

OBRAZOVANJE ZA ZDRAVU ŽIVOTNU SREDINU I ZELENU EKONOMIJU KAO DUGOROČNA STRATEGIJA U OBRAZOVNOM SISTEMU/ EDUCATION FOR A HEALTHY ENVIRONMENT AND GREEN ECONOMY AS A LONG- TERM STRATEGY IN THE EDUCATIONAL SYSTEM

Pregledni članak

Elizabeta Popova Ramova¹, Biljana Apostolova¹, Atanas Kozarev¹, Magdalena Punčeva Marina¹

¹MIT Univerzitet u Skoplju Bulevar 3. Makedonske brigade, Republika Sjeverna Makedonija,
e-mail: eliramova62@gmail.com, kozarev.atanas@yahoo.com

Sažetak

Zdravlje je fizičko, mentalno i socijalno blagostanje i čista okolina. Kao prosvjetni radnici u srednjem i visokom obrazovanju iz oblasti zdravstvene djelatnosti primjetili smo da je briga o životnoj sredini vrlo malo ili nikako zastupljena kao predmet. Smjernice koje smo dobili od SZO prije 2 godine bile su nam poticaj da sve buduće zdravstvene radnike edukujemo o zaštiti okoliša. Prethodno smo sproveli anketu koja je utvrdila da studenti uopšte nemaju znanja o tome kako da zaštite životnu i radnu sredinu, iako su upoznati sa problemom zagađenja na globalnom nivou. Svi su pokazali interesovanje da to praktikuju. U svaki stručni predmet uveli smo protokole zaštite životne sredine u procesu zdravstvene zaštite, edukaciju o zbrinjavanju medicinskog i drugog otpada i njegovoj reciklaži. Analizirali smo ekonomsku korist kroz manji broj oboljelih, manje korištenje zdravstvenih sredstava za liječenje posljedica zagađenja i više sredstava za prevenciju.

Ključne riječi: zdrava životna sredina, obrazovanje, zdravstveni radnici.

Abstract

Health is physical, mental and social well-being and a clean environment. As educators in secondary and higher education in the field of health activity, we have noticed that care for the environment is represented very little or not at all as a subject. The guidelines we received from the WHO, 2 years ago were a stimulus for us to educate all future health professionals on environmental protection. Previously, we conducted a survey that determined that students have no knowledge at all of how to protect the living and working environment, although they are familiar with the problem of pollution on a global level. They all showed interest in practicing it. In every professional subject, we have introduced environmental protection protocols in the health care process, education on disposal of medical and other waste and its recycling. We analyzed the economic benefit through a lower number of sick people, less use of health finances to treat the consequences of pollution and more finances for prevention.

Keywords: healthy environment, education, health workers.

Introduction

The protection of the environment is inevitable according to all the indicators of its pollution, which leads to climate change and the deterioration of human health, since the fourth component of the definition of health is a healthy environment. Each individual can contribute to environmental protection through personal example and practicing activities that will prevent or reduce pollution. It is our opinion that in the process of any education we can educationally influence students to create habits to preserve the environment. WHO (2023) Educational institutions should be leading in developing the concept of environmental care.

The basic and simplest procedure is creating habits for disposing of municipal waste as "Zero Waste". We live in a consumer society that fuels human gluttony at breakneck speed at the expense of human dignity, natural resources and the environment, leaving us with a lasting legacy of piles of waste that cannot be endlessly recycled even in the most developed countries. The solution to the problem can be found to a certain extent with the implementation of the "Zero waste" concept, which is based on the principles of sustainable development and circular economy. This concept is applied by 308 municipalities in Europe, where 99 percent of waste is treated as a resource, and only one percent ends up in landfills. This concept strives for municipalities, that is, cities to prepare a long-term strategic plan in steps and to make the waste management system adapted to the concept of zero waste, where a large part of the waste is recycled and used. Ramboll et al.(2019)

1. WHO.Oct.2023.: Building health workforce capacity on air pollution and health. ISBN 978-92-4-007797-3 (electronic version).
2. RambolldeBruijne Emiel; Schöpel,Miriam;et al.(2019): Directorate-General for Environment (European Commission).Publication office of EU. ISBN-978-92-76-00168-3.

