

Gieniec Weronika, Gucwa Magdalena, Galus Adrian, Jurkiewicz Beata. Public knowledge of blood cancers. *Journal of Education, Health and Sport*. 2022;12(7):790-798. eISSN 2391-8306. DOI <http://dx.doi.org/10.12775/JEHS.2022.12.07.079>
<https://apcz.umk.pl/JEHS/article/view/JEHS.2022.12.07.079>
<https://zenodo.org/record/6911998>

The journal has had 40 points in Ministry of Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Education and Science of December 21, 2021. No. The journal has had 40 points in Ministry of Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Education and Science of December 21, 2021. No. 32343. Has a Journal's Unique Identifier: 201159. Scientific disciplines assigned: Physical Culture Sciences (Field of Medical sciences and health sciences); Health Sciences (Field of Medical Sciences and Health Sciences).

Punkty Ministerialne z 2019 - aktualny rok 40 punktów. Załącznik do komunikatu Ministra Edukacji i Nauki z dnia 21 grudnia 2021 r. Lp. 32343. Posiada Unikatowy Identyfikator Czasopisma: 201159. Przypisane dyscypliny naukowe: Nauki o kulturze fizycznej (Dziedzina nauk medycznych i nauk o zdrowiu); Nauki o zdrowiu (Dziedzina nauk medycznych i nauk o zdrowiu).

© The Authors 2022;

This article is published with open access at Licensee Open Journal Systems of Nicolaus Copernicus University in Torun, Poland
Open Access. This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author (s) and source are credited. This is an open access article licensed under the terms of the Creative Commons Attribution Non commercial license Share alike. (<http://creativecommons.org/licenses/by-nc-sa/4.0/>) which permits unrestricted, non commercial use, distribution and reproduction in any medium, provided the work is properly cited.
The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 16.07.2022. Revised: 17.07.2022. Accepted: 26.07.2022.

Public knowledge of blood cancers

Weronika Gieniec

Scientific Association “Medyk”, student of Nursing, Department of Nursing, Faculty of Health Sciences, University of Applied Sciences in Tarnow

<https://orcid.org/0000-0003-1283-4734>

Magdalena Gucwa

Scientific Association “Medyk”, student of Nursing, Department of Nursing, Faculty of Health Sciences, University of Applied Sciences in Tarnow

<https://orcid.org/0000-0002-6429-3928>

Adrian Galus

Scientific Association “Medyk”, student of Nursing, Department of Nursing, Faculty of Health Sciences, University of Applied Sciences in Tarnow

<https://orcid.org/0000-0002-8928-8260>

Beata Jurkiewicz

Department of Nursing, Faculty of Health Sciences, University of Applied Sciences in Tarnow

<https://orcid.org/0000-0001-9788-7602>

Keywords: blood cancer, leukemia, screening, bone marrow transplantation, bone marrow donation

Abstract

Introduction. Blood cancers are a group of conditions that develop in the bone marrow and/or lymphatic system and include cancers of the hematopoietic system and cancers of the lymphatic system. The key test for blood cancers diagnosing is complete blood count.

The aim of the study was to assess the level of public knowledge about blood cancers and their treatment. The study was conducted in March 2022 by a diagnostic survey method using a proprietary survey questionnaire made available online via Google Forms. The analysis included 311 correctly completed questionnaires.

Results and conclusions. The respondents' level of knowledge about blood cancers and their treatment methods is very low. Nearly half of the respondents perform blood counts too infrequently (every two years or less often). Those with any knowledge of blood cancers (defined as minimal in the knowledge test) performed a blood count every six months, and not less often than once a year. Nearly 1/3 of the respondents do not want to donate bone marrow because they are afraid of the procedure. Of those registered or those who attempted registration, most presented a level of knowledge defined as minimal. The vast majority of respondents would like to see more events to promote blood cancer awareness.

