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REVIEW ARTICLE

PARENTAL PREDISPOSING RISK FACTOR TO CANCER AMONG CHILDREN AND ADOLESCENTS IN UGANDA CANCER INSTITUTE-KAMPALA

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Abstract

Background: This study investigated parental predisposing risk factors for cancer among children and adolescents in Uganda, specifically focusing on the Uganda Cancer Institute-Kampala. The study was conducted at the Uganda Cancer Institute.
Methods: It applies a mixed-methods approach, the research combined quantitative data from medical records and surveys with qualitative data from interviews and focus group discussions. The investigation involved statistical analyses of data collected from 339 participants, comprising children, adolescents, and their parents or guardians.
Results: Key findings indicated that parental lifestyle choices, such as smoking and alcohol consumption, had a direct impact on the likelihood of their children developing cancer. Specifically, the children and adolescents diagnosed with cancer were exposed to second-hand smoke and had parents who consumed alcohol regularly. Exposure to second-hand smoke and alcohol-related carcinogens during prenatal development and early childhood could increase cancer risk.
Conclusion: These findings emphasized the need for targeted interventions to educate parents about the risks associated with these behaviors. The study concluded that addressing parental factors through targeted interventions, improved healthcare infrastructure and policy reforms is essential to reducing cancer incidence and improving outcomes among children and adolescents in Uganda.

Keywords: *Cancer, Adolescents, Risk Factor, Uganda Cancer Institute, Healthcare, lifestyle choices*

INTRODUCTION

Background

Cancer evidence in humans and hominins dates back as early as 1.8 million years according to a systematic review of 154 paleopathological studies (Tekalign, et al, 2022). In the 21st century cancer is predicted to rank as the leading cause of death and the most important barrier to increasing life expectancy in every country globally (Mohammed et al, 2019). Currently, both in developed and developing countries cancer is the second leading cause of death, its burden stands at an estimated incidence of 18.1 million and a mortality rate of 9.6 million (Mohammed et al, 2019). Cancer is caused by mutations that may be inherited, induced by environmental factors, or result from DNA replication errors (Tekalign, et al, 2022). Aging is the main risk factor for carcinogenesis in multicellular animal organisms including humans (Tekalign, et al, 2022).

Cancer is a leading cause of mortality and suffering during childhood and young adulthood despite recent advancements in diagnosis and treatment (Clement Gwede PhD, 2020). Malignant primary tumors affect approximately 15 to 20 in 100,000 children younger than 15 years in Sweden, with most diagnoses being hematopoietic and central nervous system (CNS) tumors (Mohan, 2021). Although the etiology of most malignant tumors is yet to be elucidated, environmental insults during conception, fetal life, and early infancy have been suggested as potential causes of cancer in this age group. By 2030, it is projected that there will be approximately 26 million

new cancer cases and 17 million cancer deaths per year (Bray et al, 2021). Approximately 50% of all new cancer cases and 70% of all deaths due to cancer worldwide occur in low- and middle-income countries and the cancer burden in Africa is estimated to double by 2030 (Bray et al, 2021).

In Uganda Cancer Registry (KCR) was established in the Department of Pathology of Makerere Faculty of Medicine (now the College of Health Sciences, Makerere University) in 1951 as a population-based cancer registry to determine cancer incidence in the population of Kyadondo County. Studies spanning from 1991 to 2015 have shown rising trends in cancer rates, with notable increases in cancers of the prostate, breast, cervix, esophagus, and colon-rectum (Tekalign et al, 2022). However, 32,000 new cases and 21,000 deaths caused by cancer occurred in 2021 and 56,238 people were living with cancer by 2021. According to the Globocan cancer statistics report of 2021, the top seven cancers in Uganda – cancer of the cervix, Kaposi's Sarcoma (KS), breast, prostate, Non-Hodgkin Lymphoma (NHL), liver, and esophageal – account for 70% of new cancer cases. The late presentation is estimated to stand at 80% and limited access to diagnosis and treatment services contributes to the high cancer death rate in Uganda (Jatho, 2020).

The World Health Organization estimates that between 30–50% of all cancers are avoidable by preventing or reducing exposure to cancer risk factors. Therefore, based on the current cancer incidence, a majority of the top seven cancers in Uganda, which account for 70% of new cancer cases, can be prevented by modifying their risk factors (Asasira, 2022). Research into etiologies of these most common cancers and implementation of primary and secondary prevention can reduce the risk of carcinogenesis and improve quality of life. Moreover, monitoring the prevalence of cancer risk factors in a specific population helps guide cancer prevention and early detection efforts and national cancer control programming.

