

# KNOWLEDGE AND AWARENESS ON RECENT ADVANCES IN THE TREATMENT OF HODGKIN'S LYMPHOMA - A SURVEY

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## ABSTRACT

Hodgkin's lymphoma (HL) is a cancerous disease that affects the lymph nodes within the human body. The location of the disease is how it is classified and diagnosed. The majority of the patients can be potentially cured with the use of radiotherapy and multi-agent chemotherapy, a proportion of them will relapse or develop resistant disease for which treatment options are limited. The aim of the study is to determine the knowledge awareness about recent advances in the treatment of Hodgkin's lymphoma. The objective is to study the level of awareness and knowledge about advanced treatment methods for Hodgkin's lymphoma and associated risk factors among the Indian population. A survey was conducted from April to May among 100 people in the state of Tamil Nadu, India by preparing a set of standard questionnaires and answers were collected through online survey methods such as google forms. The statistical analysis was done using SPSS software and chi square analysis was done for correlation. The results clearly indicate that 57% percent of the population is aware about the recent advances in the treatment methods for Hodgkin's lymphoma and 42% percent of the population not aware about the treatment methods for Hodgkin's lymphoma. The conclusion of this study is that the above statistical analysis about knowledge awareness on recent advances in the treatment of Hodgkin's lymphoma has provided a clear view of current advanced treatment procedure and technique for the betterment of patients in future.

## KEY WORDS

Advanced treatment; Awareness; Cancer; Hodgkin's lymphoma; Hematopoietic neoplasm.

## INTRODUCTION

The first descriptions of what came to be known as Hodgkin disease date back to 1832, when the eminent British pathologist Thomas Hodgkin described an autopsy case series of patients with lymphadenopathy and splenic enlargement. Hodgkin lymphoma is a rare cancer that arises from immune cells known as B lymphocytes (B cells) and typically affects the lymph nodes and sometimes other organs (International Agency for Research on Cancer and World Health Organization, 2008; Ashika Rachael Samuel, 2015;

Villasboas and Ansell, 2016). The Hodgkin lymphoma is one of the unique hematopoietic neoplasms which is characterized by cancerous Reed-Sternberg cells with an inflammatory background. Patients are commonly diagnosed when in their 20s-30s, present with supra-diaphragmatic lymphadenopathy, often with systemic B symptoms.

Even in the advanced stage of the disease, Hodgkin's lymphoma is highly curable with combination radiation or combined modality treatment and chemotherapy. Even patients who aren't cured with initial therapy can often be salvaged with alternate chemotherapy combinations, the novel antibody-drug conjugate Brentuximab, high dose autologous or allogeneic hematopoietic stem cell transplant. The Programmed death-1 (PD-1) inhibitors Nivolumab and Pembrolizumab have both demonstrated high response rates and durable remissions in relapsed/refractory Hodgkin's lymphoma. Alternate donor sources and reduced intensity conditioning have made allo-HCT a viable option for more Hodgkin's lymphoma patients (Ambinder *et al.*, 1993; Hjalgrim, 2003; Baheerati MM, 2018; Shanbhag and Ambinder, 2018).

Characteristically, the cancer cells form a minority of the tumor and are surrounded by a reactive inflammatory milieu comprising lymphocytes, eosinophils, neutrophils, histiocytes and plasma cells. These malignant cells can be pathognomonic multinucleated giant cells or large mononuclear cells and are together referred to as Hodgkin and Reed–Sternberg (HRS) cells. (Hossfeld, 2002; Fathima and Preetha, 2016; Siegel *et al.*, 2017).

