619

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**Case Assignment**

**Executive Summary**

Epidemiology is defined as the study of disease occurrence. Taking into account the case study of people who are suffering from coccidioidomycosis, epidemiologist would use certain epidemiological approaches to understand the outbreak of disease. Surveillance methods would be used to collect relevant information regarding the occurrence of disease, taking into account the reference of any well-suited method. After that, adequate data system would be used to calculate information regarding facts and figures of the outbreak. The comparison of different determinants would be made to know the occurrence of disease. In the end, a comprehensive response plan of outbreak is also made that could help to know and calculate the information about the outbreak.

**Introduction**

Epidemiology is the study of the occurrence of disease in different groups of people, taking into account that an epidemiologist studies the cause of disease. The field of epidemiology deals with the study and analysis of distribution that deals with who, where and when aspects of a particular subject along with an exegetical analysis of the determinants and patterns of health and disease condition in a particular population (Weng, et al., 2019). Coccidioidomycosis is an epidemiological disease because it occurred in a particular population, the people residing in a village. Moreover, there is a sudden outbreak of coccidioidomycosis and there are a lot of people, provided belonging to the same village complaining about the symptoms of the disease. There is no prior understanding and assessment plan of the treatment of this disease so it is a problem of epidemiology (Weng, et al., 2019).

**Epidemiological approach**

The epidemiologist would be using ecological analysis to search about Coccidioidomycosis. This approach involves the assembling of **ecological models** that can support a reason regarding decision-making for the study of Coccidioidomycosis (Schmidt, et al.,2019). This model would facilitate understanding of ecosystem to determine if and how ecology has played a role in causing disease or health issue. It refers to the understanding of a particular issue by using a special approach that considers the feasibility of field, aspects of public health in management of the disease, modeling and analysis of the economic consequences. It is asserted that this model relies on a political and practical solution that is compatible in nature and directly related to the health issue (Schmidt, et al.,2019).

The **simulation model** aims at the provision of testbeds that are meant for contingency planning and the control of optimization (Schmidt, et al.,2019). This model is facilitated with the linkage of detailed expert knowledge that would be hosting landscape or population to control policies and the management of disease in targeted population and introduction of policies that can control the disease (Schmidt, et al.,2019). EcoEpi modeling studies facilitate the investigation of large sale epidemic spread that is based on the ecological fate of an individual (Schmidt, et al.,2019). It is asserted that epidemiologist would also consider the scenario-based evaluation of computer simulation in order to provide a mechanistic understanding of the fact such as habitat, behavior of dispersal, pattern of production and the constructor structure in the context of disease transmission. It would also include consideration of other factors such as human scale and infectivity along with the human intervention efforts. This model will help to understand risk assessment and impart effective decision-making strategies along with the evaluation of management options with a policy that could support the understanding of disease (Schmidt, et al.,2019).

**Surveillance Models**

Surveillance is defined as a close observation of the facts and figures that are associated with a particular disease or health issue. There are three major surveillance methods that can be used in epidemiology, named as passive surveillance, active surveillance, and syndromic surveillance. In order to study the epidemiology of Coccidioidomycosis, active surveillance and syndromic surveillance can be used.

**Active surveillance**

It is defined as a treatment plan that refers to a close observation of patient’s condition taking into account that a justified platform of treatment is not given until there are changes in recorded tests, that show that the tests are getting worst (Oosterhaven, et al., 2019, pp. 263-272). It is used to embed, delay or avoid the need of treatments such as surgeries and radiation therapies because these actions or treatment methodologies may be risky, having side effects or they might not be able to address the health concern of such a large population (Oosterhaven, et al., 2019, pp. 263-272). This treatment plan is added in case study because active surveillance is done by using certain test and exams on regular schedules. It is suggested in the treatment of Coccidioidomycosis because it is satisfying to the terms and conditions of ideal surveillance system such as time effective flexible, sensitive, it is acceptable by both health care providers and the public, side by side it is cost-effective.

**Syndromic Surveillance**

It is defined as the analysis of medical data that could be used to detect or anticipate the outbreak of a disease. In a simplified form, this surveillance method is used for the collection of ongoing and systematic data that is used for the critical analysis of real time indicators (Oosterhaven, et al., 2019, pp. 263-272). Syndromic Surveillances is used for the interpretation and application of the real-time indicators for coccidioidomycosis that would be used for analyzing the causative agents and propose effective control management (Oosterhaven, et al., 2019, pp. 263-272). It includes hospital admittance record or the number of people complaining or suffering from subject disease (Oosterhaven, et al., 2019, pp. 263-272). This method is facilitated by the information that is collected from internet recent reports and the information from the health department as well.

