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ENHANCING KNOWLEDGE AND EDUCATION OF BONE CANCER FOR ADOLESCENT IN INDONESIA

MENINGKATKAN PENGETAHUAN DAN EDUKASI KANKER TULANG PADA REMAJA DI INDONESIA

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Abstract

Despite much-advanced therapy developed for bone cancer, prevention of the disease remains the most favorable and low-cost management approach. Bone cancer prevention and education should be initiated with adolescents. Adolescents are the right group to receive bone cancer education, as they are in an active learning phase and have the potential to develop risky behaviors that can increase vulnerability to cancer, as they are in a stage of active learning but also face the development of risky and unhealthy behaviors. This study aims to assess the knowledge of bone cancer among adolescents in Indonesia. It is a cross-sectional study that uses a questionnaire to evaluate the participants' knowledge of bone cancer. A total of 39 questions regarding family history and general knowledge of cancer are given to the students in a pre-test and post-test format. Between the tests, a group of orthopedic specialists provided a short lecture to the students about the basic knowledge and prevention of bone cancer. The study involved 564 students from junior and senior high schools in Indonesia, with an overall mean age of 14.79 years. Bone cancer was mentioned in the family history of only 0.4% of the participants, but 21.5% to 23.5% were unsure about their own family cancer status. The study found a significant statistical result, indicating that the short lectures given by the orthopedic specialists were effective in enhancing the students' knowledge about bone cancer. The findings suggest that adolescents in Indonesia are still uncertain about their family cancer status and often misinformed about the symptoms of bone cancer. However, an educational lecture or discussion led by an expert in the field has proven to be an effective way to improve the students' knowledge about bone cancer.

Keywords: *Bone Cancer; Adolescent; Education; Prevention; Orthopaedic; Human and Medicine.*

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Abstrak

Meskipun banyak terapi canggih telah dikembangkan untuk kanker tulang, pencegahan penyakit tetap menjadi pendekatan pengelolaan yang paling menguntungkan dan hemat biaya dengan upaya pencegahan. Pencegahan dan edukasi kanker tulang harus dimulai oleh remaja. Remaja adalah kelompok yang tepat untuk menerima edukasi kanker tulang, karena berada dalam fase pembelajaran yang aktif dan berpotensi mengembangkan perilaku berisiko yang dapat meningkatkan kerentanan terhadap kanker, karena mereka berada pada usia belajar aktif tetapi juga dalam tahap di mana perilaku berisiko dan tidak sehat mulai berkembang. Kegiatan ini bertujuan untuk menilai pengetahuan tentang kanker tulang pada remaja di Indonesia. Ini adalah studi cross-sectional yang menggunakan kuesioner untuk menilai pengetahuan tentang kanker tulang. Sebanyak 39 pertanyaan mengenai riwayat keluarga dan pengetahuan kanker secara umum, diberikan kepada siswa sebelum dan sesudah tes. Sekelompok dokter ortopedi memberikan edukasi kepada siswa tentang pengetahuan dasar dan pencegahan kanker tulang di antara tes. Sebanyak 564 siswa SMP dan SMA di Indonesia berpartisipasi dalam kuesioner dan edukasi, dengan usia rata-rata 14,79 tahun. Kanker tulang hanya disebutkan oleh 0,4% peserta dalam riwayat keluarga, tetapi 21,5% hingga 23,5% tidak yakin tentang status kanker keluarga mereka sendiri. Hasil statistik yang signifikan menunjukkan bahwa kuliah singkat yang diberikan oleh dokter ortopedi efektif meningkatkan pengetahuan siswa tentang kanker tulang. Remaja di Indonesia masih belum yakin tentang status kanker keluarga mereka dan sering salah mengartikan tentang gejala kanker tulang. Namun, kuliah atau diskusi edukatif yang diberikan oleh ahli di bidang ini terbukti efektif meningkatkan pengetahuan siswa tentang kanker tulang.

