

USING AN EPIDEMIOLOGICAL APPROACH TO CRITICALLY ANALYZE A
POPULATION HEALTH PROBLEM

Anthony Failano Gomez, PT, RN, BSN, MSN, LEU, LSS, LEU, DNPs, CPHQc

Walden University

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Selecting a Population Health Problem

Population health as defined by Nash, Reifsnnyder, Fabius & Pracilio (2011) is the “distribution of health outcomes within a population, the health determinants that influence distribution, and the policies and interventions that impact the determinants” (p. xxxv). Studying a health problem that affects the population would always lead to a better healthcare delivery system, promoting health services that are accessible, affordable, available, and acceptable.

Population Health Problem and Significance

The World Health Organization Eastern Mediterranean Region Office (2013) indicated that viral hepatitis is considered as an emerging health problem in the region with “around 4.3 million persons infected with HBV and 800,000 persons with HCV in the Region each year” (p. 1). According to the organization, the cost of preventing and managing the disease has been a global encumbrance and is expected to continue to be a health problem over the next two decades.

Defining the Problem and Research Methods

Infectious diseases have been with the human race ever since man came in contact with vectors and agents of diseases. Since then, infectious diseases became a global threat that challenges various populations. Controlling these types of diseases, determining causality, identifying carriers and sources, and conceding those who are affected and at risk, are the major and important ways of dealing with this dreaded problem. As Friis & Sellers (2009) stated “Although there have been many advances in the prevention and treatment of infectious diseases, they remain significant causes of morbidity and mortality for the world’s population in developed as well as developing countries” (p. 438).

The Problem

Prison or correctional facilities around the world faces a lot of challenges not only legally but also medically. In the case of Libya where a majority of the prisoners are nonnative and originated from places where certain communicable diseases are endemic, the community is at risk from acquiring these diseases. The lack of health services provided for the prisoners, especially now after the Arab Spring 2011-2012 revolution, poses an inevitable risk of outbreak among the inmates and to the community where facilities are located.

In a developed country such as the United States of America (U.S.), correctional health care has always been a concern. According to Glaser & Greifinger (1993) “Approximately 1.2 million inmates in the U.S. Correctional institutions have a high prevalence of communicable diseases, such as human immunodeficiency virus (HIV) infection, tuberculosis, hepatitis B virus infection, and gonorrhea” (p. 139). These authors also found out that there is a “high prevalence rate of HBV serologic markers among male prison inmates” (p. 141). The reason for this remarkable prevalence rate is that most of the inmates are “intravenous drug or crack users” (p.139).

Flanigan, Zaller, Beckwith, Bazerman, Rana, Gardner, Wohl, & Altice (2010) emphasized the link between community health and correctional health. These authors reiterate the prevention of the spread of communicable diseases such as human immunodeficiency virus (HIV) infection, sexually transmitted infections (STI) and viral hepatitis that can be done by proper testing and treatment of prisoners in correctional facilities. They added that this is a neglected aspect in the prevention of communicable diseases among high-risk communities.

In Libya there is an estimated 2.5% - 10% prevalence of hepatitis in the general population and this is attributed to unsafe injections, health-care associated infections, unsafe blood and blood products, and drug use (WHO, 2009). The Public Health England (2013) reported that Libya “has a considerably higher prevalence of hepatitis C than the United Kingdom (U.K.) and has an intermediate prevalence of hepatitis B”. This report is supported by a study conducted by Khmmaj, Habas, & Azabi (2010) where the authors found out that the frequency of hepatitis B and C and HIV cases among healthy blood donors is increasing in Libya. Alashek, McIntyre, & Taal (2012) also reported that hepatitis C has a high incidence and prevalence among patients undergoing hemodialysis in Libya.

The risk associated with the high incidence of hepatitis in the country is attributed to drug-abuse, unprotected sex, and unsecure habits for the transmission of the virus (Khmmaj, Habas, & Azabi, 2010). Another risk cited is weak infection control measures especially among hemodialysis units and centers in Libya (Alashek, McIntyre, & Taal, 2012). There is also a major risk of transmission of the disease through persons in the prisons or detention centers. Since a majority of these prisoners are not from Libya, some of them carry the dreaded virus and can be a risk to the outside community.