Introduction

Blood cancers are a group of conditions that develop in the bone marrow and/or lymphatic system and include cancers of the hematopoietic system and cancers of the lymphatic system. The most common cancer in adults is acute myeloid leukemia, which accounts for about 80% of all adult leukemias and affects men slightly more often than women. The incidence of this type of leukemia is 3.7/100,000 population per year, and the possibility of contracting the disease increases significantly with age - the median age of patients with acute myeloid leukemia is 67 years. Acute lymphoblastic leukemia are considered childhood leukemias (about 80% of all leukemia cases in children) [1,2].

The key test for blood cancer diagnosing is complete blood count. It is one of the basic and cheapest of the tests performed, so it is essential for the public to be self-aware of the importance of performing it regularly (at least once a year) [3].

The public's knowledge of the disease is extremely important in the treatment and prevention of blood cancer. Above all, awareness of the risk allows for early diagnosis of the disease and, consequently, faster treatment. From the point of view of leukemia patients, this topic is particularly important because of possible bone marrow transplantation. The level of public knowledge is reflected in the number of potential Marrow Donors. An expanded base of potential Donors, in turn, increases the chances of finding a genetic twin of a person with cancer and a complete cure [4].

It is increasingly common to see campaigns promoting bone marrow donation. One of the organizations involved in organizing such events is the DKMS Foundation, which is engaged in registering potential bone marrow donors to the database. A lot of reliable information on this subject can be found on the official website. A bone marrow or hematopoietic stem cell transplant is often the last chance for people suffering from blood cancer [5,6].

The aim of this study was to assess the public's level of knowledge about blood cancers and their treatment. It was also important to find out whether the respondents know how often they should have a blood count and whether they actually follow these recommendations. In addition, the respondents' attitudes toward their willingness to help patients by donating bone marrow were examined.

Material and methods

The study was conducted by a diagnostic survey method using the author's survey questionnaire in March 2022. The questionnaire was made available to a random group of people of different ages and from different parts of Poland, and online forums. A total of 358 people participated in the voluntary and anonymous survey, of which 311 correctly completed questionnaires were included in the analysis (in addition to incomplete questionnaires, questionnaires completed by people working in health care and minors were excluded).

The first section of the questionnaire was a metric that collected basic data about the patient and included the question "Do you work in a health-related occupation". Based on the answer to this question, those associated with a health care job were eliminated from the study. Other questions were designed to determine, among others, the health status of the respondents, the level of knowledge about blood cancers and treatment methods (knowledge test), preventive behavior in terms of early diagnosis of blood cancers, registration status in the bone marrow donor database. For the knowledge test, respondents could score from 0 to 10 points. The interpretation of the knowledge test was as follows: 0 - 3 points - no knowledge; 4 - 5 points - minimal knowledge; 6 - 8 points - well-established knowledge; 9 - 10 points - above-average knowledge.

The data obtained were statistically analyzed using Microsoft Excel of Office 2016 and R software (v. 3.4.0). Quantitative variables were analyzed by counting the arithmetic mean and standard deviation (SD), while qualitative variables were analyzed by presenting the number and percentage of occurrences of each value. Linkage analysis for qualitative variables was performed using the chi2 test. A significance level of $p < 0.05$ was adopted.

Results

Among the study group of 311 subjects, women accounted for 68.2% (212 subjects), men 31.8% (n=99). The age of the respondents varied and ranged from 18 to 78 years (mean: 26.7 ± 11.3 years). With a slight advantage, respondents cited urban (n=160; 51.4%) than rural (n=151; 48.6%) as their place of residence. The largest number of respondents had a secondary education (n=170; 54.7%), the next large group were those with higher education (n=85; 27.3%), vocational education (n=35; 11.3%), while the smallest group were respondents with primary education (n=21; 6.8%). As many as 41.8% (n=130) of the respondents were those who were studying, and 24.4% (n=76) were those who were simultaneously studying and working. Professional activity was declared by 25.7% (n=80) of respondents. Professionally inactive people accounted for 8% (n=25), of which 4.5% (n=14) were unemployed, and 3.5% (n=11) were retirees/pensioners.