**Concept of descriptive and analytic epidemiology**

In order to develop an in-depth analysis of coccidioidomycosis, both descriptive and analytical epidemiology can be used.

**Descriptive epidemiology**

In order to understand coccidioidomycosis, descriptive epidemiology is applicable because it helps to describe the distribution of determinants of disease. As descriptive epidemiology ensures and facilitates the way of organizing and analyzing data to define and describe variations in the frequency of disease among the population, it will agree to the major relevant aspects in the case study such as geographical areas and the determinant such as time, person and place that may play a role in defining the spreading of disease (McCotter, et al., 2019). All these aspects and facts can then be used to generate a hypothesis, so as to carry out etiologic research.

**Analytical epidemiology**

Analytical epidemiology is another research guide that can be used to analyze this issue. Analytical epidemiology deals with the study and identification of patterns among the cases that are being reported and recorded in population with respect to time person and place (Oosterhaven, et al., 2019, pp. 263-272). As a result of these observations, epidemiologists would be able to develop a hypothesis about the causes of subject health pattern as well as the factors that can increase the risk of disease.

Moreover, epidemiologists usually prefer analytical epidemiology over descriptive epidemiology because it helps to generate a hypothesis, along with adequate testing because analytical epidemiology uses a comparison group (Oosterhaven, et al., 2019, pp. 263-272).

**Data systems to collect information**

The system that can be used in the identification of epidemiology of coccidioidomycosis is “computerized system”. It is asserted that computer is one of the valuable tools that can help in the analysis of surveillance system that is used to collect relevant data. Computerized data system can be used for quick assimilation, dissemination, as well as computation of the information related to the disease which is a far better and productive way (McCotter, et al., 2019). It would help to know the epidemics and overall observation of disease by using input data and formulate output data that could help to gain critical insight into the problem. One of the major advantage and successes of using this kind of data is, the computer will automatically define and locate the invalid input data by creating erroneous output. It would be a major aspect to adhere to validity. Computerized data system would also help to get relevant databases that could share more and in-depth analyzed information about the disease (McCotter, et al., 2019).

**Comparisons**

The computerized data system would facilitate comparison in terms of characteristics such as who when and where, in a relation to what (McCotter, et al., 2019). The context of who, when and where refers to the characterization in person. Who deals with the characterization of a person in terms of sex, occupation, and age of individual that is affected by the outcome (McCotter, et al., 2019). Place refers to the geography that includes work, hospitals and other residence places where the affected individual lives. The factor of time refers to events such as reporting, testing and the diagnosis of disease. A comparative analysis of these factors would be used for getting an insight into the disease by knowing difference and similarities (McCotter, et al., 2019).

**Secondary Surveillance Data**

There are numerous sources of secondary surveillance data that can be used in this epidemiological study. Such sources of data are, county health departments, clinics, vital statistics, school nurse records, city and country government departments that are directly or indirectly related to health, census, and NIH (McCotter, et al., 2019). The mentioned source of data is helpful because it gives an insight into the understanding of health issue. It is more cost-effective and, easy to understand. Secondary data of surveillance is one of the best tools to understand the validity and authenticity of data by comparison (McCotter, et al., 2019).

**Identification of Outbreak**

The term outbreak is used interchangeably with epidemic taking into account that both of them reflects the same underlying context and meaning. There are a number of ways under which this health issue can be defined and declared as an outbreak. One of the major steps is establishment of case definition and defining cases (Goodman, 2019, pp. 3-20). An epidemiologist has to conduct descriptive epidemiology in order to determine the personal characteristics of the cases who are found to be suffering from disease over time and the identification of difference in disease frequency-based location. After that, a hypothesis is to be developed in terms of the cause or source. This step is followed by the evaluation of hypothesis and the refining of hypothesis by conducting additional studies (Goodman, 2019, pp. 3-20). The epidemiologist would be implementing control and preventative measures, accompanied by the communication of findings. It would not be wrong to say that outbreak surveillance investigation is one of the major components of detection system and surveillance. Sensitive surveillance system can help to detect abnormal health events that are occurring at a place and guide the healthcare authorities such as the World Health Organization and local health departments to know the necessity of investigation and intervention (Goodman, 2019, pp. 3-20). As a result, the World Health Organization and other concerned departments provide aid to the foreign minister of health to support the investigation of epidemics.

**Steps to develop an outbreak response plan**

Following are the steps to be taken in order to develop an outbreak response plan

**Background**

This step would include the current situation of outbreak in the form of case details. It would include sources of information regarding the disease, date of onset, data in which disease is reported and the location of the onset of case. It would also include the age of patient, type of treatment given and the information regarding the impact and severity of disease (Goodman, 2019, pp. 3-20).