Chemotherapy and radiation are the mainstays of classical Hodgkin lymphoma (cHL) treatment, unlike some types of indolent non-Hodgkin's lymphoma where observation is an option (Jacobs *et al.*, 1968; Harsha *et al.*, 2015; Iankzhaig Devi Rj, 2016). Advances in understanding the biology of the disease and improvement in modalities of chemotherapy and radiotherapy have improved survival across the board in every stage of cHL (Howlader *et al.*, 2014; PH Dave, 2016). Advanced classical Hodgkin lymphoma (cHL) is treated mainly with combination chemotherapy. The evolution of modern cytotoxic combination regimens have been outlined in the introduction to this section and established ABVD as the primary regimen to treat advanced classical Hodgkin lymphoma (Hoskin, 2009; Shruthi and Preetha, 2018). Most patients with classical Hodgkin lymphoma (cHL) are cured by first line therapy (Choudhari, 2016; Eichenauer *et al.*, 2017). For individuals with newly diagnosed advanced-stage Hodgkin's lymphoma (stage III/IV or stage IIB with large mediastinal mass and/or extranodal disease), multimodal chemotherapy is considered standard of care. Radiotherapy is recommended for patients who have evidence of localized residual disease after the end of systemic chemotherapy.

Standard treatment regimens for advanced-stage Hodgkin's lymphoma included in the current European Society for Medical Oncology (ESMO) guidelines are adriamycin, bleomycin, vinblastine and dacarbazine (ABVD) and escalated dose bleomycin, etoposide, adriamycin, cyclophosphamide, vincristine, procarbazine and prednisone (BEACOPP escalated); the latter is an established standard for younger patients and recommended only for those up to the age of 60 (Eichenauer, Engert and Dreyling, 2011; R and Sethu, 2018; Iyer, 2019). Adverse effects of treatments are common, and include organ damage, sterility, reduced long-term quality of life, etc. (Swathy and Gowri Sethu, 2015; Bhakta *et al.*, 2016; Bröckelmann *et al.*, 2019). Although there is no apparent cause for this cancer. The aim of the present study is to analyse the knowledge and awareness about the recent advances in the treatment of Hodgkin's lymphoma.

## **MATERIALS AND METHODS**

A spellbinding cross sectional questionnaire study was conducted from April to May 2020 with 15 close ended questions to gain knowledge about recent advances in the treatment of Hodgkin's lymphoma. A total of 100 participants took part in this study. They gave their consent for the study and gave their opinions with their free will. We categorized our results according to the designation of the participants and the answers that were given for each question. Statistical analysis was performed using Statistical

Package for Social Science (SPSS). Chisquare test was utilized for the investigation. P value exactly or equivalent to 0.05 was considered measurably huge. All the obtained data was entered on Microsoft excel sheet and analysed by using statistical pie charts and bar charts.

**Inclusion Criteria:**

Only the subjects willing to participate were included in this study .

**Exclusion Criteria:**

The subjects who had not given proper consent were excluded from the study.