This concept represents the opinion that if we change our living habits we will be able to eliminate all unnecessary waste in society. Zero Waste provides access to permanent and reliable services for the collection, selection, transportation and recycling of all waste. But to implement this, it is not only necessary to have a good goal, but also legal regulations by which municipal waste will be selected, distributed and recycled. In EU it is regulated since 1994 year. EU regulation on packaging waste (1994). The aim of our research was to assess the knowledge of citizens about handling municipal waste in the interest of recycling as an energy resource and what are the reasons why it is not selected.

Material and method

In order to assess the situation in the city of Skopje, and its municipalities, we conducted a random survey of a population of 200 households. We designed a questionnaire based on models from other countries with approximately the same economic development and corrected it according to national and European standards. Sours: Nguyen,T.G et al.(2021) with the following sections: Part.1 general data on respondents, municipality, age, gender, employment and level of education. Part.2 questions for assessment of knowledge about municipal waste recycling, 1) Knowledge was evaluated based on the number of points given

for each YES answer in question (1,2,5,9) while in question 3,4,6,7,8 we assessed the knowledge of citizens about the impact of municipal waste on the health. Thus, with positive parameters, question 3 has 3 points, question 4 has 3 points, question 6 has 3 points, question 7 has 3 points, question 8 has min 0, maximum 2 points. Maximum number of points in part 2 is 18.

Tab.1 Survey with a questionnaire for the evaluation of the respondent's knowledge

No.	Question	Answer
1	Are you informed about the possibility of recycling municipal waste?	Yes No
2	Is there an opportunity to reduce domestic waste, not to pollute nature?	Yes No
3	What are the benefits of waste segregation - waste sorting? 1. health 2. personal economic 3. social economic	
4	Are you aware of the environmental impacts of daily waste disposal? Circle what you know: 1. it pollutes the soil because it does not decompose completely 2. it pollutes the air when it burns 3. pollutes water at the place where it is disposed	
5	Are plastic bags biodegradable?	Yes No Not all
6	What are the health effects of waste disposal? round up 1. air pollution, 2. increase in malignant diseases 3. increase in infectious diseases	
7	Do you know how the selection of municipal waste is performed? Circle it 1. on personal initiative 2. through the communal service of the municipality 3. through a separate company for waste selection	
8	How much do waste collection sites negatively affect passers-by, the aesthetics and the health of people in your surroundings, do you simply care? 1. not at all 2. disturbs me 3. has a significant negative impact	
9	Do you have to pay to recycle your municipal waste?	Yes No

3. European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste.

4. Nguyen, T.G et al. (2021): Knowledge, attitudes and practices of communities towards solid waste management in Vinh Truong commune, Hau Giang Province, Vietnam. JTHEM. Volume 6. Issue 23. p: 1-9. DOI 10.35631/JTHEM.623001.

People's attitudes towards municipal waste management were assessed by collecting relevant information, including collection time, satisfaction with current waste collection, willingness to pay the waste collection fee, willingness to segregate waste and share experiences with everyone around them, agreement with setting up a landfill in the community, appropriate waste collection methods and ways to access appropriate solid waste management knowledge (Table 2). The total number of positive points in this section is 12 points.

Tab.2 Survey with a questionnaire for the evaluation of the respondent's attitudes

No	Question	Answer
1	Is the collection time appropriate in your area?	Yes No
2	Are you satisfied with the waste collection by the municipal service?	Yes No
3	Would you be willing to sort your waste if it provided a better environment?	Yes No
4	Has there been installed containers for the selection of municipal waste at the place where you dispose of the waste: circle what is there 1. for paper 2. for glass 3. for plastic and cans 4. for other waste.	
5	Do you sort the garbage at home before throwing it away? If your answer is NO, is it because – circle: 1. I do not practice selection 2.no containers for selection	Yes No
6	Do you think that the municipalities should take greater actions to enable waste selection for citizens (YES) or is it represented enough (NO)	Yes No
7	Do you think you are educated enough to deal with municipal waste?	Yes No
8	Do you think that by setting up containers for selection the situation will improve, (YES) or are legal regulations needed to discipline citizens for the disposal of municipal waste (No)	Yes No

In terms of solid waste management practices, issues of participation in environmental pollution remediation, household waste containers, waste sorting agreement, household waste disposal methods, views on improper waste disposal and recommendations for solid waste management (Table 3). Total number of positive points is 12.