**Outbreak risk for further spread**

This is the second step of creating an outbreak response plan in which the risk of spreading disease is included. It includes population immunity of the surrounding areas and the infected areas. Information regarding vulnerable population is added such as either they are nomadic groups, refugees or access compromised groups. The population movement would be recorded along with routine immunization coverage and the risk of spreading of the disease to other beings (Goodman, 2019, pp. 3-20).

**Objectives of the outbreak response**

In this step, the objective of the outbreak response is quoted in terms of specific outcome to be achieved (Goodman, 2019, pp. 3-20).

**Duration of the outbreak response plan**

In this step, the duration of the outbreak response is mentioned, usually, the out-break response duration is six months to seven months (Goodman, 2019, pp. 3-20).

**Supplement immunization activities**

In this step, a complete record of the immunization activities is recorded, taking into account a grid that is used for collecting relevant information. A sample is attached,

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Round** | **NID or SNID** | **Type of vaccine** | **Date vaccine ordered**  | **Expected delivery date** | **Target age group** | **Target population** | **Geographic area** | **SIA strategy (house to house, fixed post, transit point, mobile vaccination)** |
| 1 |   |   |   |   |   |   |   |   |
| 2 |   |   |   |   |   |   |   |   |
| 3 |   |   |   |   |   |   |   |   |
| 4 |   |   |   |   |   |   |   |   |
| 5 |   |   |   |   |   |   |   |   |
| etc. |   |   |   |   |   |   |   |   |

**Micro Plan**

The micro-planning process includes the summary of human resources for major actions such as supervision, vaccination, monitoring, logistics, timelines, supplies, and transportation. It is based on the needs of major micro plan goals from the sub-district or district (Goodman, 2019, pp. 3-20).

**Advocacy, communication and social mobilization**

In this step, social mobilization, communicating tools and strategies along with advocacy and media activities are included. It would not be wrong to say that it aims at the communication of prevention tools and create awareness in general public (Goodman, 2019, pp. 3-20).

**Coordination and participation**

In this step, activities are recorded in order to overcome the outbreak. It is important to note that the status of activities is counted at a national level along with the coordination of partners and other NGOs along with the coordination of cross borders and other sources with timelines (Goodman, 2019, pp. 3-20).

**AFP Surveillance**

In this step, the surveillance system is described that is already in action in a particular area, taking into account number and priorities of sites that are providing information regarding the reporting of surveillance information (Goodman, 2019, pp. 3-20). It also includes the description of activities that are meant for enhancing AFP Surveillance with timelines. Other information sources are Pending results, maps, contact sampling and the status of core indicators (Goodman, 2019, pp. 3-20).

**Outbreak response Assessment**

It includes the analysis of initial OBRA, along with a report on the status of implementation of sources and making recommendations for the future procedures that could prove effective (Goodman, 2019, pp. 3-20).

**Human Resources**

Human Resources include the description of already available human resources that can help to deal with the outbreak (Goodman, 2019, pp. 3-20). A detail of this step is found in the table below

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Expertise** | **International or national** | **Number** | **Contract start date** | **Contract end date** | **Estimated cost /month** | **Comments** |
| 1 |   |   |   |   |   |   |   |
| 2 |   |   |   |   |   |   |   |
| 3 |   |   |   |   |   |   |   |
| 4 |   |   |   |   |   |   |   |
| 5 |   |   |   |   |   |   |   |

**Budget**

This step includes the analysis and description of estimated budget that is required to collect information and proceed with the planned actions (Goodman, 2019, pp. 3-20). A summary of the budget plan is as follows

|  |
| --- |
| **Budget Summary** |
|  |  |  |
|  | **Outbreak Response Surge Budget** | **Cost (USD)** |
| 1 | HR |  |
| 2 | Travel and Transportation |  |
| 3 | Establishment of Polio Outbreak Cell  |  |
| 4 | Training and Meetings |  |
| 6 | Surveillance Strengthening Costs |  |
| 7 | Other Operational Costs |  |
|  | **Total**  | **0** |
|  |  |  |
|  | **SIA Budget** |  |
| 1 | OPV / Vit A / finger markers  |  |
| 2 | Human resources and incentives |  |
| 3 | Training and Meetings |  |
| 4 | Supplies and Equipment |  |
| 5 | Transportation |  |
| 6 | Social mobilization and communication |  |
| 7 | Other Operational Costs |  |
|  | **Total** | **0** |
|  |  |  |
|  | Total Outbreak Response Surge Budget | 0 |
|  | Total SIA Budget | 0 |
|  | **Grand Total** | **0** |

References

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