In the City of Gharyan, particularly Al Jabal Al Gharbi, where the largest prison-detention center is located, there are reported cases of hepatitis infection. These prisoners have been in the center for sometime because they were detained during the time of the revolution. Since then cross-infection from infected individuals may have happened considering that most of them originated from a country where there is a high prevalence of hepatitis such as Chad, Nigeria,

Gambia, Niger and Ghana. There are no studies and no preliminary descriptive data available about this situation in the City of Gharyan

The preliminary research question would be:

- What is the prevalence and incidence of hepatitis B and C virus among prisoners of Al Hamra?

Research Methods

In a country such as Libya where there are no strong data to support any study, an observational epidemiologic design will be beneficial, particularly a cross-sectional study. As Friis & Sellers (2009) stated, “Cross-sectional study (also termed prevalence study is a design in which exposure and disease measures are obtained at the level of the individual” (p. 256) and this type of design are “typically descriptive, providing quantitative estimates of the magnitude of a problem” (p. 256).

An epidemiologic study on hepatitis here Libya can be best addressed by a Cross-sectional design. The chosen design does not require the use of extensive resources and can be done when time is limited. As Friis & Sellers (2009) stated “one could derive reasonable estimates of the extent of a health problem through a survey on a subset of the population” (p. 257). However, the author pointed that this cross-sectional design “do not measure the temporal ordering of cause and effect” (p. 256) and “not be used for studying disease etiology” (p. 321). One important factor why this can be helpful here in Libya is that this design has the ability to use secondary data as sources for the study.

Observational studies (OS) including cross-sectional design promote effective reporting of a disease. Reporting of cases is vital because it provides fundamental data for any study that eventually affects the population health. As Papathanasiou & Zintzaras (2010) stated, “The choice of an OS design may stem from a variety of reasons such as ethics, restrictions in study planning, or feasibility” (p.67). The author added that this type of study does maintain confidentiality as compared to clinical trials.

Screening as defined by Friis & Sellers (2009) is the “presumptive identification of unrecognized disease or defects by the application of tests, examinations, or other procedures that can be applied rapidly” (p. 410). To be able to address the problem, screening of the inmates, utilizing blood for viral screening, is deemed necessary to identify viral hepatitis. Mass screening is appropriate for Al Hamra prison since all of them are contained in one facility. A purposive sampling method is therefore suitable for the study, providing accurate representativeness of the target population.

The researcher will gather pertinent information from the inmate’s particularly demographic profiles (name, age, gender, place/country of origin, length of stay in Libya, frequency of stays in Libya, drug use/history, and sexual activities). Numbers to promote confidentiality will code the inmates. These codes will also be used in obtaining blood sample from the inmates for viral screening. Blood samples will be obtained from all prisoners regardless if the individual has hepatitis (being treated, received treatment before, have not been treated) or no past history of the having the infection. The blood samples will be sent immediately to the Laboratory Department of Gharyan University Teaching Hospital for viral screening. The results of the viral

screen will then be gathered, documented and analyzed to come up with conclusive evidences to answer the research problem.

Developing an Intervention and Determining the Impact

In order to effectively manage health problems affecting a population, a scientific and proven way of intervention should be in place. This is evident by utilizing policies and protocol that align every effort to attain the common goal, thus, providing a long-term impact for the population. As Nash, Reifsnnyder, Fabius, & Pracilio (2011) stated, “A key opportunity for population health management is seen in the potential creation, through healthcare reform legislation” (p.225).

The Intervention

The World Health Organization (2013) considered viral hepatitis, specially hepatitis B and C, as a potential health problem in the eastern Mediterranean Region, which causes 75% of cirrhosis and hepatocellular carcinoma cases. To address this situation, the WHO (2013) launched a Global Alert and Response - Global Hepatitis Program with the following goals:

- “To reduce the transmission of agents that causes viral hepatitis;”
- “To reduce the morbidity and mortality due to viral hepatitis through improving the care of patients with viral hepatitis; and”
- “To reduce the socio-economic impact of viral hepatitis at individual, community and population levels.”