Results

Field analysis results In every municipality in Skopje, there are containers for municipal waste, which are plastic and mostly green in color, all waste is thrown into them without selection. The municipality has not installed containers for the selection of paper, plastic and glass. Right next to these containers, there is a container for glass and another container for plastic and cans from the company Pacomak from Skopje, web site:(www.pacomak.mk(2023) not in all locations. In certain locations, as well as around large markets, there are containers for glass and electronic waste (batteries and small kitchen appliances). There are collection points for bulky waste in the municipalities, and on Sundays ,Sundays it can be thrown out next to the municipal waste containers. In the evening it is collected free of charge. In the collection centers, bulky waste and other waste is received free of charge if it is brought by the user, and if it is registered for transport, it is charged. Sours from: web side of municipality Karpos, from Skopje (www.karpos.gov.mk. 2023)

5. www.pacomak.mk.

6.<https://karpos.gov.mk/collecion> of bilky waste in four locations.

Tab.3 Evaluate how you personally treat municipal waste

	Question	Answer
1	Rate the level of remediation of environmental pollution caused by ourselves?- circle 1. it can be reduced 2. we will have an insignificant impact 3. it cannot be reduced	
2	What have you been doing to reduce environmental pollution caused by household waste? With previous activities: 1. I throw the garbage in a container 2. I select the garbage where there are containers 3.I can't select it because there are no containers, 4. I take plastic packaging and cans to PACOMAK recycling points	
3	How do you dispose of your broken electronic devices? 1. I throw them in a municipal waste container 2. I throw them in a container for electronic waste 3. I take them to gathering places 4. it is not known that there are collection points and containers	
4	Can placement of selective containers have: 1. economic benefit 2. environmental benefit	
5	What would you suggest for a more efficient selection of municipal waste in your environment:	
6	Is there a municipal service for the collection of solid waste in your municipality.	Yes No I don't know
7	Is there a collection point for solid waste in your municipality?	Yes No I don't know

After the assessment with points is done, the score will be presented for each part 2, 3 and 4 as well as the total score after the next score in relation to the maximum number of points 41, namely: 0-33% low, 34-66% medium, 67-100% high level of care for the environment expressed through disposal of municipal waste.

Results

Field analysis results In every municipality in Skopje, there are containers for municipal waste, which are plastic and mostly green in color, all waste is thrown into them without selection. The municipality has not installed containers for the selection of paper, plastic and glass.

Right next to these containers, there is a container for glass and another container for plastic and cans from the company Pacomak from Skopje, (www.pacomak.mk) not in all locations. In certain locations, as well as around large markets, there are containers for glass and electronic waste (batteries and small kitchen appliances). There are collection points for bulky waste in the municipalities, and on Sundays it can be thrown out next to the municipal waste containers. In the evening it is collected free of charge. In the collection centers, bulky waste and other waste is received free of charge if it is brought by the user, and if it is registered for transport, it is charged. Sours: www.karpos.gov.mk (2023).

In Skopje there are several associations and companies that collect electronic waste (larger electrical appliances as well as used computer equipment). Their web side are follow: <https://www.nulaotpad.com.mk>; www.ekonelektron.mk; www.euroekopak.mk; (2023). Apart from these organized forms of waste management, there are street collectors who search the containers and collect waste, mostly plastic bottles, which they then take to collection points. In doing so, they usually overturn the containers and leave scattered waste material on them. In all major markets, there is a separate enclosed section where cardboard and packaging paper are collected, and at a certain time they are collected by a service with which they have entered into cooperation with Ekostar. Sour from web side www.ekostar.mk (2023)

In educational institutions, schools, high schools, there are containers for collecting paper only, while the rest of the waste is collected as municipal waste in one green container. There are trash cans in the institutions, but there are none outside them and the waste is scattered everywhere. Sour from Waste Management Law (2018). Besides the markets, there are no bins for waste selection, only in some large chains Pacomak has installed collection devices only for selected plastic bottles and cans, and for them you get points, that is, 1.24 cents per piece. With a total of 400 or 600 points, you can shop in the market, that is, with 3 or 5 Euros. There is no warranty for purchased products in cans, tetra packs, plastic bottles and glass bottles. After use, they are thrown wherever they are found. There are not enough trash cans on the streets, nor around the food stalls and traffic. From the utility company, when taking care of street hygiene, according to the frequency of activities, there is not enough time to collect it every day, even though it is thrown away every day.