**RESULTS AND DISCUSSION**

Pie chart showing percentage of distribution of gender of the participants 36% (green colour) female participants and 64% (blue colour) male participants (**Figure 1**). Pie chart showing percentage distribution of awareness about the cause for Hodgkin's lymphoma 56% (blue colour) of the participants were aware about the cause for Hodgkin's lymphoma and 44% (green colour) of the participants were unaware about the cause for Hodgkin's lymphoma (**Figure 2**). Pie chart showing percentage of distribution of the inventor of Hodgkin's lymphoma symptoms, 55% (blue colour) of the participants think Dr Thomas Hodgkin is the person who invented Hodgkin's lymphoma symptoms, 14% (green colour) percent of the participants think Dr black is the person who invented Hodgkin's lymphoma symptoms, 31% (peach colour) percent of the participants think Dr Edwin is the person who invented Hodgkin's lymphoma symptoms (**Figure 3**). Pie chart showing percentage of distribution of the participants who underwent any treatment for Hodgkin's lymphoma, 21% (blue colour) of the participants has undergone treatment for Hodgkin's lymphoma and 79% (green colour) of the participants has not undergone any treatment for Hodgkin's lymphoma (**Figure 4**). Pie chart showing percentage of distribution of the participants who aware about the common side effects of Hodgkin's lymphoma treatment 71% (blue colour) of the participants were aware about the common side effects of Hodgkin's lymphoma treatment and 29% (green colour) of the participants were unaware about the common side effects of Hodgkin's lymphoma treatment (**Figure 5**). Pie chart showing percentage of distribution of the participants who know Hodgkin's lymphoma is a rare cancer 58% (blue colour) of the participants know Hodgkin's lymphoma is a rare cancer and 42% (green colour) of the participants not know Hodgkin's lymphoma is a rare cancer (**Figure 6**). Pie chart showing percentage of distribution of the participants who aware about the treatment methods for Hodgkin's lymphoma 57% (blue colour) of the participants aware about the treatment methods for Hodgkin's lymphoma and 42% (green colour) of the participants unaware about the treatment methods for Hodgkin's lymphoma (**Figure 7**). Pie chart showing percentage of distribution of the participants who aware about the signs and symptoms for Hodgkin's lymphoma 29% (blue colour) of the participants states that fever is the signs and symptoms for Hodgkin's lymphoma, 24% (green colour) of the participants states that swollen lymph nodes is the signs and symptoms for Hodgkin's lymphoma and 47% (peach colour) of the participants states that both fever and swollen lymph nodes is the signs and symptoms for Hodgkin's lymphoma (**Figure 8**). Pie chart showing percentage of distribution of the participants who aware about whether biopsy is performed to diagnose Hodgkin's lymphoma 71% (blue colour) of the participants says biopsy is performed to diagnose Hodgkin's lymphoma and 29% (green colour) of the participants says biopsy is not performed to diagnose Hodgkin's lymphoma (**Figure 9**). Bar graph represents the association between gender and awareness about common side effects of Hodgkin's lymphoma treatment. X-axis represents gender and Y-axis represents the number of participant's responses on the awareness about common side effects of treatment of Hodgkin's lymphoma. Chi-square test was done and value: 1.255, p value: 0.263 ( $p > 0.05$ ) and the association was found to be not statistically significant, however males have better awareness than females. (**Figure 10**). Bar graph represents the association between gender and awareness about recent advances in the treatment methods

of Hodgkin's lymphoma. X-axis represents gender and Y-axis represents the number of participant's responses to the awareness about recent advances in the treatment methods of Hodgkin's lymphoma. Chi-square test was done and the value: 0.051, p value: 0.822 ( $p > 0.05$ ) and the association was found to be not statistically significant, however males have better awareness than females (**Figure 11**). Bar graph represents the association between gender and awareness about Hodgkin's lymphoma. X-axis represents gender and Y-axis represents the number of participant's responses on the awareness about Hodgkin's lymphoma. Chi-square test was done and value: 0.801, p value: 0.371 ( $p > 0.05$ ) and the association was found to be not statistically significant, however males have better awareness than females (**Figure 12**). Bar graph represents the association between gender and awareness about treatment methods of Hodgkin's lymphoma. From the total population X-axis represents gender and Y-axis represents the number of participant's responses to the awareness about treatment methods of Hodgkin's lymphoma. Chi square test was done and value: 0.923, p value: 0.337 ( $p > 0.05$ ) the association was found to be not statistically significant, however males have better awareness than females (**Figure 13**). Bar graph represents the association between gender and awareness about the cause for Hodgkin's lymphoma. From the total population X-axis represents gender and Y-axis represents the number of participant's responses to the awareness about the cause for Hodgkin's lymphoma. Chi-square test was done and value: 0.124, p value: 0.724 ( $p > 0.05$ ) and the association was found to be not statistically significant, however males have better awareness than females (**Figure 14**).

In the previous study, Lump or swollen lymph nodes is the most recognised symptom- (89.3%) followed by change in the appearance of a mole (58.8%). Boys thought that someone in their 20s most likely to develop cancer in the next year (7.8%) followed by someone in their 80s (7.0%) Girls believed someone in their 30s was most likely (4.9%) followed by someone in their 20s (3.6%) (*Richard G Kyle et al., 2012*) (Kyle, Forbat and Hubbard, 2012; Renuka and Sethu, 2015). In the previous study 6% of respondents were aged between (25-44) 27% of respondents were aged between (45-64) 66% were aged over (65) Just 1% of respondents were aged (16-24).

