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ScienceDirect

Procedia - Social and Behavioral Sciences 229 (2016) 22 – 32

Procedia
Social and Behavioral Sciences

5th International Conference on Leadership, Technology, Innovation and Business Management

A Retrospective Study of Six Sigma Methodology to Reduce Inoperability among Lung Cancer Patients

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Abstract

In this study, the authors aim to examine the root causes of the delays in reaching a definitive diagnosis of lung cancer in time and investigate to reduce it by Six Sigma Methodology. The SIPOC table, Fishbone diagram and FMEA table are generated. Thirteen types of causes are identified. They cause patients with lung disease to enter the Stage IIIB and Stage IV. It is concluded that absence of patient's check-up habit and patient's anxiety and worry that cause late admission to doctor are the crucial causes of delays that may lead to inoperability.

Peer-review under responsibility of the International Conference on Leadership, Technology, Innovation and Business Management

Keywords: Lung cancer, Inoperability, Delays, Root causes, Six Sigma

1. Introduction

Lung cancer is a major global health problem and a leading cause of death in both men and women. After prostate cancer, it is the second most common fatal type of cancer in men and the fourth most common fatal type of cancer after breast, colorectal and uterus cancers in women (Ferlay et al., 2013).

In the last few decades, there has been a large increase in the number of cases of lung cancer in developing countries. The estimated numbers of lung cancer cases worldwide has increased by 51% since 1985 (Charles et al.,

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Peer-review under responsibility of the International Conference on Leadership, Technology, Innovation and Business Management
doi:10.1016/j.sbspro.2016.07.110

2011). Globally, there are an estimated 1.4 million deaths each year which represents 18.4% of cancer deaths (Ferlay et al., 2013).

The American Cancer Society's estimates for lung cancer in the United States for 2015 are about 221,200 new cases of lung cancer (115,610 in men and 105,590 in women); and 158,040 deaths from lung cancer (86,380 in men and 71,660 among women) (American Cancer Society, 2014).

Statistics that compare aspects of quality of care for people with lung cancer are limited in Turkey. While lung cancer is the most common fatal type of cancer in Turkish men with an incidence of 60.57±0.61/100.000 people, it is the sixth most common cancer in Turkish women after breast, thyroid, colorectal, uterus and stomach cancers (Turkish Ministry of Health, 2015). It is observed in Turkey that 59.4% of lung cancer cases have made distant metastasis (Turkish Ministry of Health, 2015).

Diagnosis of stage for any type of cancer is essential for treatment recommendations. Once an accurate objective staging process has been established; then, treatment recommendations can be made. Surgery has been shown to be the most effective form of treatment for lung cancer. However, IIIB and IV are the stages of inoperability for lung cancer patients. In the United States, the observed survival rates for Stage IIIB and Stage IV are 5% and 1%, respectively (The National Cancer Institute, 2015). Since these cancers have spread to nearby and/or distant sites, they are very hard to cure and surgery is not an option for treatment. Thus, timely diagnosis is crucial for curing the patients at risk. Reducing the causes of delays is of utmost importance for saving patients' lives.

Cancer survival is crucial but delayed diagnosis can also have a negative effect on quality of life, with the use of more toxic treatments when cancer is diagnosed at Stage IIIB or Stage IV, and an increase in psychological distress (Risberg et al., 1995).

The majority of lung cancers (>80%) are diagnosed and treated at an advanced stage, i.e. stage IIIB and IV, by when they are beyond the scope of curative resection (Chandra et al., 2009; Mountain, 1997). This may, in part, be due to a long delay between the onset of symptoms and establishment of a diagnosis and finally, initiation of treatment.

National Patient Safety Agency (2010) stated that delays might result from three sources: patient, healthcare practitioner or provider and system. They focused on patient delay in the diagnostic journey. They defined patient delay as the length of time an individual will be aware of symptoms before seeking healthcare practitioner advice, and highlighted the risk factors as symptom recognition and interpretation, psychological factors and socio-demographic/ethnicity factors.

Dependent on several modifiable and non-modifiable causes, delay is variable and ranges from three to six months in Western countries (Billing and Wells, 1996). The causes of delay include lack of patient awareness of the disease, lack of accessibility to health care, and aggressiveness of the diagnostic approach (Chandra et al., 2009). In addition, these causes lead to a situation in which curable disease becomes incurable. Since many of these causes are modifiable, it was crucial to quantify the delay from symptom onset to treatment, as this had definite implications on patient survival (Chandra et al., 2009).