

Research Proposal

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Dated

Submitted to

Research Proposal

Introduction

This research proposal involves the information about the data sources, methods used, research tools, sample size, and data size. The defibrillation protocols in public places can improve the survival after out-of-hospital cardiac arrest (OHCA). The AEDs drones have been an emerging technology that can manage and help the OHCA by improving the time to first AED connection. The drone networks must consider the optimization and can reduce the arrival time. This research proposal has been linked to establish the viability of using aerial devices to delivery AED's in response to emergency services calls received from the public resulting from OHCA. The quantitate and qualitative will be used to validate the results of the studies. This research proposal has been linked with the goals and objectives of determining the feasibility of using drone to cope with public emergency calls caused by traffic accidents (Anderson et al., 2012).

The use of an automated external defibrillator (AED) can significantly increase the management of the hospital operations. The drones can fly at high speeds and may carry equipment to the location of OHCA. The purpose of this study is to study the feasibility of drone systems to access the impact of survival rates with favourable neurological outcomes (Boutilier et al., 2017). The response time between rural and urban areas have been quite different while the lack of access to emergency medical services is a major obstacle to the treatment of emergency medical emergencies such as cardiac arrest. This study explores the potential of drone technology to provide emergency medical services with respect to the series of new regulatory, technical, and operational challenges (World Health Organisation, 2016).

Claesson et al., (2017) explained that the medical emergencies account for more than one-third of the global death toll such as cardiac arrest, road traffic accidents and maternity health issues. Despite these evidences, the emergency medical services have been a common problem. Hence, this research has proposed the fact that the drones may become the revolutionary devices that can improve the outcome of OHCA in residential and/or other locations by improving the time to first AED connection. In recent years, dramatic developments of drones have made the significant progress. Drones may become disruptive innovations in the consumer market. This research has proposed drones to provide the emergency services to medical care. The use of drones may trigger the new operational issues which may lead to an increasing number of management and research.

Research Philosophy and Selection

This focuses on systems that must fundamentally solve problems, this involves the realism, positivism and interpretivism. The root of positivism rests first on empiricism, which works with observable facts. The basic philosophy of positivism is that all factual knowledge is based on positive information obtained from observable experiences. Every idea that goes beyond verifiable facts is metaphysical hence the analytic statements can be considered real. Interpretation has been the kind of understanding in which the reality is not objective and external, but they are constructed by society and have the meaning endowed by human beings. This view is often referred to as the qualitative approach and is based on induction (Green, and Thorogood, 2009).

Silverman (2010) define realism based on the belief that there is an autonomous reality in human minds and beliefs and that it can consciously or unconsciously influence their perceptions. The management and economics studies are often a mixture of positivism and hermeneutics, and may reflect realist positions. The research questions will try to determine the approaches of implementation of AED equipment (drone) to improve OHCA performance in residential and/or other areas by improving the time. For positivism, the process of deduction involves the formation of conceptual and theoretical positions before empirical observations are used to prove their views. Interpretation has been the reflection of recent and past experiences while the realism allows the use of deductive and inductive processes. The optimized drone networks can significantly reduce the delivery time to OHCA (Out Of Hospital Cardiac Arrest) events. These drones have the potential to become innovative devices in emergency care for patients with sudden cardiac arrest. Hence, the research is needed to understand the implementation, issues and determine the cost-effectiveness of such systems. The research philosophy of this study is explanatory; therefore this will choose an induction method along with the use of Qualitative method.

Research design

For the purpose of this study, the questionnaires will be developed by the researchers themselves along with the informal interviews and observations. The research method used in this study is an inductive research method. Cresswell (1998) defines the qualitative research as a traditional research process which has been based on different methodological studies of social or human problems. In this study, the data comes from the doctors or nurses who have witnessed the use of drone in terms of the OHCA (Out Of Hospital Cardiac Arrest) events. The primary source of data is the information provided by the respondent through the

researcher's questionnaire. All the data will be collected, validated, analyzed and explained in the study. The use of questionnaires has been the the main tool while the personal interviews are conducted during data collection. However, there are no formal and accepted guidelines for informal interviews. In practice, many researchers follow the following steps when planning and implementing unstructured interviews. There could be various difficulties in obtaining the data particularly if the researchers are "strangers" in the environment.

