience in paediatrics and neonatology for three years, he transitioned to public health to work as the director of the Public Health Emergency Office of the National Centre for Disease Control (NCDC). During the COVID-19 pandemic in 2019-2022, he led the emergency response efforts, coordinated training programmes and served as a member of the supreme committee to fight the pandemic in the country. Muhammed also continued working at the hospital's isolation centre, providing care for children and neonates in the western and southern regions of the country.

Fellowship

In September 2022, Muhammed Al Azebi started his MediPIET fellowship at the National Centre for Disease Control, Tripoli, Libya. This report summarises the work performed during the fellowship.

National supervisors: Miluda Rajab, Taher Emahbes

Scientific coordinators: Kostas Danis, Nana Mebonia, Pawel Stefanoff

Fellowship projects

3. Surveillance

Setting up of an event-based surveillance system in Libya, 2022-2024

Introduction: WHO identified Event-Based Surveillance (EBS) as an important component of early warning and response that will be instrumental in helping Libya to report all events of potential risk to public health under a single platform. Our aim was to set up the new EBS with the following objectives: (a) To improve the sensitivity of the surveillance system and equally encourage the exchange of information on events of significance between different sectors; (b) To improve the capacity of early outbreak detection at health facilities and in the community, as well as strengthen the coordination between the preventive and curative sectors of the health system, by facilitating/enhancing early detection of potential signals and public health events (e.g. disease outbreaks), and to introduce timely and effective response measures.

Types of signals: The National Centre for Disease Control (NCDC) in collaboration with partner organisations, led the implementation of the EBS system. We defined seven signals which will be collected in the initial phase, covering some well-known infection diseases and also, emerging/re-emerging diseases: (a) At least one child, less than 15 years old, with: sudden weakness of limbs (possible event: Acute Flaccid paralysis, AFP); (b) At least one child, less than 15 years old, with: fever and rash (possible event: measles); (c) Two or more cases of severe respiratory illness (fever, cough, difficulty breathing) from the same village, area, school, workplace, or congregate setting (e.g. refugee/migrant camps, prisons, etc.) within the same seven-day period (possible event: COVID-19); (d) Three or more rice watery stools in 24 hours with dehydration (fatigue, thirst, or sunken eyes) in any person five years of age or older (possible event: cholera); (e) Two or more cases with the yellow colour of eyes and dark brown urine from the same village, area, or school within the same seven-day period (possible event: viral hepatitis); (f) Unexpected large numbers of: (f1) Children absent from school due to the same illness in the same seven-day period; (f2) Pharmacy sales of people buying medicines for the same kind of illness; (g) Illness is never seen before or rare symptoms in the community (possible event: Emerging/remerging diseases).

Procedures: Signals detected by community members or key informants will be reported to community health workers (CHWs). CHWs will report the signals to the EBS focal points (also known as surveillance officers) at municipalities. The signal reporting should be done immediately, within 24 hours after detection, by phone calls, SMS, or in person. The reported signals will be triaged and verified within 24 hours of notification. Once the event is verified, the EBS focal point shares the event with its RRTs (Rapid Response Team) in municipalities to conduct a rapid risk assessment and provide a response. Based on the detected signals, the RRT will define the risk level (low, moderate, high, very high) and determine the actions to be taken (no action needed, monitor, immediate response). Once a rapid risk assessment is completed, the RRTs will also coordinate with the NCDC/Ministry of Health team on the process of initiating a response and involving all the relevant sectors.

Implementation: In December 2022, the pilot system was implemented, and later on, the programme expanded to the four regions (East, South, Central, and West) of the country in about 35 out of 120 municipalities of Libya. We trained more than 100 surveillance officers and 554 community members in 35 municipalities. For annual reports, we will use the following output indicators: (a) the number of personnel trained in EBS; (b) Signals detected (c) Signals triaged; (d) Signals which underwent verification; (e) Signals verified as events (f) Events characterised by risk level; (g) Events responded to; (h) Personnel equipped to conduct EBS.

Role and outputs: Fellow's roles and responsibilities within the task force of the event-based surveillance system setup were:

- Served as an active task force member overseeing the design and deployment of the national EBS framework.
- Led the literature review and needs assessment, identifying critical gaps and best practice relevant to Libya's surveillance context.
- Facilitated the engagement of key stakeholders, including coordination of consultative meetings and communication with governmental and technical partners.
- Contributed to the drafting of national EBS guidelines, aligning with WHO standards and regional priorities.
- Developed comprehensive training materials tailored to operational needs and strategic objectives.
- Delivered capacity-building workshops for senior epidemiologists and surveillance officers at the National Centre for Disease Control, ensuring readiness and technical proficiency.