Of the respondents, 20.57% (n=64) declared that they had chronic diseases, in addition, there was no person who had blood cancer. The presence of blood cancer in a close relative was indicated by 11.6% (n=36) of the respondents, of which 48.6% (n=18) indicated, the person's blood cancer was detected due to increased symptoms of a progressive disease, in 21.6% (n=8

people) did not know the circumstances under which the disease was detected, 18.9% (n=7) admitted that the cancer was detected during a preventive examination from a general practitioner, and 10.8% (n=4) indicated that during a periodic examination for work.

Respondents were asked to rate their knowledge of blood cancers, where the highest score was 5 and the lowest was 1. Respondents rated their level of knowledge in this area at an average of 2.3 points (± 1.0 points). In turn, the average score on the knowledge test (10 questions) was 3 points (± 1.5 points). The interpretation of the results was as follows: no knowledge (62.7%; n=195); minimal knowledge (28.3%; n=88); well-established knowledge (9.0%; n=28); above-average knowledge - no person received such a score.

Detailed data on the percentages of correct answers given to each knowledge test question are provided in Table I. Respondents had the most difficulty with the question on what age people most often get cancer. The correct answer "age 50-80" was indicated by 12.86% (n=40). Respondents had the least difficulty with the question regarding whether leukemia can be cured; the correct answer "leukemia can be cured" was indicated by 48.87% (n=152).

Table I. Descriptive statistics of correct answers in the test of knowledge about blood cancers and their treatment

Question	Correct answer N(%)
In your opinion, the most common age group for blood cancers is: <i>50 – 80 years</i>	40 (12.86%)
In your opinion, blood cancers are more likely to affect: <i>Men</i>	115 (36.98%)
In your opinion, the most common cancers of the hematopoietic system are: <i>acute myeloid leukemia</i>	139 (44.69%)
In your opinion, how often does blood cancer recur in children? <i>15 – 20%</i>	143 (45.98%)
In your opinion, every how many months should preventive blood count tests be done to detect cancer in its early stages? <i>Every six months, every year</i>	128 (41.16%)
Do you think it is possible to cure leukemia? <i>Leukemia can be cured</i>	152 (48.87%)
In your opinion, which leukemia treatment methods provide the best therapeutic results? <i>Bone marrow transplantation, hematopoietic stem cell transplantation</i>	52 (16.72%)
In your opinion, the highest probability of compatibility for bone marrow transplantation occurs: <i>among siblings</i>	51 (16.40%)
In your opinion, what methods exist for bone marrow collection? <i>Collection of hematopoietic stem cells from peripheral blood, bone marrow collection from the hip plate, bone marrow collection from the lumbar vertebrae</i>	51 (16.40%)
Which bone marrow collection method is most commonly used? <i>Collection of hematopoietic stem cells from peripheral blood</i>	122 (39.23%)

The largest group of respondents said they perform preventive blood counts every year (31.8%; n=99). The next numerous group was those who perform blood counts less frequently than every two years (28.9%; n=90). The remainder perform blood counts every two years (20.9%; n=65) or every six months, or more frequently (18.3%; n=57).

Most people were referred for preventive blood tests by their family doctor in the absence of worrisome symptoms (26.7%; n=83), a similar percentage (25.1%; n=78) declared that they self-refer for preventive blood tests in the absence of worrisome symptoms. The remainder indicated that they perform the tests privately when something worrisome concerns them (18.0%; n=56), are referred by their family doctor because of worrisome symptoms (15.4%; n=48), or perform blood tests during periodic examinations for work (14.8%; n=48).

As many as 31.8% (n=99) of respondents admitted that they did not want to donate bone marrow because they were afraid of the procedure, 19.6% (n=61) said they were already registered with the bone marrow donor database, followed by those who were not registered with the bone marrow donor database, but had attempted to register (19.6%; n=51). Equal groups were those who did not know where they could register in the Donor database (16.1%; n=50) and those who expressed no interest in donating bone marrow (16.1%; n=50).

