Gender differences in adherence to COVID-19 preventative measures and preferred sources of COVID-19 information among adolescents and young adults with cancer

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ABSTRACT

Background: The COVID-19 pandemic has greatly altered the behavior of adolescents and young adults (AYAs) with cancer. No data exists on how gender influences the adherence of individuals with cancer to COVID-19 related public health guidelines and their preferred methods of receiving COVID-19 related information.
Methods: We conducted a cross-sectional survey of adolescents and young adults with cancer. Data were summarized using descriptive statistics. Multiple logistic regression was used to assess differences in adherence to COVID-19 preventative behaviors, and differences in preferred information sources of COVID-19 related information between men and women.
Results: Among 633 participants, adherence to key COVID-19 preventative measures was 44.9-58.8% for males and 53.4-68.1% for females. After adjusting for key confounding variables in multivariable analysis, males were less likely to adhere to frequent hand washing (AOR [adjusted odds ratio] 1.45, 95% CI [confidence interval] 1.03-2.03), not touching face (AOR 1.82, 95% CI 1.29-2.56) and social distancing (AOR 1.93, 95% CI 1.37-2.71) than females. Both genders preferred to receive information from their cancer institutes and social media.
Discussion: Gender-specific interventions are needed to improve the adherence of males to COVID-19 precautionary measures. Information should be disseminated via cancer institutes and social media as these are the preferred sources of COVID-19 related information among AYAs with cancer.

1. Introduction

Adolescents and Young adults (AYAs) with a cancer diagnosis have altered their behavior to protect themselves from COVID-19. Gender influences adherence to COVID-19 protective measures and may also affect preferred modes of communication of COVID-19 related information among individuals without cancer [1,2]. We previously reported that among AYAs with cancer, females are more likely to comply with social distancing rules than males during this pandemic [3]. However, no data exists on the impact of gender on adherence to other COVID-19 preventive measures such as wearing masks and hand washing and

preferred sources of COVID-19 related information among AYA patients with cancer. Pre-COVID-19 pandemic, individuals with cancer were just as likely to engage in risky health behaviors as non-cancer peers [4]. Understanding the behaviors of this cohort during the COVID-19 pandemic can aid cancer organizations and governments in developing gender-adapted strategies to provide COVID-19 related information to these patients cancer at heightened risk of COVID-19 related morbidity and mortality [5]. Therefore, this report assesses the influence of gender on adherence to preventative COVID-19 measures and preferred modes of communication of COVID-19 related information among AYAs with cancer using the Impact of COVID-19 on AYAs with

Cancer (ICOVIDAYA) survey.

2. Methods

We conducted a self-administered anonymous online survey of AYAs with cancer in Canada (ICOVIDAYA). Participants had to be at least 18 years old and diagnosed with cancer between 15-39 years. The 49-item questionnaire was administered via REDCap in English and French. Both participants receiving cancer-directed therapies and those who had completed cancer treatment were included. The participants completed online consent before participation. Enrollment occurred during January and February 2021, coinciding with a second wave of COVID-19 in most Canadian provinces and was prior to the widespread availability of the COVID-19 vaccine in Canada. Participants were recruited via the social media sites of national AYA cancer support groups and clinics at CancerCare Manitoba. Full survey methodology has been published previously [3,6].

Participants reported adherence to COVID-19 preventative measures and preferred sources of COVID-19 related information. The adherence to the COVID-19 preventative measures was assessed by asking, "What sort of behavioral modifications or preventative measures have you been regularly doing during the pandemic?". Participants could select as many behaviors as were applicable to them from a list of frequent hand washing, not touching the face, wearing a protective face mask, wearing gloves, avoiding crowds or populated places, abiding by social distancing rules in your jurisdiction, complete isolation from members outside of your household, avoiding public transport, avoiding visit to any stores including grocery stores, and other. Preferred sources of information related to COVID-19 and cancer were assessed by asking participants, "How would you like to receive the information specific to COVID-19 and cancer?". Participants could select all sources of information from the choices of medical professionals, pamphlets developed by the cancer institute, online information from the cancer institute's website, social media, patient organization / support group, and others. Gender was measured by asking, "What is your gender?" and individuals could select male, female, transgender, gender variant/non-conforming, I prefer not to answer or other. Sociodemographic, health- and cancer-related data were also collected.

