

Can Obesity be Considered as Risk Factor to Ovarian Cancer? A Review



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Abstract

Ovarian cancer is the most fatal gynecologic cancers and is an important source of cancer-related mortality, particularly in developed countries. Epidemiological studies have shown that the risk of ovarian cancer associated with body mass index obesity and overweight differs across different geographical distributions. Obesity and the possibility of ovarian cancer have been widely studied, but findings have yielded inconsistent results. The aim of this review study is to investigate the association of obesity, overweight and body mass index with ovarian cancer. The relevant search of databases was conducted, including Medline, Springer, NCBI, PubMed, Cancer organizations, WHO reports and Cancer statistics. Due to broad scope of the research questions a narrative review approach was undertaken. All studies that assessed the relation between obesity leading to ovarian cancer and obesity as risk factor for ovarian cancer were selected for review. The prevalence of obesity and overweight was found to be increasing worldwide. Obesity and overweight are believed to be related with psychological, and social problems along with other health problems. These conditions are needed to be monitored and controlled more effectively both in developed and underdeveloped countries. There is a lack of data on the relationship between obesity and ovarian cancer from low-income countries due to scarcity of resources and low awareness levels. As a result, further research is required to better understand the biological pathways underlying the connection between obesity and ovarian cancer.

Keywords: Obesity, overweight, ovarian cancer, BMI

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Introduction

Ovarian cancer is the most fatal gynecologic cancer contributing to an increase in mortality rate, particularly in developed countries (1). It is the seventh commonly diagnosed cancer and eighth world's leading cause of death among females (2). Ovarian cancer is among common gynecological cancers causing death (3) and accounts for 2.5% of female cancers globally (4).

The rising ovarian cancer-related mortality is due to late diagnosis and hesitancy towards treatment, causing a delay in cure (5,6). According to the American Institute for Cancer Research (2018), the report on global cancer incidence for women shows that ovarian cancer accounts for 3.6% of all female cancers. The number of new cases diagnosed in 2018 was 295,414 that was projected to increase to 434,184 in 2040 (4). According to the WHO 2018 statistics, the estimated age-standardized incidence and mortality rates of ovarian cancer in 2018 worldwide for females of all ages, are 6.6 and 3.9 percent, respectively. Of all gynecological cancers it is the most lethal with an approximately five years of survival rate of about 46 percent, primarily due to difficulties in early diagnosis and cure (7).

Methodology

The relevant research is explored from Medline, Springer, NCBI, PubMed, Cancer organizations, WHO reports and Cancer statistics. Due to broad scope of

the research questions narrative review approach is undertaken. All studies that assessed the relation between obesity leading to ovarian cancer and obesity as risk factor for ovarian cancer is taken as inclusion criteria.

Results

A significant number of studies have shown that having a higher body mass index (BMI) is linked to an elevated risk of ovarian cancer. This suggests that factors during obesity are related to ovarian cancer. The prevalence of obesity and overweight is found to be increasing worldwide. Obesity and overweight are believed to be involved in bringing psychological, and social problems along with other health problems. These conditions are needed to be monitored and controlled more effectively both in developed and underdeveloped countries. Since, there is a lack of data on the relationship between obesity and ovarian cancer from low-income countries due to scarcity of resources and low awareness levels. The issues put resistance in data collection of current incidences. Further research is required to better understand the biological pathways underlying the connection between obesity and ovarian cancer.

Discussion

Obesity

Obesity is also prevailing, particularly in urban regions, in low- and middle-income countries. According to World Health Organization "body mass