Results of environmental care education

In the educational system, there are certain educational lessons about ecology, protection of the human environment and the need to reduce pollution. They are an integral part of the subject Biology and related sciences, while in medical sciences it is studied in the subject Hygiene, where importance is also given to medical waste. Medical waste, its selection, transport and destruction is regulated by law and is mandatory, while municipal waste is not selected. Realizing that there is a lack of education, we have introduced lessons in our University and in the Secondary Medical Private School, for medical waste, care for the environment in the work process and communal waste.

Results of the questionnaire

A total of 55 volunteers (male 56%, female 44%) with age 36-55 years were 70%, and total family member 181 were included. The all volunteers were employed. There were from 8 municipalities in Skopje, 4 from central part and 4 from periphery.

7.<https://www.nulaotpad.com.mk>.

8.www.ekonelektron.mk

9.www.euroekopak.mk

10.www.ekostar.mk.

11.Waste Management Law in RN Macedonia.(2018) Article 6.

Results of part 2 of the questionnaire:

Total score of positive points is maximum 880, we found 465 (53%) or medium, in assessment of knowledge about municipal waste recycling. In this section, We would like to comment the answer of question of whether they mind the unsorted waste, for 56% it mattered a lot to them, while 33% did not mind it at all

Results of part 3 of the questionnaire:

Total score of positive points is maximum 697, we found 354 (51%) or medium, for people's attitudes towards municipal waste management. From total 55, 67% do not practice waste selection, but 78% of them because there are no containers for selection.

Results of part 4 of the questionnaire:

Total score of positive points is maximum 715, we found 357 (50%) or medium, in terms of solid waste management practices. The percentage of 83% who think that waste sorting has both economic and environmental benefits is high.Total maximum score of all questioner is 2292, and we found 1176 (51%). In this part in question 5, the most of volunteers have opinion that situation can be improved with more containers for waste selection and legal regulations towards both citizens and municipalities with a binding character and responsibility. This study not support the all situation because the examples are very, very low.

Discussion

In our country, the distribution of waste, including municipal waste, is regulated by law and is under the authority of the Ministry of Ecology and Environment. Each municipality collects municipal waste and distributes it where its disposal is planned. Sours: JP Communal hygiene-Skopje, meeting of MK Municipals May (2021). Waste sorting is an expensive business. One waste bin of 120 liters costs 10 Euros. The association of utility service providers, in which the public utility companies from the country are members, explained to "Meta.mk" that a complete system for collection, transport, selection and disposal of waste (construction of a modern landfill, procurement of new utility vehicles and specialized vessels for waste) for each separate region of the country would cost over 30 million Euros. Sours: <https://meta.mk..>

The law on protection at work does not oblige employees to select municipal waste, but only medical and veterinary services select medical waste. In cosmetic studios, massage parlors and fitness clubs, there is neither medical nor communal waste selection, because the law does not require it, but only norms for meeting protection at work.

Through public services and mass media, there are occasional broadcasts and presentations of environmental protection activities by citizen associations fighting for environmental standards and nature conservation. Sours: Official Gazette of the RM No:146, (2007). Our capital is constantly in the first 3 places in Europe and in the first 5 places in the world according to air pollution. There are no institutions for processing old glass, while aluminum and plastic are recycled. I learned from the collective waste center that floor tiles are produced from recycled plastic, which are offered for paving gardens and yards at a price of 20 Euros per square.

12. <https://meta.mk.2021.selekcijata-na-otpadot-e-skapa-investicija>

13. Official Gazette of the RM, No146, of 2007. Rulebook on how to deal with medical waste, as well as its packaging and marking.

There are no legal sanction measures for neglecting nature, starting from the disposal of municipal waste and ending with street hygiene and natural areas. Wild landfills exist, and in the landfills designated for the disposal of municipal waste, it is burned and pollutes the environment. In the developed countries of Europe, garbage is used up to 99%. It is used for recycling and obtaining energy. Sours: EU directive (1998).

