

Opole, 4.04.2022

dr hab. n. med. Tomasz Czarnik, prof. UO
Department of Anesthesiology and Intensive Care
Institute of Medical Sciences
University of Opole

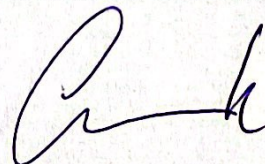
The review of Doctoral Dissertation
Student Name: Mohammad Sabbah

„Business continuity during disasters in the medical health in Israel”

PhD Supervisor: Prof. Jacek Wysocki
PhD Co-supervisor: Dr. Dariusz Walkowiak

The review was done based on letter KKN/116/2021 (31.01.2022) from Prof. dr hab. Jaroslaw Walkowiak, The Chancellor of The College of Health Sciences at the Poznan University of Medical Sciences

Business Continuity is defined as the capability of a business entity to continue with its essential functions following a disruptive incident. Originally, this term pertained solely to very large enterprises, but is actually highly relevant for organizations of any size. The source of disruption may be a natural disaster, rapid weather change, military conflict, terrorist attack, cyberattack, or pandemic. Business Continuity planning establishes risk management procedures that aim to prevent interruptions to the essential activity, and re-establish the organization's near normal level of activity as quickly as possible after a critical incident.



There are three key components of a Business Continuity plan, namely resilience (which can be increased by designing critical functions and infrastructures), rapid recovery to restore functionality, and contingency plans for different scenarios.


Hospitals can be regarded as business organizations, which are prone to all kinds of threats. Hospitals need proper Business Continuity plans to maintain or even increase activity in the case of critical events in order to provide services for normal or significantly increased numbers of patients. A Business Continuity plan in any healthcare system is one of the key components of national security.

Since its formation in 1948, the State of Israel remains at constant risk of military conflicts. Moreover, the country is located in a highly seismic area and the risk of infrastructure damage caused by earthquakes is significant. In addition, Israeli citizens face the significant risk of terrorist attacks and incoming rocket fire from hostile territories. In Israel there is thus a significant risk of vital infrastructure damage, including hospitals, along with a serious security threat. Consequently, efficiency and resistance to various disruptions of the healthcare system should be of paramount interest to those the Israeli government. One of the fundamentals of the stability of the healthcare system in Israel's daily reality is to have an efficient Business Continuity plan for every hospital.

Mr. Mohammad Sabbah decided to examine the degree of preparedness of the medical health system in Israel using a Business Continuity approach. Sabbah focused on the readiness of Israeli hospitals to withstand any kind of emergency including military conflicts, natural disasters, terrorist attacks, and pandemics. His doctoral dissertation was supervised by Professor Jacek Wysocki and Doctor Dariusz Walkowiak.

The dissertation comprises 293 pages, with the typical chapters, namely the Introduction, Theoretical Background, Methodology, Findings, Discussion, Conclusions, Bibliography, and Appendices. It contains 41 tables, 18 figures and begins with acknowledgments, a clear table of contents, list of tables, list of figures, and an abstract.

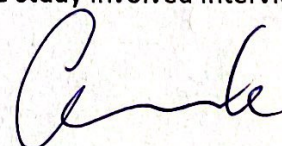
In the Introduction, Sabbah presents the specific context of the dissertation, aims of the study in general, and what has been published on this topic to date. The significant part of the introduction comprises a detailed description of the specificity of the healthcare system in Israel, which is essential for understanding the results of the study.



The Theoretical Background section starts with the presentation of the process of building a plan for disaster preparedness. A diagram clearly displays the four phases, namely mitigation, preparedness, response, and recovery. Sabbah also refers to other healthcare systems worldwide. The next part of this section refers strictly to the concept of Business Continuity and contains the following key elements: the definition, the theoretical basis of the development of a Business Continuity plan according to the official World Health Organization (WHO) document, and the specificity of Business Continuity in medical and healthcare services. The last part of this section depicts the research goals, questions, and hypotheses. The research goals are as follows: to examine the issue of Business Continuity in hospitals in Israel, to examine the level of preparedness of the hospital staff to cope with different kinds of critical situations, and finally to assess the preparedness of Israeli hospitals for critical events and disruptions. Sabbah formulates five research hypotheses:

1. All hospitals have a set plan for coping with emergency cases, according to emergency directors
2. There are discrepancies between the degree of preparedness in different hospitals in coping with emergencies as the result of:
 - a. Hospital size (large hospitals are better prepared for emergencies)
 - b. Previous experience (hospitals previously exposed to critical events are more prepared)
3. (a and b)
 - a. Hospital staff (nurses and physicians) will report that they are less prepared for critical events than what is set out in the hospital's general preparedness plan (according to reports of emergency directors)
 - b. There is a positive correlation between the seniority of the staff and the degree of preparedness for emergencies (higher seniority is associated with better preparedness)
4. There is a difference between the level of preparedness of physicians and nurses (physicians are better prepared than nurses)
5. There is a difference between the level of preparedness of emergency departments and other hospital departments (emergency departments are better prepared)

Chapter 3 describes the methodology. Sabbah applies a mixed method approach. In the quantitative phase, questionnaires developed by Sabbah, were submitted to nurses, physicians, and WHO questionnaires (related to Business Continuity doctrine) to emergency directors of ten hospitals in Israel. The qualitative phase of the study involved interviews with



emergency directors of ten hospitals in order to summarize, comment, and formulate final conclusions. The complex demographic data, the research tools (questionnaires), and statistical analysis plan is clearly presented in this chapter.