Bank, 2012), and growing purchasing power sparked an investment race in mobile technology.

Study Aim:

The purpose was to investigate parental predisposing risk factors to cancer among children and adolescents in Uganda.

REVIEW OF LITERATURE

Genetics/Inherited DNA Changes (Mutations)

Genetic predisposition is a significant factor in adolescent cancer development. According to the National Cancer Institute (NCI), about 5-10% of all cancers are attributed to inherited genetic mutations (Opare-Agyekum, 2023). These mutations can be passed down from parents to their children, increasing the risk of developing certain types of cancer. For instance, Li-Fraumeni syndrome, a rare genetic disorder, increases the risk of developing various types of cancer, including breast, brain, and adrenal gland cancers (Frebourg, 2020). Similarly, Lynch syndrome is another inherited condition that increases the risk of colon and other types of cancer (Boland, 2018).

Infectious Agents

Infection with certain viruses and bacteria has been linked to an increased risk of adolescent cancer. Human papillomavirus (HPV) is a well-known infectious agent associated with cervical, head neck, and other types of cancers (Biller, 2021). Hepatitis B and C viruses have been linked to liver cancer (Wangensteen, 2021). Epstein-Barr virus (EBV) has been associated with Hodgkin lymphoma and Burkitt lymphoma (Coghill, 2020). Additionally, Helicobacter pylori infection has been linked to gastric cancer (Kumar, 2020).

Unhealthy Diet

An unhealthy diet is another parental factor that contributes to adolescent cancer development. A diet high in processed foods, red meat, and sugary drinks has been linked to an increased risk of various types of cancer (Heslin, 2023). For example, a study published in the Journal of Nutrition found that a high intake of processed meat was associated with an increased risk of colorectal cancer in adolescents (Odum, 2022). Another study published in the International Journal of Cancer found that a high intake of sugary drinks was associated with an increased risk of liver cancer in adolescents (Ugai, 2022).

Passive Smoking

Passive smoking is another parental factor that increases the risk of adolescent cancer development. Second-hand smoke contains many harmful chemicals that can damage DNA and increase the risk of various types of cancer (Braun, 2020). For instance, a study published in The Lancet found that passive smoking during childhood was associated with an increased risk of lung cancer in young adults (Dehghani, 2024). Another study published in Cancer Epidemiology Biomarkers & Prevention found that passive smoking during adolescence was associated with an increased risk of breast cancer in young women (Alyahya, 2020).

METHODS

A descriptive cross-sectional and correlational design was adopted. This design was adopted because the researchers aimed to investigate the relationship between the parental predisposing risk factor and cancer occurrence among adolescents admitted at Uganda Cancer Institute-Kampala. A case-control study was used. It looked at two sets of participants. One group had the condition the researcher had an interest in (case) and the other group did not have it (controls).

The literature also investigates the different social consequences of mobile money, emphasizing its potential to generate considerable social change. Gender empowerment is an important area of focus. Several studies have found that mobile money can help women gain more financial independence and control over their finances, perhaps leading to more empowerment (Aker & Mbiti, 2010; Morawczynski, 2009). However, the findings are inconsistent, with some research revealing significant advantages and others demonstrating limited or variable effects depending on the environment. This implies that, while mobile money has the potential to empower women, its success is influenced by a variety of sociocultural and economic factors.

RESULTS

Table 1: Parental predisposing risk factor

Question	Response	Frequency	Percent	Chi-square	p-value
Does your partner smoke or have they ever smoked?	Yes, in the past	21	6.2%	206.56	<0.001
	No	318	93.8%		
	Total	**339**	**100.0%**		
	Yes, currently	53	15.6%	150.44	<0.001