Kata kunci*: Kanker Tulang; Remaja; Pendidikan; Pencegahan; Ortopedi; Manusia dan Kedokteran.*

INTRODUCTION

As the second leading cause of death worldwide, cancer causes a dramatic clinical burden, disrupts social standards, and erodes many economic resources. Although it accounts for a small percentage of 0.2% of all malignancies worldwide, bone cancer poses the same or even worse threat due to patient limitation and disability (Kube et al. 2022). The World Health Organization (WHO) estimates that cancer deaths are likely to surpass that of ischemic heart disease in the near future (Mattiuzzi and Lippi 2019). Despite the much-advanced therapy developed, prevention of the disease is still the most favorable and low-cost management to reduce the overall cancer incidence and/or death rate, especially in bone cancer. Osteosarcoma, chondrosarcoma, and Ewing sarcoma, as the most common bonce cancer subtypes, are frequently aggressive and require early diagnosis (Kube et al. 2022). Awareness is key to identifying early symptoms, preventing cancer development, and providing positive health outcomes (Kyle, Nicoll, et al. 2013).

Cancer prevention and education should be started by adolescents. This age group provides a window of opportunity for cancer risk education and intervention as they are in an age of active learning but are also in a stage where risky behaviors, such as smoking and alcoholism begin (Kyle, Nicoll, et al. 2013). Adolescents should be aware of the potential risks and lifestyle choices that can lower their risk of acquiring cancer because health-related behaviors are frequently formed during this time. A study using a Cancer Awareness Measure (CAM) on adolescents showed improvement in cancer warning signs within two weeks of the intervention and a statistically significant decrease incidence of cancer. Another systematic review showed six trials involving educational interventions for adolescents reported a positive effect on composite sun protection behaviors for skin

cancer (Henrikson et al. 2018). However, data regarding bone cancer awareness and education attempts are limited.

Current literature suggests that many adolescents and college students in the USA lack cancer-preventative knowledge and engage in cancer-risk behaviors such as unhealthy diets, frequent alcohol consumption, and low physical activity (Abraham et al. 2023). In one study, only 49% of adolescents reported awareness of the human papillomavirus (HPV) vaccine and cervical cancer (Bhatta and Phillips 2015). Addressing this lack of awareness is crucial to empowering adolescents to make choices to prevent cancer and reduce cancer risk factors (Abraham et al. 2023). The provision of short lectures was chosen for several reasons, including the standardization of educational material delivery and the same duration of learning, which will reduce bias during evaluation. This study aims to educate and assess the level of knowledge about bone cancer among adolescents in Indonesia, addressing a gap in current research on cancer awareness in this age group.

COMMUNITY SERVICE METHOD

This cross-sectional study aimed to assess adolescents' knowledge of bone cancer through a questionnaire-based approach. This study was conducted at junior and senior high schools in Jember, Indonesia from September to October 2023. The questionnaire consisted of 39 questions divided into three sections: three questions on personal or family cancer history, three questions on any history of bone cancer symptoms, and 33 questions assessing general knowledge about bone cancer. Then, a group of orthopedics under the Indonesian Orthopaedic Association gave a short lecture to the students about basic knowledge and prevention of bone cancer. A similar questionnaire was then given to the student again as a post-test. The results of general cancer history questions are analyzed descriptively, and the knowledge of bone cancer questions is analyzed statistically to assess the results of lectures.

RESULTS AND DISCUSSIONS

A total of 564 junior and senior high school students from Jember, Indonesia, participated in the study, with a mean age of 14.79 years (range: 11-19 years), and a majority of participants were female (55.4%). Demographic data show that the majority of the participants are female (55.4%) with an overall mean age of 14.79 years old (youngest 11 y.o. and 19 y.o. oldest). The results of general cancer history questions are described in Table 1 below, as 9.7% of pre-test students know their family suffered from cancer and 7.2% know that some of their relatives died of cancer. However, some participants do not know if they have a family history of cancer. Breast Cancer is the most reported type, while bone cancer has a small percentage of 0.4% together with prostate and thyroid. However, 23.2% of participants don’t know about their family history or (21.5%) death of cancer.

Table 1. General Cancer History Questions.

Cancer History Question	Frequency (n=564)	Percentage (%)
Has anyone in your family ever had cancer?		
Yes	55	9.8%
No	378	67.0%

Don't Know	131	23,2%
Has anyone in your family died of cancer?		
Yes	41	7.3%
No	402	71.3%
Don't Know	121	21.5%
What type of cancer does your family suffer from?		
Pulmonary Cancer	11	2.0%
Breast Cancer	25	4.4%
Colon Cancer	3	0.5%
Liver Cancer	1	0.2%
Thyroid Cancer	2	0.4%
Prostate Cancer	2	0.4%
Bone Cancer	2	0.4%
Others	10	1.8%

Despite the small percentage, of bone cancer symptoms history questions show a higher percentage of 11.8% of the student ever experienced a lump/mass in their bone (Table 2). A smaller percentage (8.7%) mention the lump/mass is accompanied by pain. However, after the short lecture, the percentage of lump/mass symptoms and accompanying pain slightly decreased. Table 3 shows a remarkable mean increase in the result of bone cancer's knowledge questions. With one correct point for every 33 questions, the minimum score from the participants was 3 and the highest score was 30 in the pre-test, while in a post-test increase from 11 minimum to 33 maximum score. A significant statistical result shows that short lectures given by orthopedics were effective in enhancing the student's knowledge about bone cancer.

