

## CHAPTER I INTRODUCTION

### 1.1 Background

Cancer arises from the transformation of normal cells into tumor cells in a multi-stage process that generally progresses from a pre-cancerous lesion to a malignant tumor. These changes are the result of the interaction between a person's genetic factors and three categories of external agents, including (1) Physical carcinogens, (ultraviolet and ionizing radiation); (2) Chemical carcinogens, (asbestos, components of tobacco smoke, aflatoxin (a food contaminant), and arsenic (a drinking water contaminant); (3) Biological carcinogens, (infections from certain viruses, bacteria, or parasites) (Weinberg,1996).

World Health Organisation (WHO), through its cancer research agency, the International Agency for Research on Cancer (IARC), maintains a classification of cancer-causing agents. The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age. The overall risk accumulation is combined with the tendency for cellular repair mechanisms to be less effective as a person grows older. (WHO, 2021)

Cancer during pregnancy is a rare event, occurring approximately once per 1,000 pregnancies annually, corresponding to 0.07% to 0.1% of all malignant tumors (Stensheim, et al. 2009). Global estimates show rising incidence rates in both developed and developing countries. In Europe, this number translates yearly into 3000–5000 new patients with cancer diagnosed during pregnancy (Calsteren. 2016). Melanoma, Breast cancer, cervical cancer, lymphoma cancer, and leukaemia are the most frequently occurring cancers in pregnancy (Eibye, et al. 2013). De Haan et al (2018) states in their international cohort study of 1170 women “the most common invasive cancers in pregnancy are breast cancer (39%), cervical cancer (13%), lymphoma (10%), Ovarian (7%), and leukaemia (6%)”.

Despite its rarity, its incidence nowadays keeps on increasing worldwide. The prevalence of cancer during pregnancy has increased because many women postpone pregnancy until a later age (Parazzini, et al. 2017). Other factors contributing to the increase in the rate of pregnancy-associated cancer over time may be improvements in diagnostic techniques and detection and increased interaction with medical services during pregnancy. It

has also been hypothesized that the hormones and growth factors necessary for fetal growth may accelerate tumor growth (Howdeshell & Shelby. 2016).

The time of cancer diagnosis and the appropriate treatment during pregnancy affect the maternal and fetal outcomes (Shim, et al. 2016). As regularly medical consulting and physical exams, blood tests, and ultrasound exams allow for the early diagnosis of life-threatening maternal diseases like cancer. On the other hand, A missed diagnosis or delayed treatment often poses a greater risk to the patient and her pregnancy than the hazard associated with ionizing radiation for cancer diagnoses (Calsteren. 2016). Fetal outcomes depend mainly on the type of treatment which also depends on the gestational age, the type and stage of cancer, and the treatment options. Sometimes fetal outcomes could be fetal mortality (abortion) (Pereg& Koren& Lishner. 2008). Also, cancer during pregnancy was associated with premature newborns like: low birth weight, and low Apgar score (Esposito. 2021). So, pregnancy affects cancer by the time of diagnosis and by the type of treatment, while cancer effects pregnancy on maternal and fetal outcomes which depends on the time of diagnosis and type of treatment.

According to the latest WHO report of Indonesia Cancer Profile (Fig.1), the most common cancer case in 2018 among females is breast cancer with an incidence of 16.7% which increases to 44% in 2020. In the second stage cervical cancer with an incidence of 9.3 % also increases to 24.4%. Ovarian cancer increased from 3.8% in 2018 to 10 % in 2020 (WHO, 2018; WHO, 2020).

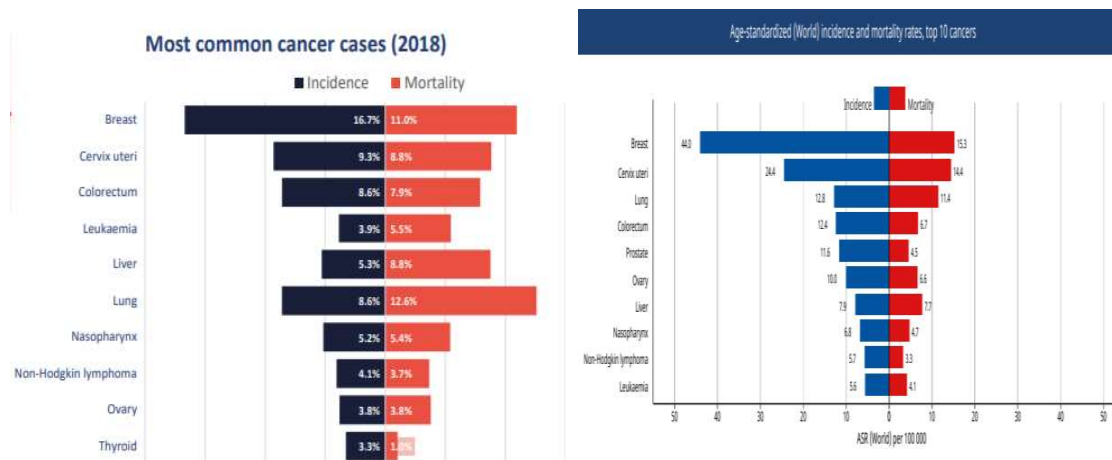


Fig 1.1  
Indonesian cancer profile 2018 & 2020, (WHO. 2021)