The World Health Organization (2013) conducts an annual Global Hepatitis Survey for the Eastern Mediterranean Region from its twenty-two member states including Libya, “which has a total population of 605 million” (p. 67). In the 2012 Global Hepatitis Survey, in which Libya did not participate, they found out that “4.3 million people are infected with hepatitis B and 800,000 people are infected with hepatitis C” (p. 67). The survey concluded, “there are an estimated 17 million people in the Region suffer from chronic hepatitis C infection” (p.67).

Al Hamra prison, which is, located in the West Mountains of Libya, particularly in Gharyan City, houses majority of the prisoners of Jabal Nafousa (West Mountain) region. Majority of the prisoners are from the twenty-two Member States of the World Health Organization Eastern Mediterranean Region and from African Region, which has a high prevalence of hepatitis B and C virus. These prisoners are illegal migrants from these Regions seeking refuge in the country of Libya.

The influx of illegal migrants from various racial and ethnical minority groups and from regions with high prevalence of hepatitis B and C virus in Libya, poses a great risk to the community. The absence of health care policy or program to tackle the problem will complicate the situation and may cause the spread of infection to the local residents. Provision of a Correctional Health Care will ensure that individuals incarcerated will have access to proper medical services, which in turn safeguards the health of the community. As Goldenson & Hennessey (2009) stated “By providing comprehensive prevention screening, and treatment services in prisons and jails, communities can take advantage of a tremendous opportunity to improve public health by reducing the problems associated with untreated inmates returning to the community” (p. 3).

Jails and prisons are appropriate locales for the public health sector and local authorities to work together to address and manage populations with high incidences of communicable infections (Weinbaum, Sabin, & Santibanez, 2005). In Al Hamra prison, collaboration among the local health sector or city hospital and local authorities will ensure that individuals in the prison are properly screened and eventually treated if found positive for hepatitis B and C.

To determine the prevalence of hepatitis B and C among prisoners of Al Hamra, each individual or prisoners currently detained in the center will be screened using blood as sample for viral screening. The screening will be done at the medical laboratory of Gharyan University Teaching Hospital. Since purposive sampling will be utilized, the total number of prisoners will be included in the study. In case wherein an individual refuses to participate, this number will be identified and included as part of the study. The population that tested positive for hepatitis B and C will then be referred to Gharyan University Teaching Hospital for proper medical management. Best possible outcome would be that all prisoners will be tested and the city officials will take action about the situation. Worst possible outcome would be that the authorities would not do anything about problem, which is inevitable.

Allen et al. (2003) pointed out the vast clinical, financial and public repercussions of determining and treating prisoners infected with hepatitis virus. The authors suggested that individualized treatment based on strict guidelines should be followed. A written informed consent indicating the period of treatment should be emphasized since medications for hepatitis virus infections have adverse reactions. The authors concluded "To increase efficacy, partnerships with health departments and community clinicians will need to be enhanced to

better coordinate appropriate follow-up after discharge given that most incarcerated patients eventually return to the community” (p. 190).

Spaulding et al. (2006) emphasized the importance of management of hepatitis C in prisons. These authors proposed a framework grounded on “providing targeted HCV testing and standard-of-care hepatitis C medical management, treatment, and prevention programs” (p.762). The framework includes “identification of individuals with HVC in incarcerated populations, provide these individuals with substance abuse treatment, select HCV inmate-patients which may benefit from treatment, use treatment regimens that follow published guidelines; and improve collaboration between correctional and public health systems” (p. 767). However, the authors also argued that this framework of management might require additional cost to the facility.

The Impact

An epidemiological study on the prevalence of hepatitis B and C among prisoners of Al Hamra would provide substantiable data to the health authorities in Libya where there are none. This study will challenge the immediate health needs of illegal migrants detained in the center. These health needs does not only affects the incarcerated individual but the local community as well. This study will also be a basis for the development of a healthcare plan, policy, or program for correctional health care, ensuring that prisoners have access to appropriate medical services, preventing the spread of infection, consequently, protecting the local community.

Chow, Joesoef, Kent, Weinstock, & Fenton (2009) stated “The development of effective multifaceted control strategies to identify infection early upon entry into detection is necessary to prevent ongoing transmission in the community upon release and within detention” (p.1). These

authors argued that in order to objectify this intention, an effective protocol should be in place. Part of this protocol will include screening and cost-effective efforts to manage viral infections in correctional populations.