Demographic information, clinical factors, behavior modifications and information sources were summarized using descriptive statistics. Simple logistic regression was used to test the association of gender and COVID-19 preventative behaviors and preferred sources of COVID-19 related information. Multiple logistic regression was used to estimate the independent association between gender (male vs. female) and adherence to COVID-19 precautions, and preferred sources of COVID-19 related information, after adjusting for key confounders such as age, race/ethnicity, relationship status, province, location, employment status, personal income in year 2020, type of cancer, cancer treatment status, self-reported mental health condition and presence of self-reported chronic physical health condition; No significant correlation existed between the variables entered in the regression (variance inflation factor < 4). Participants with missing information for included variables were excluded. All tests were two-sided, and a p-value less than 0.05 was considered statistically significant. Analysis was done using SPSS version 28.0. The University of Manitoba Ethics Board approved this study (HS:24501) [7].

3. Results

Of the 805 AYAs between 18-39 years of age, who completed the survey, this analysis included 633 participants; 352 males (55.8%), 279 females (44.2%) and 2 (0.3%) gender variant/non-conforming. The whole cohort characteristics have been published [3,6]. We excluded 168 participants for having missing data for even one of the confounding variables (N = 168). The mean age was 30.4 years (range 19 to 39 years), 601 (94.9%) were Caucasian, 525 (82.9%) had a non-hematologic malignancy, and 200 (31.6%) were on active cancer therapy, and 355 (56.1%) were within 2 years of completing their treatment. Wearing a mask was the most adhered to public health measure for both males (N = 207, 58.8%) and females (N = 190, 68.1%). On univariable analysis, females were more adherent to frequent hand washing (OR [odds ratio] 1.43, 95% CI 1.04-2.00), not-touching face (OR 1.73, 95% CI 1.23-2.39) and wearing a protective mask (OR 1.52, 95% CI 1.09-2.21) than males. After adjusting for key confounders, the adjusted odds ratio (AOR) of frequent hand washing (AOR 1.45, 95% CI 1.03-2.03), not touching face (AOR 1.82, 95% CI 1.29-2.56), and abiding by social distancing rules (AOR 1.93, 95% CI 1.37-2.71) were significantly higher among females compared to males (Table 1). Males and females had similar adjusted odds of wearing masks and gloves, avoiding crowded and public places, completely isolating themselves, avoiding public transport, and avoiding all stores. The most preferred source of information for both genders was online information on the website of a cancer institute (males N = 160, 45.4%; females N = 150, 53.8%). Females had a higher adjusted odds of preferring information from medical professionals (AOR 1.62, 95% CI 1.14-2.30) than males, but a similar adjusted odds of preferring information from all other sources (Table 2).

4. Discussion and conclusion

Our study demonstrates that among AYAs with cancer, adherence to

Table 1
Differences in adherence to COVID-19 precautions among males and females with cancer (N = 631).

		Number of events (%)	OR (95% CI)	AOR (95%CI)
Frequent hand washing	Female	149 (53.4%)	1.43(1.04-2.00)	1.45 (1.03-2.03)
	Male (ref)	158 (44.9%)		
Not touching face	Female	130 (46.6%)	1.73 (1.23-2.39)	1.82 (1.29-2.56)
	Male (ref)	119 (33.4%)		
Wearing protective mask	Female	190 (68.1%)	1.52 (1.09-2.12)	1.41 (0.99-2.01)
	Male (ref)	207 (58.8%)		
Wearing gloves	Female	112 (40.1%)	0.90 (0.65-1.23)	0.93 (0.66-1.31)
	Male (ref)	152 (43.2%)		
Avoiding crowds or populated places	Female	167 (59.9%)	1.25 (0.91-1.72)	1.19 (0.85-1.66)
	Male (ref)	193 (54.8%)		
Abiding by social distancing rules in the jurisdiction	Female	172 (61.6%)	2.10 (1.52-2.89)	1.93 (1.37-2.71)
	Male (ref)	153 (43.5%)		
Complete isolation from members outside of household	Female	75 (26.9%)	1.14 (0.80-1.63)	1.11 (0.76-1.62)
	Male (ref)	87 (24.7%)		
Avoiding public transport	Female	92 (33.0%)	1.13 (0.81-1.58)	1.04 (0.73-1.49)
	Male (ref)	108 (30.7%)		
Avoiding visit to any stores including grocery stores	Female	62 (22.2%)	1.39 (0.94-2.06)	1.44 (0.94-2.21)
	Male (ref)	61 (17.3%)		

AOR (Adjusted odds ratio): adjusted for age (continuous), race/ethnicity, relationship status, province, location, employment status, personal income in year 2020, type of cancer, cancer treatment status, presence of self-reported mental health condition and presence of self-reported chronic physical health condition.