Claesson et.al., (2017) stated that he defibrillation protocols indicate that survival can be significantly improved by outdoor cardiac arrest (OHCA), and patients who are in health facilities may receive most of the survival benefits. Although the use of AEDs drones in some public facilities is cost-effective but the static AEDs in private facilities are not very cost-effective. In addition, due to past access and availability issues, the usage of static AEDs is very low hence the improved access to and shorter defibrillation times are important for improving the survival of OHCA. Therefore, a new method is needed to significantly increase the survival rate of OHCA particularly in rural and private environments. Hence, the negotiation techniques and tactics are necessary in this case. The researchers should also consider the political, legal, and bureaucratic barriers that may arise when visiting the environment. The main purpose of unstructured interviews is to understand the meaning of human experience from the perspective of the respondent. Therefore, unstructured interviews are subject to the cultural practices of the research environment. This means that the researchers understand the language of the interviewees and their significance in the specific cultural context of the research environment (Ritchie and Lewis, 2003).

Harvey and Land (2017) found that the unstructured interviews are two-way conversations and the quality of the conversation is greatly influenced by the way visitors present themselves. The interviewer's self-characterization depends on his environment, but in any case, the interviewer is an "apprentice" in the conversation and must understand the interviewee's experience from their perspective. More importantly, the researcher must have sufficient ability to guide and interpret the unknown language and culture in the environment. For the success of unstructured interviews, it is important to build trust and have the relationships. Hence, the respondents will be able to share their experience with the interviewer, especially if the subject of the conversation is confidential. If the researcher has been trying to cultivate this relationship, then the interviewer should be careful: make the participants' lives easier so that they can no longer achieve their research goals. But in unstructured interviews, notes may interrupt the natural flow of conversation hence it is best to record the interview in the digital recorders (Moule, Aveyard and Goodman, 2017).

Sampling and recruitment

Regardless of the research questions and goals, the researcher needs to collect the answers and responses. According to Robson (2011), there have been various sampling methods for a wide range of methods that allow the researchers to minimize the amount of data that researchers need to collect, use only subsets of data for consideration, not all possible cases or two probability samples. The Probability samples are characterized by the fact that each element in a known sample has a zero probability of selection in the sample, but the fact that the sample has no probability is opposite to the case where the sample probability cannot be estimated. This study will be based on non-probability sampling because the sample size is not important. The size of the interview is 4, and the questionnaire is 100. The interview selection in the sample is based on managers who have different positions in the organization and their ability to contribute to the subject matter of the survey.

Robson (2011), emphasize that the main objective of the sample survey is to obtain accurate and reliable information about the drones for cardiac operations under investigation with minimal cost, time, and effort. If researchers use sampling methods, the basic assumption is that the sample selected from the population is the best representative of the survey population. Therefore, good samples are those that accurately represent the population. Hence, the non-probability sampling techniques produce the effective samples. In terms of measurement, the sample must be valid. The validity of the sample depends on its accuracy which has been defined as the degree of distortion of the sample and they must accurately represent the population. A good sample should be of sufficient size and reliability. The size of the sample must be such that the conclusions drawn from the sample are correct at a certain confidence level to represent the entire population of interest(Parahoo, 2006).From the above analysis of sampling techniques, it can be seen that there is no difficulty and rough rules in choosing the appropriate sampling method. However, it is true that improper selection of sample units or sample size may undermine the ability of researchers to achieve desired results. Therefore, researchers must be very careful when selecting sampling plans, sample sizes, and selecting the appropriate sampling techniques(Boutilier et.al., 2017).

Data collection

The information collected in this research will be based on the secondary and primary data collection methods. The main sources of data come from the answers of doctors and

nurses while the literature review will also be considered. Secondary sources will be obtained from books, unpublished materials, brochures, and other high-quality assurance articles and e-learning of higher education institutions. The primary data collection tools used in this study are questionnaires based on the objectives of the implementation of an aerial (drone) AED device. The interviews will be conducted to improve the instrument and provide information on the effectiveness of the questionnaire. The questionnaire must be distributed and collected in person as soon as possible after the respondent receives the questionnaire to obtain a high recovery rate. Interviews are a widely used tool that can capture people's experiences, opinions, attitudes and feelings. According to the degree of interviews, these can be divided into three categories: semi-structured interviews, structured interviews, and unstructured interviews (Parahoo, 2006).

Pope and May (2006) found that the structured interview is the discussion that contains a set of predefined questions and questions that are presented in the same order as all respondents. When preparing the questionnaire design, researchers should conduct informal interviews with several key interviewees in order to create a broader perspective on research tools. The researcher received a transfer letter requesting permission from the selected university. Based on the information collected, the researcher can formulate a draft questionnaire. However, when validating the questionnaire, the questionnaire must go through the necessary verification process to ensure that the collected data is useful for research. For this reason, the project should be presented to people with experience in the writing of papers and invited them to comment on the format, content, and other aspects of the questionnaire. Harvey and Land (2017) found that the questionnaire should be submitted for review by the researchers' consultants. The researcher must prepare questionnaires so that they can manage themselves so that respondents can respond with less help or support. According to Robson (2011), the questionnaires will be sent to the respondents personally when appropriate so as not to interfere with the normal working process. The questionnaires collected by the researcher must be correctly determined or coded by the university and respondents to facilitate the process (Whittaker and Williamson, 2017).