54% of respondents to the survey were male and 46% of respondents were female. (Robb *et al.*, 2009; Feizi *et al.*, 2011; Hooti *et al.*, 2019). In the previous study done by Bruce D *et al.*, the participants to his survey had a complete understanding of Hodgkin's lymphoma and only 19% of respondents were unaware about Hodgkin's lymphoma, 25% in between the age group of 16 years to 24 years compared to 55% in between the age group of 65 years to 74 years (Bruce D. Cheson *et al.*, 2017) (Cheson, 2017; Timothy, Gayatri Devi and Jothi Priya, 2019) and 61.8% of the participants were females 38.2% were males the highest age frequency was between 18 and 27 (65.3%).

In an earlier study, the level of education among the participants almost half of the participants were undergraduates (47.9%) one third of them were post graduate (33.7%) about 10% were school educated (10.7%), (6.2%) were in technical institutes and (1.5%) were non-educated. Younger age group participants (18-27 yr.) were more familiar with Hodgkin's lymphoma cancer definition and concept (52.37%) undergraduates were the most familiar (38.4%) with definition of Hodgkin's lymphoma cancer followed by post graduates (25.93%) occupation medical and non medical ( $P = 0.013$ ) (*Nariman Salem et al., 2019*) (*Chen et al., 2017*; *Salem, 2019*; *David et al., 2019*).

In the previous study done by Shamseddine *et al.*, participants tended to have only basic knowledge of Hodgkin's lymphoma and were unaware of many risk factors (76.42%) less than half of participants mentioned virus EBV as a risk factor (Shamseddine *et al.*, 2014). The study findings align with other studies which demonstrate poor awareness of Hodgkin's lymphoma and that was (32%) of the participants were unable to identify lymphoma as a type of cancer by any means (Robb *et al.*, 2009; Feizi *et al.*, 2011; Al-Azri *et al.*, 2015; Abigail *et al.*, 2019).

### **Limitation of the study**

The limitation of this research decrease in sample size and Inclusion of more criteria . This study population was laminated upto 100 participants only.

### **Future scope**

The future scope of this research is to expand our knowledge about advanced treatment methods for Hodgkin's lymphoma avoid major complications associated with hodgkin's lymphoma Identification and management of the disease

### **CONCLUSION**

Hodgkin's lymphoma is one of the cancerous diseases that affects the lymph nodes within the human body and it is one of the most common lymphomas affecting the young population. It is a chemo sensitive and radiosensitive disease, for which most international protocols combine the two modalities of treatment. Treatment for Hodgkin lymphoma has improved significantly since the ABVD chemotherapeutic combination was invented over 30 years ago. Thus the present study concluded that most of the people have awareness and knowledge about advanced treatment methods for Hodgkin's lymphoma.

### **AUTHOR CONTRIBUTION**

Aksha Sharen A, contributed to the data acquisition and drafting of manuscript. Dr.A.Jothi Priya, contributed to the design, Lakshminarayanan Arivarasu contributed to editing and critical revision of the manuscript. Dr.Karthik Ganesh Mohanraj, contributed to the supervision and proof reading of the manuscript.

### **CONFLICT OF INTEREST: NIL**

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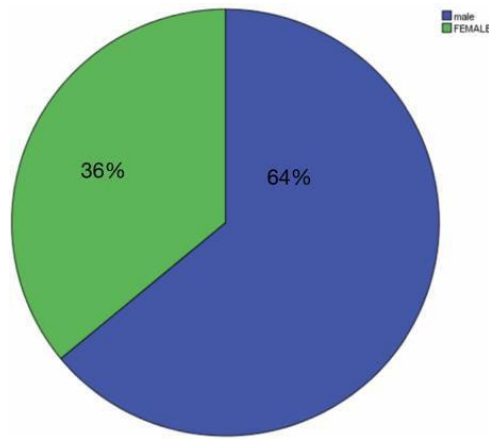


Figure1: Pie chart showing percentage of distribution of gender of the participants 36 % (green colour) female participants and 64 % (blue colour) male participants.