Table 2
Differences in the preferred sources of COVID-19 related information among males and females with cancer (N = 631).

		N (%)	OR (95% CI)	AOR (95%CI)
Medical professional	Female	131 (46.9%)	1.52(1.10-2.09)	1.62 (1.14-2.30)
	Male (ref)	131 (37.2%)		
Pamphlet from cancer institute	Female	123 (44.0%)	1.20 (0.87-1.65)	1.14 (0.81-1.59)
	Male (ref)	141 (40.1%)		
Online information on website of cancer institute	Female	150 (53.8%)	1.42 (1.03-1.94)	1.33 (0.95-1.87)
	Male (ref)	160 (45.4%)		
Social media	Female	138 (49.5%)	1.19 (0.87-1.63)	1.05 (0.75-1.47)
	Male (ref)	160 (45.4%)		
Patient organization or support group	Female	45 (16.1%)	1.31 (0.84-2.05)	1.21 (0.76-1.93)
	Male (ref)	46 (13.1%)		

AOR(Adjusted odds ratio) adjusted for age (continuous), race/ethnicity, relationship status, province, location, employment status, personal income in the year 2020, type of cancer, cancer treatment status, presence of self-reported mental health condition and presence of self-reported chronic physical health condition

COVID-19 precautionary behaviors is lower among males than females. In a cohort of Canadians without a history of cancer, females were also identified to have a higher odd of adhering to precautionary COVID-19 measures [8]. When comparing the key protective measures recommended by the Public Health Agency of Canada (wearing masks, avoiding crowds, social distancing, and handwashing) between our study of AYAs with cancer and a cohort of Canadians without cancer, adherence was similar (~60%) [8]. Adherence for AYAs with cancer to protective health measures is low given their vulnerability to severe COVID-19 infection. Future studies must examine the reasons for non-adherence among males to public health measures to maximize adherence to safety guidelines. Gender-adapted strategies to improve compliance with COVID-19 preventative measures must be developed, such as increasing targeted education towards men, engaging their partners and families, and eliminating barriers to healthcare utilization for men [9]. As we did this study before the widespread availability of COVID-19 vaccines in Canada, future studies should also evaluate gender differences in COVID-19 vaccination uptake and the association of vaccine uptake with the adoption of COVID-19 precautionary measures.

Studies have shown that the perceived risk of COVID-19 influences adherence to COVID-19 preventative measures [10]. Therefore, it is vital to provide reliable COVID-19 related information to patients with cancer to influence their perceived risk and compliance to preventive measures. Given the preference for online resources for both genders, ongoing efforts are essential to communicate the importance of preventative COVID-19 measures and COVID-19 vaccine-related information via these platforms to these young adults with cancer. Since 47% of females and 37% of males prefer to receive COVID-19 information from their health care providers, all providers must continue to provide COVID-19 specific information to these patients during their regular visits.

Our study has several important limitations. First, the demographics of our study cohort differ from that of the general Canadian population. Our cohort has an over-representation of White individuals (94.9% vs. 72.6% in the general Canadian population), and did not capture enough gender-diverse individuals to examine their adherence to public health measures and preferred sources of information [11]. Significant health disparities such as access to quality healthcare have been described among racial, ethnic and gender diverse individuals during the COVID-19 pandemic [12]. The pandemic experiences and precautionary behaviors of AYAs belonging to these subgroups may differ from those who completed our survey, and it is essential to examine this in future studies. Secondly, we relied on self-reported adherence to public health guidelines which may differ from actual adherence. Finally, there may be substantial differences between responders and non-responders. Our study was conducted online, which may have limited those without access to technology from participating.

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Adam P. Yan: Conception, Collection and Assembly of Data, Data Analysis and Interpretation, Manuscript Writing, Final Approval. Kaitlyn Howden: Conception, Collection and Assembly of Data, Data Analysis and Interpretation, Manuscript Writing, Final Approval. Camille Glidden: Conception, Collection and Assembly of Data, Data Analysis and Interpretation, Final Approval. Sheila N. Garland: Conception, Final Approval. Sapna Oberoi: Conception, Collection and Assembly of Data, Data Analysis and Interpretation, Manuscript Writing, Final Approval.

Authors' disclosures of potential conflicts of interest

No conflicts of interest to declare.

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