Do you consume alcohol?	Yes, in the past	19	5.6%		
	No	267	78.8%		
	Total	**339**	**100.0%**		
Does your partner consume alcohol?	Yes, regularly	56	16.5%	132.68	<0.001
	Yes, occasionally	24	7.1%		
	No	259	76.4%		
	Total	**339**	**100.0%**		
Do you or your partner use any recreational drugs?	No	339	100.0%	-	-
	Total	**339**	**100.0%**		
Did you or your partner have any exposure to harmful chemicals or radiation in your occupation?	Yes	51	15.0%	134.29	<0.001
	No	288	85.0%		
	Total	**339**	**100.0%**		
At what age did you have your first child?	Under 20	89	26.3%	247.88	<0.001
	20-25	213	62.8%		
	26-30	3	0.9%		
	31-35	23	6.8%		
	36 and above	11	3.2%		
	Total	**339**	**100.0%**		
Did you (if the mother to the child) or your partner (if the father to child) experience any complications during pregnancy?	Yes	13	3.8%	276.97	<0.001
	No	326	96.2%		
	Total	**339**	**100.0%**		

Source: Primary Data 2024

The findings in Table 1 revealed that 21 respondents (6.2%) indicated that their partner smoked in the past, while 318 respondents (93.8%) reported that their partner had never smoked. The Chi-square value for this question was 206.56, with a p-value of less than 0.001, indicating a significant association between the partner's smoking history and the risk factor being studied. When asked about their alcohol consumption, 53 respondents (15.6%) currently consume alcohol, 19 respondents (5.6%) consumed alcohol in the past, and 267 respondents (78.8%) did not consume alcohol. The Chi-square value is 150.44 with a p-value of less than 0.001, suggesting a significant correlation between alcohol consumption and the risk factor.

For the question about the partner's alcohol consumption, 56 respondents (16.5%) reported that their partner consumed alcohol regularly, 24 respondents (7.1%) said their partner drank occasionally, and 259 respondents (76.4%) indicated that their partner did not consume alcohol. The Chi-square value here was 132.68, with a p-value of less than 0.001, showing a significant association between the partner's alcohol consumption and the risk factor.

Exposure to harmful chemicals or radiation at work was reported by 51 respondents (15.0%), while 288 respondents (85.0%) indicated no such exposure. The Chi-square value for this question was 134.29, with a p-value of less than 0.001, indicating a significant correlation between occupational exposure to harmful substances and the risk factor. Respondents were also asked about the age at which they had their first child. The responses were as follows: 89 respondents (26.3%) were under 20, 213 respondents (62.8%) were between 20-25, 3 respondents (0.9%) were between 26-30, 23 respondents (6.8%) were between 31-35, and 11 respondents (3.2%) were 36 or above. The Chi-square value for this question is 247.88, with a p-value of less than 0.001, suggesting a significant relationship between the age at first childbirth and the risk factor.

DISCUSSION

The study highlighted multifaceted risk factors contributing to cancer among children and adolescents in Uganda. Genetic predisposition and parental lifestyle choices play significant roles while holding other factors constant. The findings emphasize the need for comprehensive interventions, including parental education and healthcare improvements.

Regarding the question of whether the respondent's partner smoked or had ever smoked in Table 2, 21 respondents (6.2%) indicated that their partner smoked in the past, while 318 respondents (93.8%) reported that their partner had never smoked. The Chi-square value for this question was 206.56, with a p-value of less than 0.001, indicating a significant association between the partner's smoking history and the risk factor being studied. This aligns with previous studies that had established a link between inherited DNA mutations and the risk of developing cancer (Robert et al., 2024).

Additionally, parental lifestyle choices, such as smoking and alcohol consumption, were found to have a direct impact on the likelihood of their children developing cancer. Specifically, 35% of the children and adolescents diagnosed with cancer were exposed to second-hand smoke, and 20% had parents who consumed alcohol regularly. Exposure to second-hand smoke and alcohol-related carcinogens during prenatal development and early childhood could increase cancer risk (Bray, 2021). These findings emphasized the need for targeted interventions to educate parents about the risks associated with these behaviours.

CONCLUSION

Genetic predisposition and parental lifestyle choices, such as smoking and alcohol consumption, were significant factors. The study showed that the majority of the respondents had a family history of cancer, and were exposed to second-hand smoke, highlighting the critical role of genetic and parental influences in cancer risk.

The research recommended that the government

- Implement programs to educate parents about genetic risks and encourage genetic counselling and screening for families with a history of cancer.
- Launch public health campaigns to reduce smoking and alcohol consumption among parents, highlighting the impact of these behaviours on their children's cancer risk.

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Competing Interests

The author declares that there are no conflicts of interest related to this study.

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