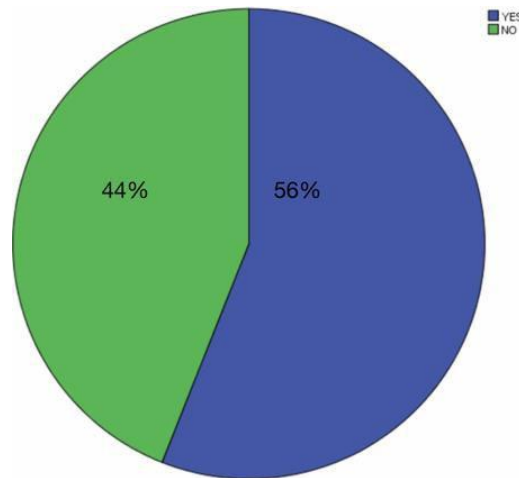


Figure 2: Pie chart showing percentage distribution of awareness about the cause for Hodgkin's lymphoma 56% ( blue colour) of the participants were aware about the cause for Hodgkin's lymphoma and 44% (green colour) of the participants were unaware about the cause for Hodgkin's lymphoma.

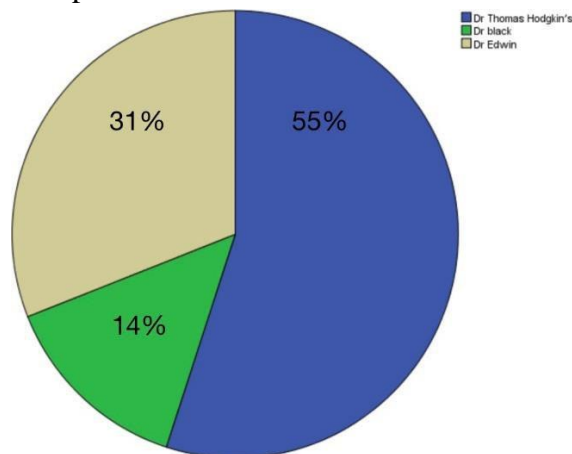


Figure 3: Pie chart showing percentage of distribution of the inventor of hodgkin's lymphoma symptoms, 55% (blue colour) of the participants think Dr Thomas Hodgkin is the person who invented hodgkin's lymphoma symptoms, 14% (green colour) percent of the participants think Dr black is the person who invented Hodgkin's lymphoma symptoms, 31%( peach colour) percent of the participants think Dr Edwin is the person who invented odgkin's lymphoma symptoms.



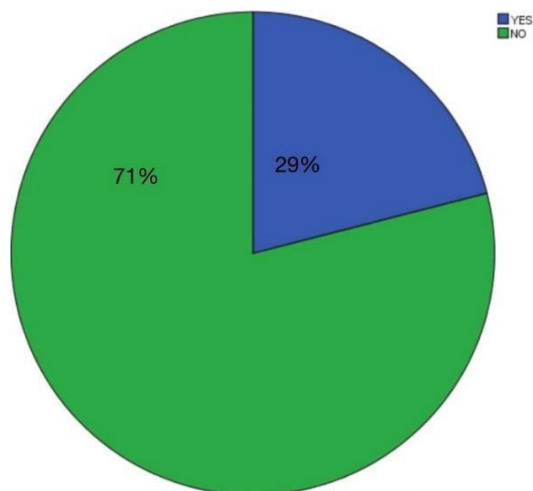


Figure 4: Pie Chart showing percentage distribution of the participants who underwent any treatment for Hodgkin's lymphoma, 21% (blue colour) of the participants has undergone treatment for Hodgkin's lymphoma and 79% (green colour) of the participants has not undergone any treatment for Hodgkin's lymphoma.