Glass and paper are left in selected containers in certain collection areas. The glass packaging, cans and tetra packages are charged a deposit when buying, and when the product is consumed in the same markets there are devices in which the packaging can be returned and the deposit can be returned, which can be used for subsequent shopping. Deposits are high, so returning the packaging is worthwhile. Communal garbage is collected according to the number of inhabitants by frequency, and there is also a selection of ordinary garbage and bio garbage. Sours: Antony King.(2022) The energy produced from household waste can take several forms: Heat, for example, to supply heating networks, or electricity, which can be distributed to neighboring households or sold to the national grid. The race is on to reuse waste as energy in the most effective way possible. Combined heat and power is an old idea for saving fuel with a new imperative to slash emissions. Innovative furnaces

based on biofuel systems will generate heat and power from waste materials with near-complete efficiency and very low emission.

Biofuel is produced from biological waste. Here in the food industry, it is mandatory to store solid and liquid waste according to standards. So, for example, grape seeds during wine production are stored and then given as fodder, which is very healthy for poultry nutrition. When we have an investment and cooperation with a foreign company from the

European Union, they obligatorily require that the project of the facility and production includes ecological waste disposal.

Determining an appropriate waste management strategy can be a complicated and challenging endeavor for municipalities. When making decisions and designing waste management strategies, governments must consider multiple components, such as the quantity and composition of waste produced in the urban area, the waste management and recycling systems present, local needs and willingness to pay for improved services, as well as the broader policy, institutional and cultural contexts.

For this, a solid waste management assessment (baseline survey) of local conditions can generate critical information and data to support appropriate decision making. UN. (2010):Guidliens for solid waste management.

14. Commission Directive 98/15/EC of 27 February 1998 amending Council Directive 91/271/EEC with respect to certain requirements established in Annex I thereof (Text with EEA relevance).
15. Antony King.(2022): Waste not, want watts – turning waste into energy.Journal of
a. EU Commission for Energy and Agriculture.
16. UN.(2010): Guidliens for solid waste management assessment (baseline survey) in secondary cities and small towns in Asia and the pacific.

Conclusions

After our short and quick investigation of a problem that has been simmering in our midst for a long time, we can say that: 1. education should be increased to protect the environment and start with correcting the behavior of each individual, 2. legal regulations for the selection of municipal waste at the municipal level are needed, with an indication of the economic benefit, 3. all public institutions should be an example of installing green energy equipment, and this should be financed by the state, 4. all new individual and residential buildings should be built according to eco-standards, receive loans with favorable interest rates.

References

1. WHO.Oct.2023.: Building health workforce capacity on air pollution and health. ISBN 978-92-4-007797-3 (electronic version).
2. Rambolde Brujine Emiel; Schöpel, Miriam; Zotz, Ferdinand; et al.(2019): Directorate-General for Environment (European Commission). Publication office of EU. ISBN-978-92-76-00168-3.
3. European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste.
4. Nguyen, T.G et al.(2021): Knowledge, attitudes and practices of communities towards solid waste management in vinh truong commune, Hau Giang Province, Vietnam. JTHERM. Volume 6. Issue 23. p:1-9. DOI 10/35631/JTHERM.623001.
5. www.pakomak.mk.
6. [https://karpos.gov.mk.colection](https://karpos.gov.mk/colection) of bilky waste in four locations.
7. <https://www.nulaotpad.com.mk>.
8. www.ekonelektron.mk
9. www.euroekopak.mk
10. www.ekostar.mk.
11. Waste Management Law in RN Macedonia.(2018) Article 6.
12. <https://meta.mk.2021.selekcijata-na-otpadot-e-skapa-investicija>
13. Official Gazette of the RM 146 of 2007. Rulebook on how to deal with medical waste, as well as its packaging and marking.
14. Commission Directive 98/15/EC of 27 February 1998 amending Council Directive 91/271/EEC with respect to certain requirements established in Annex I thereof (Text with EEA relevance).
15. Antony King.(2022): Waste not, want watts – turning waste into energy. Journal of a. EU Commission for Energy and Agriculture.
16. UN.(2010): Guidliens for solid waste management assessment (baseline survey) in secondary cities and small towns in Asia and the pacific.