Data Analysis

The analysis of the data covers the basic elements of research design. This will be an activity-based and time-based plan based on research questions. It will guide the types and sources of information collected. This will be a framework for specifying the relationship between research variables. Therefore, the design describes the procedures for each research

activity. Hence, the qualitative research methods will be used after collecting data in order to analyze the process and consider and explain qualitative analysis. The usual statistical tools are nominal measures of frequency and percentage and they may require a lot of time, funds and limitations. Hence, the thematic content analysis will be used in order to determine the viability of using aerial devices to delivery AED's in response to emergency services calls received from the public resulting from OHCA (Out Of Hospital Cardiac Arrest). In thematic analysis, the data is analyzed by topic while the collection and analysis of data is done at the same time. Hence, the backgrounds and knowledge on the subject can help explain upcoming issues. Robson (2011), emphasize that this aims to understand the data rather than know the data. The main goal is to create key topics that describe the nature of the study and provide an important structure hence it takes time. This depends on the complexity of the text and the experience of researchers (Boutilier et.al., 2017).

User participation

Morgan, and Seetharaman (2015) argued that Cardiac arrest has been the most common manifestations of cardiovascular disease and one of the leading causes of death. The data on the relationship between out-of-hospital cardiac arrest (OHCA) and implementation of an aerial (drone) AED is limited. This study explores how the viability of using aerial devices to delivery AED's in response to emergency services affect the appearance of OHCA. One aspect that needs to be considered first is accessibility. According to Robson (2011), accessibility has been considered as the first step in the investigation. It is necessary to influence the collected data. Hence, the access to research is not only related to ICT resources or official historical data, but also related to other types of resources, such as interviewing people hence these have been the issues for the researchers to overcome these obstacles. Park et.al., (2017) argued that some companies and researchers have developed the drone technology that can transport AEDs to cardiac arrest sites. Google has successfully obtained patents for the delivery of medical supply drones (including AEDs). The AED delivery has been the application that is proposed for drones for the betterment of the emergency services calls received from the public resulting from OHCA (Out Of Hospital Cardiac Arrest). Despite the technical challenges that need to be overcome, the drones may potentially revolutionize the care for patients with sudden cardiac arrest particularly those who are in urgent need for emergency care (Tierney et.al., 2018).

Recently, Levine et.al., (2007) conducted the test flights with AED drones and found that the average time for drones on site was 16 minutes. Due to the enormous potential of

drones to provide life-saving approaches, it had been evident that this is just one example of the potential of UAV technology improve the outcome of OHCA in residential and/or other locations by improving the time to first AED connection. The lack of access to emergency medical services has been considered as the major obstacle to the health. Although drones cannot carry trained professionals but they can provide the kits along with the cameras and microphones in drones. Road traffic accidents have been the basic phase of the medical emergency that causes more than 1 million deaths each year. Hence, more than 60% of patients died before arriving at the hospital and this it has been possible for drones to provide the kits on site.

Ethical issues

As part of this study, the researcher has to prepare a formal notice for the approval of the research from the Ethics Committee and the plagiarism cannot be considered in this regard. The researcher will be ready to send a letter to the dean of the university and faculties in the hospitals to use the questionnaire. This instrument will serve as the basis for the preparation of the study to determine the impact of survival rates with favourable neurological outcomes. Most importantly, the questionnaires and their answers will remain confidential for the betterment of the results. The use of validity and reliability in quantitative studies is very common. Patton (2001) believes that reliability and effectiveness have been the factors that must be taken into account in any study in conducting research. This helps to analyse the results and evaluate the quality of research. The effectiveness is the extent to which information collected by researchers truly reflects the phenomenon of research. The effectiveness of leisure and tourism research is considered a daunting task.

Robson (2011) explained this phenomenon because empirical research focuses on people's behaviors and attitudes. In order to obtain this information, researchers mainly rely on their own reports as the answer to the questionnaire. And other forms of interview situations do not always lead to serious and thoughtful answers. The respondents tend to exaggerate or underestimate their answers to certain questions. On the other hand, the questionnaire must be completed in the short period of time. This can be considered by providing the incentives, choosing the best time, and sending more follow-up actions by extending the entire investigation period hence this can increase the response rates and reduce the issues and this can help ensure the validity of this survey. Robson (2011) interprets this as a person in a different and changing social context. Therefore, this study may be useful for

other related studies on the implementation of an aerial (drone) AED device by improving the time to first AED connection (Claesson et.al., 2016).