The majority of respondents did not have a potential bone marrow donor among their friends (58.2%; n=181), while 10.0% (n=31) had a bone marrow recipient among their closer or further acquaintances.

Survey respondents have mostly (72.3%; n=225) encountered an event promoting bone marrow donation, and the vast majority of respondents would like to see more events promoting blood cancer awareness (92.0%; n=286).

The relationship between the knowledge test score and sociodemographic data was analyzed. Age and gender had no effect on the level of knowledge of the subjects ($p>0.05$). However, there was a correlation between education and the level of knowledge about blood cancers and their prevention - at least minimal knowledge was most often presented by those with secondary education, followed by those with higher education (Table II).

Table II. Level of knowledge of blood cancers and prevention vs. education of respondents

Variables	n	%	Chi2
Lack of knowledge	195		p=0.017293
Primary/vocational	42	21.54	
Secondary	109	55.90	
Higher	44	22.56	
Minimum/established	88		
Primary/vocational	14	15.91	
Secondary	61	69.32	
Higher	41	46.59	

The influence of other factors on the subjects' level of knowledge in the aforementioned area was also analyzed. Variables such as the presence of blood cancer in close relative, fear of contracting blood cancer, and having a bone marrow recipient among friends were not significantly related to the level of knowledge of the subjects about blood cancer and its prevention ($p>0.05$).

The level of knowledge about blood cancers and their prevention depended on the frequency of preventive examinations – complete blood count; it was shown that significantly more often the minimum level of knowledge concerned those who performed this type of examination not less than once a year (Table III).

Table III. Frequency of preventive examinations vs. level of knowledge about blood cancers and their prevention

Variables	n	%	Chi2
Lack of knowledge	195		p=0.000253
Every two years or less frequently	101	51.79	
Every six months or more often, not less than once a year	94	48.21	
Minimum	88		
Every two years or less frequently	23	26.14	
Every six months or more often, not less than once a year	65	73.86	
Established	28		
Every two years or less frequently	14	50.00	
Every six months or more often, not less than once a year	14	50.00	

It was also shown that knowledge of blood cancers and their prevention depended on the status of registration in the Marrow Donor Database; in the group of people who had no knowledge in the above-mentioned area, the vast majority did not want to donate marrow. Of those who were registered or who attempted to register, the majority presented a level of knowledge defined as minimal (Table IV).

Table IV. Marrow donor registration status vs. level of knowledge about blood cancers and their prevention

Variables	n	%	Chi2
Lack of knowledge	195		p=0.01038.
No, because I do not want to donate bone marrow, I am afraid of the procedure; I am not interested in donating bone marrow; I do not know where I can do it.	137	70.26	
Yes, I am registered./ I made an attempt to register	58	29.74	
Minimum	88		
No, because I do not want to donate bone marrow, I am afraid of the procedure; I am not interested in donating bone marrow; I do not know where I can do it.	46	52.27	
Yes, I am registered./ I made an attempt to register.	42	47.73	
Established	28		
No, because I do not want to donate bone marrow, I am afraid of the procedure; I am not interested in donating bone marrow; I do not know where I can do it.	16	57.14	
Yes, I am registered.	12	42.86	

Discussion

Leukemia screening is not popular in Poland, and Poles are quite reluctant to go to the doctor if they do not feel increased symptoms. Most patients see a doctor only after they experience alarming symptoms, thus reducing their chances of a full recovery. This way of thinking makes it very difficult to diagnose the disease at an early stage, and this significantly affects the results of treatment. In Poland, there is a problem of patients not taking part in screening, while in Iceland, for example, more than 90% of eligible patients attend preventive examinations [7]. According to experts, the positive effect of implementing such programs is achieved when at least 70% of people in risk groups are covered [8].