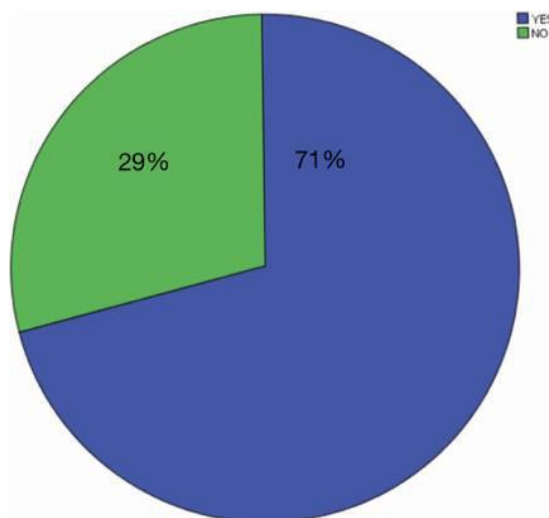


Figure 5: Pie chart showing percentage distribution of the participants who aware about the common side effects of Hodgkin's lymphoma treatment 71% (blue colour) of the participants were aware about the common side effects of Hodgkin's lymphoma treatment and 29%( green colour) of the participants were unaware about the common side effects of Hodgkin's lymphoma treatment.

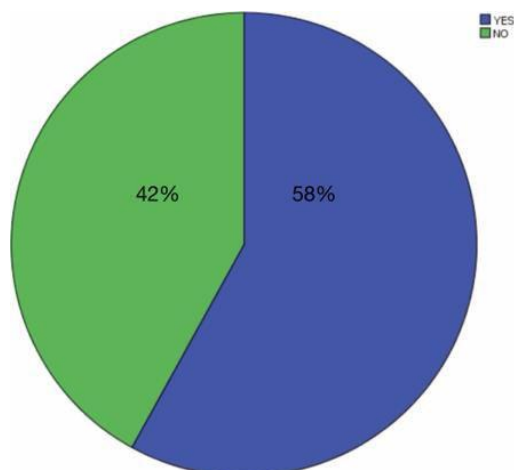


Figure 6: Pie chart showing percentage distribution of the participants who know Hodgkin’s lymphoma is a rare cancer 58% (blue colour) of the participants know Hodgkin’s lymphoma is a rare cancer and 42% (green colour) of the participants not know Hodgkin’s lymphoma is a rare cancer.

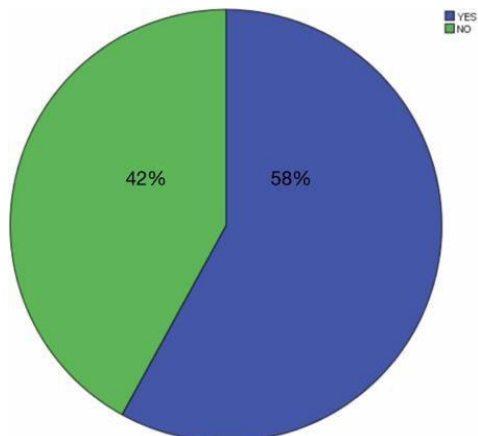


Figure 7: Pie Chart showing percentage distribution of the participants who aware about the treatment methods for Hodgkin’s lymphoma 57% (blue colour) of the participants aware about the treatment methods for Hodgkin’s lymphoma and 42% (green colour) of the participants unaware about the treatment methods for Hodgkin’s lymphoma.