Dissemination and Limitations

Although the qualitative research could be a successful research strategy, it is neither necessary nor sufficient for high-quality research. The collection, design, and analysis of data from different methodological styles can often only be carried out in the context of large research projects. The researcher wanted to combine various methods but may lack the time and money to complete each aspect of the study effectively. He may encounter the obstacles that may cause the issues in this strategy. In addition, the introduction of different types of data in this result presents its own challenges. For example, time constraints may prevent the complete presentation of qualitative results.

Harvey and Land(2017) found that it may be difficult to establish a stylistic and substantial balance between different types of research. Sometimes the problem of different types of data could be slightly diverse for example the Quantitative data and Qualitative data have been the two different type of approaches. Hence, the qualitative data will bring their own challenges, so at least as effective techniques and insights as single method studies are required. The inclusion of non-cardiac cases may result in a change in the outcome of more cases. However, the data should be based on the maximum drone time of some minutes and the delay time may be shorter than the time indicated. The data from a limited number of AED test flights is the subjective experience of the researchers and is not based on quantitative data. The literature review and thematic analysis about the drones may give the different conditions and may change the results (Boutilier et.al.,2017).

Reflections on the proposed study

I have found that the ERC recommends that AEDs be placed in cardiac arrest and the AHA guidelines state that AEDs should be placed in areas of high incidence of cardiac arrest in order to have a reasonable AED probability within 5 years. I found a study in which the information systems had been marked on the Copenhagen digital map and estimated that the ERC's 19.5% recommendation for OCHA was adequate and required the drones. I think that if we use the advice, this coverage will increase to 60% of the management. This study explores the viability of using aerial devices to delivery AED's in response to emergency services calls received from the public resulting from OHCA (Out Of Hospital Cardiac Arrest).

I have found that the interviews and surveys can provide the appropriate location of drones which may be suitable for AEDs in large cities. It may be safe and feasible to use drones in rural areas to provide AEDs at OHCA hence a suitable location can be designed for the drone system. To be viable, UAVs need to be implemented in the context of existing technical capabilities, case law, and existing search. We believe that the safety features of aviation authorities, navigation plans and delayed approval of applications are major obstacles to the effectiveness of such systems.

However, another technological device must adapt to the chain of survival. However, existing regulations limit the flight of drones to provide AEDs that are not available to pilots. The technological innovations and other studies on automatic drone alarms need to provide such equipment safely. In addition to rescue services, UAV technology has an important role in search and rescue operations and operations. The drones equipped with infrared or high resolution cameras allow the operators to search large areas in real time. I have evaluated that the drones can also be used as part of a coordinated disaster response to provide remote and/or unreachable areas.

I have determined that the drones can be used to reach patients in areas that may be considered too dangerous for first responders. Some countries have tested and implemented drones for search and rescue purposes. Many drone companies have been developing technologies specifically designed for search and rescue applications. This has included the ability of drones to fly long distances or autonomously coordinate the fleet searches for large areas.

Conclusion

This research proposal describes the research methods and data analysis methods which will be used to carry out this research. This contains methods for collecting primary and secondary data. Qualitative research methods will be used to explain the data collected by the respondents which will be based on the questionnaire for the effective results. According to the researchers, the use of drones to deliver the medical services may reduce the delay between first attack and cardiac arrest. The use of drones may increase the chance of survival of the patients and gives them the best chance.

According to the report of the World Health Organisation (2016), more than 300,000 sudden cardiac arrests have been occurred in areas other than hospitals in the United States. The drones indicate that a person has a survival probability of about 1 to 10. This study clearly shows that drones will be able to provide defibrillators before ambulances

arrive particularly in remote countries. The drones can provide defibrillators for patients within one minute and may increase the patient's chance of survival from 8% to 80%. This has been particularly effective for emergencies such as drowning, heart failure, trauma and breathing problems, which have become possible because lifesaving technologies such as defibrillators are so small that they can transport drones. The research teams can use the data to assess whether drones benefit the medical services. This proposal shows that if the low-cost systems are used then the people may have the potential to survive even at high interest rates. The automated external defibrillator provided by a drone can save lives and restore the heart, which can have a major impact. The equipped drones can significantly increase the out-of-hospital survival rate of cardiac arrest which could be beneficial for the patients of all the ages.

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