The study conducted by a team from the Medical University of Lublin shows that the general level of parents' knowledge of leukemia in children is insufficient. As many as 12% of surveyed parents see no need in conducting preventive blood tests on their child. This is a frightening result, since leukemia is the most common childhood cancer, and complete blood count with differential is the key diagnostic test in this disease. Parents are unaware of the basic principles of prevention and indicate the greater importance of diet over blood tests. In addition, a significant number of parents (10%) consider leukemia an incurable disease [9]. Our own research shows that as many as 51.13% of respondents doubt or do not believe that leukemia can be cured.

Unsatisfactory levels of knowledge about blood cancers are not only demonstrated by Poles - the problem also affects other countries. In the study conducted at Shah Abdul Latif University among 204 students, as many as 27% believed that leukemia is hereditary, and 61.3% answered that leukemia can be contracted through a blood transfusion. Only 2% of the students were able to name the causes and symptoms of leukemia [4]. A similar study was conducted in Pakistan on 150 medical students. The results show that 25.3% of the students mistakenly believed that leukemia is hereditary, while 54% said it can be acquired through a blood transfusion [10]. Both studies clearly illustrate the gaps in knowledge about leukemia and the need for educational programs on the subject.

Marrow transplantation is still a thread shrouded in many myths and stereotypes ingrained in the nation. The public is unaware of what bone marrow donation looks like and how important it is, which is the reason for the insufficient number of potential Donors. Our own research shows that respondents are reluctant to agree to a bone marrow donation mainly because of fear - the myth still lives among the public that marrow is taken from the spine, which is a highly dangerous procedure. Stem cell donation is a safe procedure. There are two methods of collecting stem cells - from peripheral blood (about 85% of all donations) and from the hip plate (15%). Every donor may experience side effects, but they are not dangerous and, depending on factors such as the donation method, the donor's age, gender or obesity, are aggravated to varying degrees. The most common are pain after blood collection, pain after injection, and tingling. These discomforts are primarily short-lived and easy to manage [11].

The study conducted by Ławecka and Gotlib found that the level of knowledge of nurses working in departments (regardless of their education) about bone marrow transplantation is unsatisfactory [12]. This indicates the need for careful education in the course of academic training so that medical personnel can provide up-to-date information to patients and spread the right attitudes toward bone marrow transplantation among the public. Similar results were obtained by a team from Szczecin, which conducted a study on bone marrow and bone marrow transplantation among secondary school students [13]. The knowledge of adolescents in this area was low, and there is clearly a need for activities aimed at raising awareness of bone marrow transplantation. The authors emphasize that educational campaigns should straighten out misinformation and stereotypes that have taken root in society. Nowadays, the most easily accessible source of information is the Internet, so it would be worthwhile to use it to conduct educational activities in this area.

The Internet provides opportunities to promote unreliable information very easily. Health fraud perpetrated via the Internet is not uncommon. Data provided by Ulatowska-Szostak et al. show that more than half of the Internet users surveyed (51.2%) just indicated the Internet as the primary source of information on their own or a family member's ailments, diagnosed disease, its course and treatment options. In addition to reliable, accurate and up-to-date information, there is erroneous information, sometimes even deliberately misleading the potential recipient [14].

The positive effects of the educational workshops were described by Wolinska et al. who conducted a study on bone marrow knowledge and transplantation among secondary school students. The aforementioned workshops raised the level of knowledge among secondary school students. This indicates that an extremely important role can be attributed to activities related to educating young people about bone marrow transplantation. An increase in knowledge can contribute to an increase in the percentage of people willing to remain potential bone marrow donors [15]. The analysis of our own research confirms the need for educational activities about blood cancers. The survey also shows the need for more campaigns on blood cancers. Respondents mostly expressed their interest in such events. This proves that there is still a lack of reliable campaigns on leukemia. People are often encouraged to become Marrow Donors, but in order for such invitations to make sense, misinformation that has taken root in society needs to be corrected [13].