Utilizing an epidemiological approach to obtain data for policy and program development will efficiently manage any health risk and problems affecting a population. Identifying the prevalence of hepatitis B and C among prisoners in Al Hamra will guarantee that health care services should be delivered regardless of the one's state in the community. Even though these individuals are detained illegal migrants, the right to medical services should not be removed. Provision of proper health care to this population ensures the health and well being of the community-at-large.

Planning for Evaluation

Population health is crucial to the practice of every medical professional. Improving, maintaining, and ensuring the health of the population remains the primary responsibility of professionals in the healthcare industry. Promoting effective programs for specific health problems can continuously adhere this to. In order to determine if a program is acceptable, available, affordable, and accessible, a process of evaluation should be considered. Evaluation will determine the functionality of a program, as the Centers for Disease Control and Prevention (2013) stated "Evaluation has been defined as systematic investigation of the merit, worth, or significance of an object" (p.2).

Evaluation Plan

Friis & Sellers (2009) identified four stages of evaluation, formative evaluation, process evaluation, impact evaluation and outcome evaluation. Each of these stages has distinct processes but considered as a continuum. The CDC (1999) stated “Effective program evaluation is a systematic way to improve and account for public health actions by involving procedures that are useful, feasible, ethical, and accurate” (p. 4).

Determining the prevalence and incidence of hepatitis B and C virus among prisoners of Al Hamra will provide substantiable data and evidence for program development. The data gathered and the conclusion derived from these data can be used and reused by the community authorities and medical professionals in the city for planning on how to manage and control the spread of hepatitis virus coming from high-risk population such as Al Hamra prison. Those prisoners who will be tested positive for the virus can be identified, isolated and treated, thus, preventing the spread of the virus within the facility. By doing this, risk of the virus spreading within the community will be prevented.

Since majority of the prisoners are from countries, which have a high prevalence of hepatitis, B and C virus, mandatory screening is warranted. The Center for Health Improvement (CHI) (2005) indicated that some states in the US such as Indiana “conducts a mandatory screening for HCV and HIV” (p. 2). However, the agency pointed the need for an informed consent prior to the testing.

The initial target outcome would be the identification of individuals infected with hepatitis B and C virus. Blood will be obtained from the prisoners for viral screening which will done in the

medical laboratory of the city hospital. Nurses and medical technologists will do the collection of blood samples in the prison facility from the hospital. The whole process will be done in a period of one week every morning up to 1 PM since the time of their prayer starts at 3 PM. An estimated 20 to 30 prisoners will be tested per day. This whole project will be organized by the city hospital in collaboration with the city public health sector and the interior ministry.

Prevalence and incidence rate will be measured and infected individuals will be identified. This will include all new cases and individuals with past history of hepatitis B and C, whether undergoing treatment or had been treated. The result of the study will then be submitted to the authorities and public health sector of the city recommending immediate isolation and treatment of infected prisoners. The treatment and management of infected individuals will be provided by the city hospital. The ultimate goal of this project is to have a 100% identification and treatment of individuals with hepatitis B and C infection whether it is a previous or existing infection. Tracing of the infected individuals, even if they will be sent out of the facility, will be done by the cooperation of the interior ministry and city health office for the continuous treatment. This program will be part of the services provided by the correctional facility.

The epidemiological data gathered from Al Hamra prison would benefit the city of Gharyan by determining and controlling the infection in high-risk population. Since this program and evaluation will be the first and the only program that will be done in the prison, this initiative will provide insights to the problems that the prisoners are facing and the possible effect of these problems to the community. Programs or policies can be developed to address the problem and in this case this program will be part of the services of the correctional facility. These programs or policies will be evaluated based on the decreasing incidence of hepatitis B and C virus in the

facility. Another form of evaluation would be a continuous tracing of the identified infected individual even after release from the facility and integration to the community.

Conclusion

Libya is facing the darkest days of its history. With this comes an enormous challenge facing the country. Problems almost everywhere arise on a daily basis that health concerns becomes a secondary importance. The influx of illegal migrants from disturbed neighboring countries and lack of authority places every community in this place at risk for diseases. An epidemiological approach will help alleviate this problem by providing substantial data and evidences important for program development. This approach will guarantee that amidst the uncertainty happening, the health of the population is still properly addressed and secured.

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