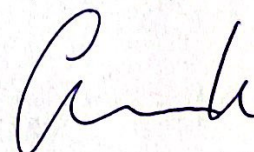
The Findings section presents detailed results of the research, comments, statistics, and a general summary of the results. A major observation was that there is a good level of preparedness in the Israeli hospitals, and hospitals organize drills and simulations. However, there was no alternative plan in most of the ten participating hospitals in the case of total damage, and the medical staff had no formal training on the subject of Business Continuity.

Hypothesis 1 was not confirmed. Not all hospitals have a plan for emergency events, as measured by their overall preparedness to cope with emergencies. The degree of readiness is variable and partly related to the size of the hospitals. The ten participating hospitals have not completed all recommended actions needed. According to emergency directors and hospital staff, the level of preparedness of large and small hospitals was similar.

Hypothesis 2a was not supported. Emergency directors reported that hospitals had a similar level of preparedness for critical events, regardless of their previous experience. Likewise, hospital staff did not confirm Hypothesis 2b. The overall difference between hospitals with and without previous experience was not significant. The level of preparedness of Business Continuity plans was reported by emergency directors to be close to completion, which was not confirmed by hospital staff. These findings confirmed Hypothesis 3a. Senior staff members (nurses and physicians) reported a higher degree of preparedness. Therefore, Hypothesis 3b was supported: higher seniority was associated with a better level of preparedness for critical events.

Regarding Hypothesis 4, the difference between nurses and physicians regarding the Business Continuity was not confirmed (the hypothesis 4 was refuted). Likewise, Hypothesis 5 was not supported. On average, there was no significant difference between emergency departments and other hospital departments in terms of the level of preparedness for any critical situations (Business Continuity).

According to the qualitative content analysis, all emergency directors accepted the results and expressed a willingness to make changes in the near future based on the presented findings. However, a lack of satisfactory knowledge on the topic was revealed. There was a significant difference in the level of preparedness between large and small hospitals. Large hospitals had more staff, and greater budgets to cope with any kind of emergency. Small hospitals had limited



budgets, workforce, protocols, and resources. Emergency directors indicated the urgent need for more simulation exercises involving hospital staff, and for new emergency protocols.

The Discussion starts with an overview of critical events and natural disasters around the world, and how healthcare systems of different countries managed to neutralize their adverse effects. Sabbah then discusses in detail the results of the dissertation. At the end, recommendations and suggestions are formulated. Sabbah's most important conclusion is that to maintain the desired level of functionality of hospitals, new Business Continuity plans must be developed, with the revision of all existing protocols.

Interestingly, Sabbah offers his own, new model of Business Continuity named 'The chain survivor model'. The foundation of this new model is as follows: management, workforce, maintaining critical systems, supplies, and functionality.

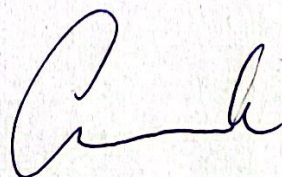
Chapter 6 comprises the main conclusions and a brief summary.

Taking into account the whole content of the dissertation, Mr Mohammad Sabbah exhibits significant knowledge of Business Continuity. The choice of bibliography is wide and thorough. The dissertation was properly planned and executed using studious scientific methods. The results were covered using proper statistical methods and presented cohesively. The conclusions formulated in the dissertation are justified, arise from the results, and significantly broaden our knowledge on the specificity of the practice of Business Continuity in Israel. Moreover, the dissertation fulfils the criteria of novelty.

The weaknesses of the dissertation are as follows:

1. Only 10 out of 23 Israeli hospitals took part in the study, so the generalizability of the results is questionable (the results should be treated as preliminary).
2. Throughout the dissertation, there are several unnecessary inclusions regarding the literature findings and the specificity of different healthcare systems – these should be reserved for the Introduction and Discussion.
3. The results of the study are reported again in the Discussion section, which is unnecessary.
4. Generally, the whole text should be shorter, which would make it more readable.
5. The English needs copyediting, there are many typos.

The strengths of the dissertation are as follows:



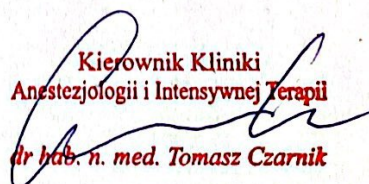
1. The study fulfils the criteria of novelty in Israel.
2. The results enable a direct comparison between the healthcare system in Israel with other healthcare systems regarding Business Continuity.
3. The conclusions regarding the Business Continuity doctrine in Israel are straightforward and clearly formulated.
4. The author offers his own, new and useful model of Business Continuity.
5. The results can be treated as a basis for future comprehensive study encompassing all hospitals in Israel.

My questions to Mr Mohammad Sabbah are as follows:

1. Considering the experience acquired during the COVID-19 pandemic, what elements of the Israeli healthcare system would he like to change if any?
2. Did the Israeli healthcare system manage to cope with the COVID-19 pandemic?
3. What elements of Business Continuity from other countries could be implemented in Israel?
4. Can the Chain Survivor Model be easily adopted in other healthcare systems worldwide?

In my opinion the dissertation "Business Continuity during disasters in the medical health in Israel" authored by Mr Mohammad Sabbah fulfils formal dissertation requirements defined by article 14 of legal act regarding scientific degrees enacted on 14 April 2003 (Dz.U. nr 65/90 poz. 386). Therefore, it is my great pleasure to introduce to The High Council of The College of Health Sciences at the Poznan University of Medical Sciences my recommendation to allow Mr Mohammad Sabbah to continue further proceedings of the dissertation process.

dr hab. n. med. Tomasz Czarnik, prof. UO


Kierownik Kliniki
Anestezjologii i Intensywnej Terapii
dr hab. n. med. Tomasz Czarnik