Limited data are available regarding cancer during pregnancy and its maternal and fetal outcomes in Indonesia. Therefore, more research that focuses on knowing the prevalence of cancer diagnoses during pregnancy in Indonesia and focuses on knowing the maternal and fetal outcomes of cancer during pregnancy is needed.

## 1.2 Problems Identification

The maternal health condition during pregnancy has a great impact on the fetal or newborn baby outcome. Smorti et.al (2019) states that maternal prenatal anxiety and depression negatively affect the clinical aspects of the labor experience and, indirectly, the Apgar index. Also, there is a cross-sectional study on the effect of smoking during pregnancy on birth weight, and the result shows a significant weight reduction in full-term infants, compared with infants born to non-smoking mothers. The birthweight decreased as the category of cigarette number per day increased (Kataoka, et al. 2018). In another study (Widiyanto, Lismawati. 2019), the result shows that there is a relationship between maternal age and anemia with birthweight, as they affected the low birth weight of newborns.

From the primary study done in 2021 at one of the most important referral hospitals from 37 districts in East Java - Dr. Seotomo Hospital in Surabaya, some pregnant women with cancer have bad maternal or fetal outcomes like Maternal death – fetal death after delivery, or abortion – premature delivery. Therefore, there is an urgent need to know the risk factors for these bad outcomes, to avoid them and find a solution.

According to the previous findings, this study described the available data on pregnant women with cancer in East Java- Indonesia, type of cancer, stage of cancer, maternal age, gestational age, maternal outcome, and fetal outcome, and also discussed the risk factors of bad fetal outcome in pregnant women with cancer.

## 1.3 Research Question

According to the previous studies, findings showed that there is a great relationship between maternal health conditions and fetal outcomes like mortality, low birthweight newborn, and APGAR scores. Generally, psychological condition, lifestyle (smoking, drinking alcohol), nutrition condition, and maternal age has a significant relationship with fetal

outcomes (birth weight, birth condition, and APGAR scores). From the primary study done in Dr. Seotomo Hospital – 2021, some pregnant women with cancer have bad maternal or fetal outcomes like fetal death during delivery or abortion – premature delivery. On the other hand, there is not enough data on the relationship between cancer during pregnancy and these fetal outcomes. For this reason, this study will discuss whether is there any relationship between cancer type, cancer stage, maternal age, or maternal outcome on the fetal outcomes (birth condition, birth weight, Apgar score).

So, the main question of the Thesis is:

- 1- Are there any relationships between type of cancer, stage of cancer, maternal age, gestational age, or maternal outcome, and the fetal outcomes for pregnant women with cancer?

## **1.4 Research Objectives**

### **1.4.1 General Objectives**

This research aims to determine the risk factors of fetal outcomes for pregnant women with cancer from an epidemiological point of view.

### **1.4.2 Specific Objectives**

1. To know the prevalence of cancer during pregnancy in East Java – Indonesia as Dr. Seoteomo Hospital is one of the most important referral hospitals from 37 districts in East Java.
2. To determine their cancer characteristics: type and stage of cancer, and Maternal and fetal outcomes.
3. To determine if there is any relationship between the type of cancer, the stage of cancer, the maternal age, gestational age, and maternal outcome with the fetal outcome of pregnant women with cancer.

## **1.5 Research Benefits**

### **1.5.1 Theoretical benefits**

Theoretically, this study focused on analyzing the risk factors of fetal outcomes for pregnant women with cancer in East Java- Indonesia. So, this study provides data on cancer prevalence in pregnancy in Indonesia, especially in East Java. It is also providing knowledge and data about the outcome of pregnant women with cancer. In addition, provides the possible risk factors for the fetal outcome.

### **1.5.2 Applied benefits**

Practically, the available data on the risk factors of fetal outcomes for pregnant women with cancer would increase healthcare management in pregnant women with cancer, to avoid or reduce those bad outcomes. Also, it would help in making awareness among women about the importance of ANC during pregnancy for the early diagnosis of critical diseases.