Table 2. Bone cancer symptoms history questions.

	Pre-test	**%**	**Post-test**	**%**
Have you ever experienced a lump/mass in your bone?				
Yes	67	11,9%	63	11.2%
No	497	88,1%	501	88.8%
Have you ever experienced a lump/mass in a bone accompanied by pain?				
Yes	49	8,7%	46	8.2%
No	515	91,3%	518	91.8%
Have you ever experienced bone pain?				
Yes	190	33,7%	183	32.4%
No	374	66,3%	381	67.6%

Table 3. Knowledge of Bone Cancer Questions.

Cancer History Question	**Pre-test Mean (SD)**	**Min-max**	**Post-test Mean (SD)**	**Min-max**	**p-value**
Knowledge of bone cancer score	19.45 (4.35)	(3-30)	24,65 (3,78)	(11-33)	<0.001*

(33 Questions (1 point each))	

*Wilcoxon-test

Adolescence is the phase of life between childhood and adulthood, which is an age of active learning but is also a stage where risky and unhealthy behavior begins to develop (Barros et al. 2016). Participant of this study has a fitting age of adolescence to WHO criteria, from ages 10 to 19, with an overall mean age of 14.79 years old. Adolescents are the right group to receive bone cancer education, as they are in an active learning phase and have the potential to develop risky behaviors that can increase vulnerability to cancer. because they are at an active learning age but also at a stage where risky and unhealthy behaviors begin to develop.

The results of general cancer history questions show uncertainty about their family history of cancer. Although most participants answered affirmatively (yes or no) 21.5% to 23.5% are unsure about their family cancer status. In concordance with recent prevalence (Kube et al. 2022), bone cancer was mentioned only by 0.4% of participants making it a type of cancer that is rarely known to the general public, especially adolescents because of minimal education of cancer.

Although bone and joint cancer are most frequently diagnosed among those aged <20, the presence of a lump/mass in the bone in the common population is extremely rare, constituting less than 1% (Verma et al. 2018). Pathological fractures of the bone are the most common symptoms present, while mass at the bone is the least symptom. Even in high-grade tumors, mass is often not present (Gerrand et al. 2016). However 9.8% of participant stated experiencing a lump/mass in their bone. With their lack of knowledge, adolescents often associate cancer with negative emotions, views, and attitudes. Some studies suggest that adolescents describe cancer as life-altering, costly, and potentially fatal (Kyle, Macmillan, et al. 2013; Kyle, Nicoll, et al. 2013). It is possible that participants misinterpreted mass in their bone with common swelling or minor soft tissue inflammation. After the short lecture, the percentage of lump/mass symptoms and accompanying pain slightly decreased, indicating that a small proportion of the participants were unsure about their symptoms.

Targeting cancer prevention areas is essential to lowering adolescent cancer risk. Engagement of adolescents through education is ideal due to their ability to actively learn at this stage of life and provides researchers and educators with an optimal opportunity for education and engagement in preventative behaviors (Barros et al. 2016). This is consistent with the participant's interest in cancer education and preventative behaviors given by the orthopedics. However, some barriers obstruct adolescents from proper cancer education and preventative behaviors. Despite the effectiveness of the educational intervention, barriers such as social stigma, cultural norms, and discomfort in discussing cancer remain challenges for adolescents (Kyle, Macmillan, et al., 2013). Literature suggests that engagement with cancer survivors or specialists can help reduce these barriers and encourage positive attitudes toward cancer prevention.

CLOSING

Conclusion. Adolescents in Indonesia often lack awareness about their family's cancer history and are frequently misinformed about bone cancer symptoms. Providing targeted education and awareness initiatives is essential to reducing cancer risk among adolescents, particularly for bone cancer.

Suggestion. An educational lecture or discussion given by an expert in the field proves effective in enhancing the student's knowledge about bone cancer.

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