index (BMI) is a person's weight (in kilograms) divided by the square of his or her height (in meters"). In general, an individual with a BMI of 30 or more than 30 is considered obese. Overweight is considered an individual with a BMI equal to 25 or greater than 25. Obesity results in much more than just a weight gain. Obesity and overweight become significant risk indicators for many chronic diseases including cancer (30). Despite some inconsistencies, it is known that overweight and obesity trigger chronic diseases including cancer, and thus, weight control is an important factor to improve quality of life and better survival. Obesity and overweight are responsible to increase many cancer mortalities including ovarian cancer (8). Overall, overweight and obesity have been estimated to cause 20 percent of all cancer cases. The burden of obesity on society continues to rise and requires clinicians to pay more attention to both cancer prevention and to improve results after diagnosis. To explore more insights into risk factors to ovarian cancer growth would prompt new perspectives to avoid this deadly gynecological cancer (9). Ovarian cancer mortality is correlated with obesity and weight gain throughout adulthood (10) and obesity perhaps can cause ovarian cancer (11). Women with ovarian cancer that are obese tend to survive considerably worse than non-obese women (12). Cancer risk and cancer mortality rates, including ovarian cancer, are found to be associated with obesity. BMI may confer a slightly higher risk of ovarian cancer, but considering that adiposity is a modifiable risk factor, future studies on various 19 anthropometric measures should be considered (13). Epidemiological investigations over the previous decade have demonstrated that adiposity disease hazard affiliations are specific for sex, site, and geographical distribution. The biological components supporting these correlations, not entirely explored yet, need to be assessed by the future prevention methodologies (14). Overweight and obesity could also be considered significant risk factors for ovarian cancer (15,16). Therefore, the increased population of obese individuals in developing countries may indicate an increased prevalence of ovarian cancer in these countries as well. A large number of studies have investigated varied trends of obesity in the general population. This current study concentrates on the effects of total BMI and timing of weight gain as the specific parameters of obesity on the incidence of ovarian cancer (17). Obesity has a relationship with endometrioid ovarian cancer but not with high-grade ovarian cancer (18). Future research is required on weight gain relating to cancer (19). Obesity in females at reproductive age may also affect ovaries (20). Losing weight deliberately can reduce ovarian cancer risk along with other cancers. Therefore the "European Code against Cancer Nutrition Working Group" has developed the recommendation of taking steps to achieve a balanced body weight (21) The literature review also mentions the variation in the incidence of ovarian cancer worldwide (22). The epidemiological studies have shown that risk for cancer associated with obesity is

different for geographical distribution. However, more investigations are required from epidemiological perspectives to prevent risk factors. Reducing weight gain and weight control approaches are essential for both cancer likelihood and survival among patients with cancer (14). A meta-analysis study found that increased body fatness or severe obesity both promotes ovarian cancer. However, in the case of sub-group analysis like post-menopausal women the situation is different, the obesity was found to have no connection with ovarian cancer. In premenopausal women, the connection does exist (23). Apart from BMI other adiposity - related factors can be considered as factors for ovarian cancer to assess associations with important tumor features and consider weight patterns with ovarian cancer possibility and survival over the course of life (1). Obese and severely obese patients both have recovery like normal weight patients, which means that overweight does not affect ovarian cancer patients' recovery (24). A bivariate analysis of different factors shows that ovarian cancer is significantly correlated to obesity besides many other factors (25) showing a strong increase in obesity as a risk factor in high-income countries with a predominantly white population (26). The largest frequency of ovarian cancer in Iran is associated with early young females with no significant connection with socioeconomic status and weight status (27). According to the American Cancer Society, overweight might increase the risk of ovarian cancer or may be considered a risk factor but not with the aggressive type of ovarian cancer. Obesity may affect the survival of ovarian cancer patients also (4-28). Obesity is still a controversial risk factor for ovarian cancer and more research is required to establish or otherwise this connection (29). Obesity has also been associated with several health complications as diabetes, cardiovascular diseases and cancer. A complicated mixture of genetic, environmental and psychological variables may enhance the risk of obesity in a person. Global Health Observatory (GHO, 2016) data mentioning the prevalence of overweight, shows that 39% of females of 18 years of age and above were overweight. According to the WHO report of 2018, the global incidence of obesity nearly tripled from 1975 to 2016. Many cancers (including ovarian, liver, breast, gall bladder endometrial, kidney and colon) are due to obesity (30). It is estimated that "by 2035 incidence of obesity will increase to 371,000 a year (55%) and deaths will increase by 67% to 254,000 (31). Obesity has become a problem especially in women of reproductive age and is related to an increased risk of pregnancy complications (32). There is an urgent need for preventive and treatment policies, particularly in females, to avoid overweight and obesity and to encourage weight loss and to reduce the health burden of obesity (33). In the past twenty years, the obesity rate has become tripled in the developing countries (34) and some form of cancer risk will get higher with increase of body mass index (35) Obesity is a complex, multifactorial chronic disease, requiring a multidisciplinary approach (36).