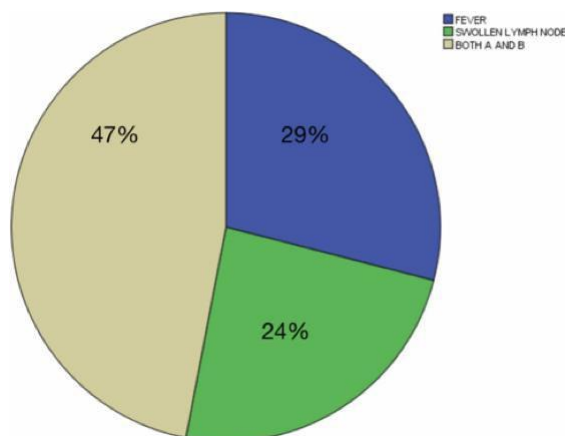


Figure 8: Pie chart showing percentage distribution of the participants who aware about the signs and symptoms for Hodgkin’s lymphoma 29% (blue colour) of the participants states that fever is the signs and symptoms for Hodgkin’s lymphoma, 24% ( green colour) of the participants states that swollen lymph nodes is the signs and symptoms for Hodgkin’s lymphoma and 47% (peach colour) of the participants states that both fever and swollen lymph nodes is the signs and symptoms for Hodgkin’s lymphoma.

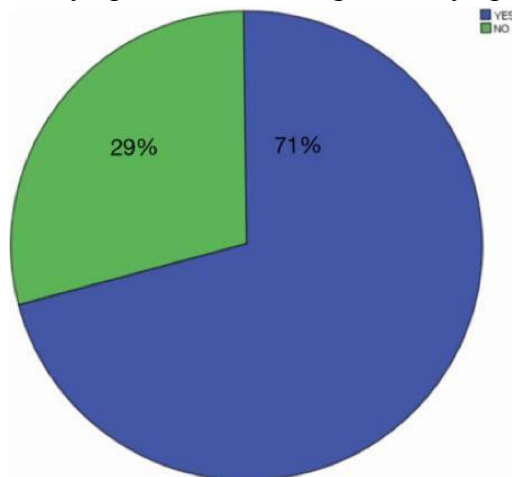


Figure 9: Pie chart showing percentage distribution of the participants who aware about whether biopsy is performed to diagnose Hodgkin’s lymphoma 71% (blue colour) of the participants says biopsy is performed to diagnose Hodgkin’s lymphoma and 29% (green colour) of the participants says biopsy is not performed to diagnose Hodgkin’s lymphoma

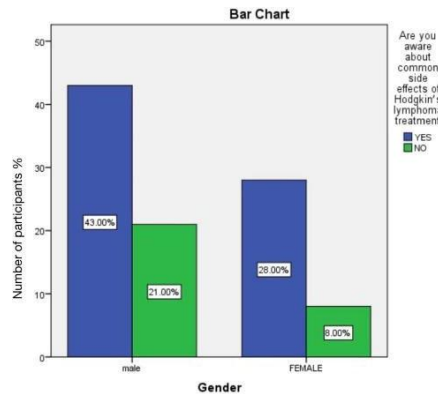


Figure 10: Bar graph represents the association between gender and awareness about common side effects of Hodgkin’s lymphoma treatment. X-axis represents gender and Y-axis represents the number of participant’s responses on the awareness about common side effects of treatment of Hodgkin’s lymphoma. Chi- square test was done and value: 1.255, p value: 0.263 ( $p > 0.05$ ) and the association was found to be not statistically significant, however males have better awareness than females.

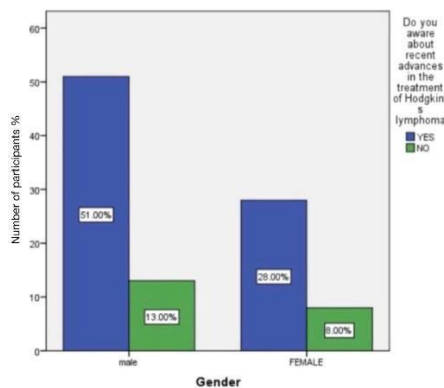


Figure 11: Bar graph represents the association between gender and awareness about recent advances in the treatment methods of Hodgkin’s lymphoma. X-axis represents gender and Y-axis represents the number of participant’s responses to the awareness about recent advances in the treatment methods of Hodgkin’s lymphoma. Chi- square test was done and the value: 0.051, p value: 0.822 ( $p > 0.05$ ) and the association was found to be not statistically significant, however males have better awareness than females