Supervisor: Taher Emahbes

4. Outbreaks

Increased risk of diarrheal diseases in children under five years during a large outbreak after flooding in AL-Bayda, Libya

Introduction: On 11/09/2023, catastrophic rains of Tropical Cyclone Daniel led to flooding in Al-Bayda, Libya. Since 25/10/2023, physicians have reported an increasing number of patients with acute diarrhoea. In contrast, the outbreak was discovered by the public health emergency team in charge of assessing risks in the affected areas. We investigated to describe the outbreak and enhance control measures.

Methods: A case was defined as a person residing in Al-Bayda, experiencing three or more loose stools and vomiting within 24 hours with or without dehydration between 26/10/2023 and 2/11/2023. We searched for cases from medical facilities and obtained information from medical records on demographics, exposures, clinical, and laboratory findings and outcomes (hospitalisation or death). We calculated Attack Rates (AR), Attack Rate Ratios, and 95% Confidence Intervals (CI). Our team collected stool specimens from cases and water samples from ground wells in affected areas.

Results: During 26/10/2023-2/11/2023, we identified 1 041 cases, with 54% (n=561) being children <5 years and 59% (n=614) being females. The overall AR was 0.6% (1 041/190 000), while the risk of being a case was 4.9 times (95% CI: 4.4-5.6) higher among children <5 years compared to older individuals. Watery diarrhoea (72%, n=750) was the most common symptom. All 89 hospitalised patients were <5 years old, with two fatal cases. South Al-Bayda was a highly affected area (AR=1.6%, 574/35 000). All cases used well water for washing and cooking, while 23% (n=239) used bottled water only for drinking. The positive stool samples were 16/43 (37%) for *Entamoeba histolytica* and 6/43 (14%) for *Escherichia coli*. Well water samples were positive for faecal coliforms and *Entamoeba histolytica*.

Conclusions: Epidemiological and laboratory investigations indicated the link between the outbreak and contaminated well water; children <5 years were highly affected. We recommended the immediate implementation of water, sanitation, hygiene (WASH) and awareness-raising measures targeting groups vulnerable to severe outcomes. The surveillance system was strengthened as part of rapid response measures; an expansion of event-based surveillance to areas which are hard to reach was initiated.

Role and outputs: Muhammed led the outbreak investigation. As the principal investigator, he was responsible for all stages of the investigation, including planning, report writing, and the development of conclusions and recommendations. He produced a final report for the general director of the National Centre of Disease Control, the Ministry of Health and a peer-reviewed manuscript.

Supervisors: Taher Emahbes, Miluda Rajab

5. Research

Knowledge, attitude and preventive practice of tuberculosis among cases, Libya, 2023

Introduction: Tuberculosis (TB) incidence in Libya remains high (59/100 000), driven by migration, conflict, and healthcare access barriers. This study assessed TB-related knowledge, attitudes and practices among Libyan patients to inform control strategies.

Methods: In January–April 2024, we enrolled and interviewed 350 patients newly diagnosed with TB residing in Eastern (n=100) and Western (n=250) Libya. The structured interview included 11 questions on knowledge of TB, 10 questions on attitudes (10-item Likert scale), and 10 questions on preventive practices. Data were analysed using SPSS v25 by means of descriptive statistics, t-tests and chi-square test.

Results: 63% of respondents had poor knowledge (Mean score: 5.8/11; ±2.1 SD). Gaps included asymptomatic transmission (recognised by 37.1%), BCG prevention (28.6%), and ventilation (34.3%). Higher education (p<0.001) and urban residence (p=0.002) correlated with better knowledge. 54% of respondents expressed positive attitudes towards TB diagnosis and prevention (Mean score: 28.4/50; ±6.7 SD). Stigma was prevalent (65.7% reported discrimination), though 74.3% believed TB is curable. Positive attitudes were associated with female gender (p=0.01) and employment (p=0.03). 71% respondents reported poor practices (Mean score: 4.2/10; ±1.8 SD). Only 34.3% covered coughs; 51.4% delayed care >2 weeks (stigma/financial barriers). Poor practices were linked to low education (OR=2.4; 95% CI:1.5–3.8) and rural residence (OR=1.9; 95% CI:1.2–3.1). Western participants (predominantly migrants) had lower knowledge (p=0.04) and treatment adherence (58% vs. 72%, p=0.02) due to stigma and resource constraints.

Conclusions: We identified critical gaps in knowledge, attitudes and practices among patients with diagnosed TB, exacerbated by stigma, migration, and regional inequities. We recommended implementing culturally tailored education on transmission routes and preventive practices, reducing stigma via community engagement, improving migrant-inclusive services and cross-border collaboration. In addition, we recommended strengthening rural healthcare access (e.g. mobile clinics).

Role and outputs: The fellow developed the study protocol, cleaned and validated the data, conducted data analyses, and authored a comprehensive final report, which supervisors reviewed along with the frontline scientific coordinator.
Supervisor: Miluda Rajab

6. Scientific communication

Conference presentations

Muhammed Alazebi. Risk of diarrheal diseases for children under 5 years during a large outbreak followed by flooding in Al-Bayda, Libya, 2023 and presented at MEDIAN Scientific Event, 22 November 2024; Stockholm, Sweden.