BMI and Overweight

There is an immediate relationship of ovarian malignant growth hazard with BMI (37, 38). Overabundance, body adiposity ordinarily communicated as weight record (BMI), is a hazardous factor for some basic grown-up cancers. It is more evident that body mass index is associated with ovarian cancer. With the increase in body mass index, ovarian cancer has a slight chance to increase as well (39). A study finding also confirmed the association of BMI to ovarian cancer in families having no family history of ovarian cancer as compared to families having ovarian cancer history showing BMI effect (40). There is no role of height, weight or BMI in ovarian cancer prognosis. Future research is required with larger samples that include measures of overall and central adiposity across the lifespan (41). A Collaborative Group on Epidemiological Studies of Ovarian Cancer (2012) analysis included 25,157 women with ovarian cancer from 47 epidemiological studies that investigated this relationship. The available epidemiological data of ovarian cancer was re-analyzed and summed up results shows that with the increase in weight the chances of ovarian cancer would increase up to 3% per decade. These findings are inconsistent with the relevance of women having an increase in body weight and developing a risk of ovarian cancer (42). Although high BMI is associated with an increased risk of ovarian cancer among young women, no evidence of its association with ovarian cancer survival was found (43). Ovarian cancer should be added to the list of cancers likely to be related to obesity. The risk of developing the less prevalent histologic subtypes of ovarian cancer, especially borderline and low grade invasive serous cancers and endometrioid cancers, appears to be moderately increased by obesity. However, it does not seem to raise the incidence of the more prevalent high-grade invasive serous cancers that account for the majority of ovarian cancer deaths, with the potential exception of pre-menopausal women (44). A meta-analysis similarly found that obese (but not overweight) females are at greater risk of ovarian cancer than females with a standard index of body mass (45). In one study the body mass index was not correlated with the risk of ovarian cancer (46). A randomization study shows that higher BMI could be a risk factor for non-high grade serous ovarian cancers, but the situation is inverse in the case of high-grade serous ovarian cancer. Higher BMI has no association with the aggressive substages of ovarian cancer (47). But Tworoger and Huang (2016) found that obesity has no connection with ovarian cancer; hence cannot be considered as the causative factor for ovarian cancer (1). The absence of excess body fatness shows sufficient evidence for ovarian cancer preventive effect. But the evidence for prevention of ovarian cancer with weight loss still needs more investigation due to a smaller number of quality studies for evaluation (48). As BMI only cannot be considered as the risk factor for ovarian cancer. Only histological subtypes of this cancer are dependent on BMI. Future research is required both for the risk and survival of ovarian cancer (1). Obesity and excessive weight gain can

boost the risk of ovarian cancer in postmenopausal African American women. Several studies have found that being overweight or obese can increase the risk of developing ovarian cancer. The framework of this study is based to see the probability of ovarian cancer risk by the calculation of the impact of body mass index (BMI) one year before the diagnosis of this disease and weight gain at 18 years. But there is little knowledge of ovarian cancer epidemiology in African American, the group which is more affected by obesity in the US. The results emphasize the significance of weight control among African American females in decreasing the risk of ovarian cancer. African American females have a lower risk of being diagnosed with ovarian cancer as compared to whites but tend to have more aggressive disease and worse experience (49). One of systematic review shows the limited association between obesity and ovarian cancer. Summary data in the form of relative risk, hazard ratio, has been analysed for each comparison group. The summary shows no connection between obesity and ovarian cancer (50).

Conclusion

Responsive and timely health care facilities that use relational communication, provide patient-centered data and prepare females for survival from obesity could enhance women's health experience with ovarian cancer. By highlighting the risk factors of ovarian cancer in future relevant to weight gain will pave the way for an appropriate government policy and intervention to decrease the disease burden of ovarian cancer for a healthier population.

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