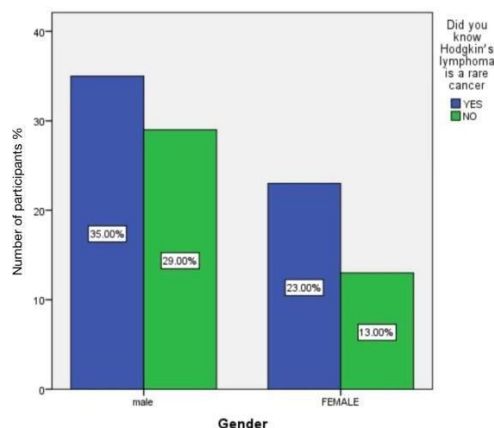


Figure 12: Bar graph represents the association between gender and awareness about Hodgkin’s lymphoma. X-axis represents gender and Y-axis represents the number of participant’s responses on the awareness about Hodgkin’s lymphoma. Chi- square test was done and value: 0.801, p value: 0.371 ( $p>0.05$ ) and the association was found to be not statistically significant, however males have better awareness than females.

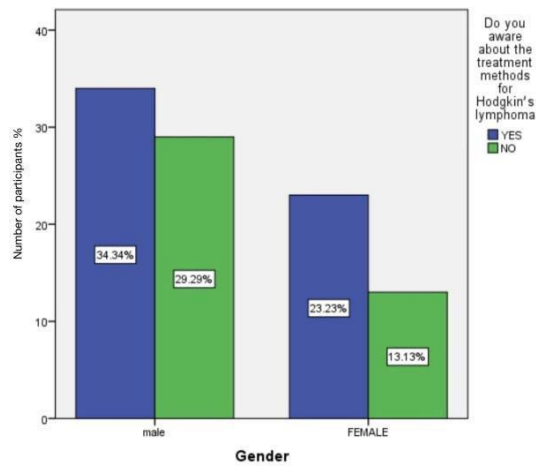


Figure 13: Bar graph represents the association between gender and awareness about treatment methods of Hodgkin’s lymphoma. From the total population X-axis represents gender and Y-axis represents the number of participant’s responses to the awareness about treatment methods of Hodgkin’s lymphoma. Chi square test was done and value: 0.923, p value: 0.337 ( $p>0.05$ ) the association was found to be not statistically significant, however males have better awareness than females

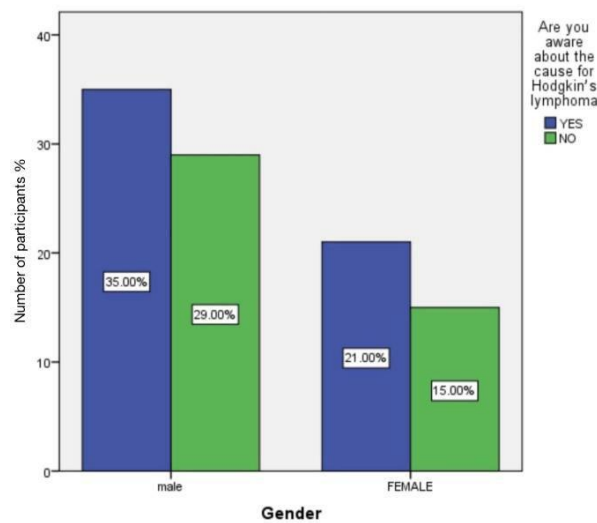


Figure 14 : Bar graph represents the association between gender and awareness about the cause for Hodgkin’s lymphoma. From the total population X-axis represents gender and Y-axis represents the number of participant’s responses to the awareness about the cause for Hodgkin’s lymphoma. Chi- square test was done and value: 0.124, p value: 0.724 ( $p>0.05$ ) and the association was found to be not statistically significant, however males have better awareness than females.