Publications and outputs

Alazebi M, Rajab M, Ibrahim RS, Emahbes T. Investigation of a diarrhoeal disease outbreak following flooding in Al Bayda City, Libya, 2023. Submitted to the African Journal of Public Health.

7. Teaching activities

Training workshops on community and event-based surveillance for community health workers in the east flood-affected areas

Muhammed organised a training session for 120 community health volunteers and 30 surveillance officers from the flood-affected eastern municipalities of Libya. The session was organised from the 29 February 2024 till the 10 March 2024, in the city of Benghazi, Libya. The session aimed to equip frontline personnel with the skills to detect and report unusual health events, thereby strengthening the national surveillance network. The interactive, face-to-face training covered the importance of surveillance and Event-Based Surveillance (EBS), identifying information sources and priority events, signal detection, and the roles and responsibilities of Community Health Volunteers in community engagement. The programme utilised PowerPoint presentations for theoretical understanding, followed by practical exercises simulating real-life scenarios to enhance skills in detecting, reporting, and verifying EBS signals. Pre- and post-tests along with feedback forms, were used for evaluation, revealing that over 90% of participants found the objectives clear, the content relevant and well-organised, and felt encouraged to participate. Participants expressed confidence in applying the learned knowledge and sharing it within their communities to improve disease detection. While the training was largely successful, future sessions could benefit from allocating more time to certain topics for deeper comprehension. The session fostered a relaxed and communicative environment, contributing to the trainer's growth in designing effective and engaging public health training programs.

8. Other activities

1. Director of the public health emergency operation centre at the National Centre for Disease Control, Libya.
2. Leading task force to implement event-based surveillance in Libya.
3. Leading the response to a measles outbreak in the south and the vaccination campaign to respond to this outbreak.
4. Participating in the implementation of a basic field epidemiology program in Libya as a mentor in this program for 3 patches.
5. Leading the response during the flooding in the eastern part of the country as the director of the field emergency operation centre on the ground and leading the emergency team in the field.
6. Participating in Workshop on Risk Profiling and Internal Review of Emergency Preparedness on 13-16 May 2024.
7. Participating in updating the new list of notifiable diseases in the country.
8. Provide training workshops to implement the incident management system during an emergency in the flooded affected region in the country
9. Appearing in several TV shows and news regarding public health emergencies in the country
10. Acting director of the epidemiology office at the National Centre for Disuses Control

9. MediPIET modules attended

1- Introductory Course, 26 September – 7 October 2022, Spetses, Greece, attended face to face.
2- Inject Days on Operational Research, 8-10 November 2022, virtual.
3- Introduction to R, 28 November - 1 December 2022, virtual.
4- Outbreak Investigation module, 5-9 December 2022, Berlin, Germany, attended face-to-face.
5- Qualitative Research inject days, 31 January and 3 February 2023, virtual.
6- CBRN Awareness and Mitigation module, 13-17 February 2023, Petrovac, Montenegro, attended face-to-face.
7- Vaccinology inject day, 29 March 2023, virtual.
8- Multivariable Analysis module, 22-26 May 2023, Frankfurt, Germany, attended face to face.
9- Rapid Assessment and Survey Methods (RAS) module, 19-23 June 2023, Stockholm, Sweden, attended face to face.
10- Project Review module 2023, 28 August - 1 September 2023, Lisbon, Portugal, attended face-to-face.
11- Time series analysis and GIS module, 11-15 December 2023, Rome, Italy, attended face-to-face.
12- One Health module, 3-7 June 2024, Belgrade, Serbia, attended online.
13- Project Review module, 26-30 August 2024, Lisbon, Portugal, attended face-to-face.

10. Personal conclusions of fellow

Completing the MediPIET fellowship has been an invaluable experience that significantly enhanced my capabilities in the field of epidemiology. Through the programme's comprehensive training and hands-on projects, I gained crucial skills in surveillance, outbreak investigation, teaching, and research. This fellowship has directly contributed to my professional growth, equipping me with the expertise necessary to effectively lead as a field epidemiologist and the director of the public health emergency operation centre in my institute. I am confident that the knowledge and practical experience gained through MediPIET will be instrumental in strengthening public health security in my country Libya.

11. Acknowledgements

I would like to express my sincere gratitude to the MediPIET program and the European Centre for Disease Prevention and Control (ECDC) for providing this invaluable fellowship opportunity. I am deeply thankful for the guidance and support of my dedicated national supervisors, Miluda Rajab and Taher Emahbes, and the insightful direction from the scientific coordinators, Kostas Danis, Nana Mebonia, and Pawel Stefanoff. I also want to acknowledge the collaborative efforts of the public health emergency team members who were instrumental in the outbreak investigation at my institution. also, my sincere appreciation goes to all the facilitators and participants of the various MediPIET modules that contributed significantly to my learning journey.