Conclusions

The respondents' level of knowledge about blood cancers and their treatment methods is very low. Similarly, the respondents themselves assessed their level of knowledge in the above-mentioned area. Nearly half of the respondents perform blood counts too infrequently (every two years or less often). Those with any knowledge of blood cancers (defined as minimal in the knowledge test) performed a blood count every six months, and not less often than once a year. Nearly 1/3 of those surveyed do not want to donate bone marrow because they are afraid of the procedure. Of those registered or those who attempted registration, most presented a level of knowledge defined as minimal. The vast majority of respondents would like to see more events to promote blood cancer awareness.

References

Czyż A, Giebel S. Ostra białaczka limfoblastyczna i chłoniaki limfoblastyczne. *Onkologia w Praktyce Klinicznej - Edukacja* 2020; 6:204-241.

Wierzbowska A. Ostra białaczka szpikowa. *Onkologia w Praktyce Klinicznej - Edukacja* 2020;6:119–144

DKMS. Morfologia krwi – co to jest i jak czytać wyniki badania? <https://www.dkms.pl/dawka-wiedzy/o-nowotworach-krwi/morfologia-krwi-co-to-jest-i-jak-czytac-wyniki-badania> [24.02.2022]

Channa TA, Mangi AA, Khan H, et al. Awareness of Shah Abdul Latif University (SALU) students regarding leukemia and associated complication. *MOJ Bioequiv Availab.* 2019;6(1):14–17; DOI: 10.15406/mojbb.2019.06.00129

DKMS. Białaczka <https://www.dkms.pl/dawka-wiedzy/o-nowotworach-krwi/bialaczka> [24.02.2022]

Stanicki P, Dobosz M, Chilimoniuk Z, et al. Przegląd najnowszych metod leczenia ostrej białaczki szpikowej [In:] *Postępy w diagnostyce medycznej*, Bednarski J, Pawlicka M, Bałabuszek K, Mroczek A (eds); wyd. Instytut Promocji Kultury i Nauki, Lublin 2020: 90-99

Paszkiewicz D, Piotrkowski J. Profilaktyka w systemie ochrony zdrowia. Kontrola -Państwowa 2017; 4: 77-96

Krajowe ramy strategiczne. Policy paper dla ochrony zdrowia na lata 2014–2020”, Ministerstwo Zdrowia, Warszawa 2015

Kister K, Sodolska A, Skiba K, et al. Świadomy rodzic – większa szansa na pokonanie białaczki [In:] Medycyna wczoraj i dziś - klasyczne rozwiązania i nowoczesne technologie, Bednarski J, Gędek A, Nogalska A (eds), Instytut Promocji Kultury i Nauki, Lublin 2021: 43-53

Raees H, Khan S, Sadia H, et al. Awereness of Leukemia Among Medical Students; RADS Journal of Pharmaceutical Sciences 2017; 5(4): 23-26

Styczyński J. Bezpieczeństwo dawców krwiotwórczych komórek macierzystych; Hematologia 2012; 3(1): 58-65

Ławecka M, Gotlib J. Analiza wiedzy i postaw pielęgniarek pracujących w oddziałach zabiegowych wobec dawstwa szpiku kostnego. Medycyna Ogólna i Nauki o Zdrowiu 2013; 19(4): 425-430

Gościniak M, Wójta – Kempa M. Wiedza i postawy studentów wrocławskim uczelni na temat transplantacji szpiku kostnego. Pielęgniarstwo i Zdrowie Publiczne 2011; 1(1): 27-34

Ulatowska-Szostak E, Marcinkowski JT, Gromadecka-Sutkiewicz M, et al. Badania nad Internetem jako źródłem informacji o chorobie. Problemy Higieny i Epidemiologii 2009; 90(2): 246-253

Wolińska W, Karpeta – Pawlak IE, Kotwas A, et al. Wiedza na temat szpiku kostnego i jego transplantacji wśród młodzieży licealnej. Pomeranian Journal of Life Sciences 2017; 63(2): 63-67; DOI:10.21164/pomjlifesci.254