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Effect of an anti-tobacco programme of health education on changes in health behaviours among junior high school adolescents in Białystok, Poland

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Abstract

Introduction. School health education programmes are among the instruments for the prevention of tobacco smoking among children and adolescents. Knowledge obtained in evaluation studies of these programmes indicates the degree of their effectiveness and serves to improve their quality.

Objective. Recognition and evaluation of the effect of two-year anti-tobacco programme of health education on the changes in the level of knowledge, attitudes and behaviours of adolescents.

Materials and method. An intervention study was originated in May 2007, and covered 859 first-year schoolchildren from eight public junior high schools in Białystok in Poland, from among 3,318 schoolchildren attending 33 schools. The sample was selected by means of two-stage stratified sampling with consideration of two groups: an intervention group covered with educational actions (417 schoolchildren), and a control group (442 schoolchildren), where anti-tobacco education was not carried out. Before the educational programme and after its completion an evaluation of knowledge, attitudes and behaviours of junior high school adolescents was performed with respect to nicotinism, based on a survey. The educational part consisted in conducting within 2 years, 4 educational classes and 2 competitions concerning tobacco-related problems.

Results. After two years, in the group of adolescents covered by the educational programme a significant increase was observed – by 11.6% – in the percentage of schoolchildren who were familiar with the negative effects of tobacco smoking, and an increase by 4.4% of those who were convinced that smoking is harmful. With respect to adolescents' attitudes, the effect of the programme was noted in only one of six components analyzed. After completion of the two-year educational programme, both in the group covered by this programme and the control group, the percentage of smokers significantly increased (by 12.8% and 12.7%, respectively).

Conclusions. It is necessary to evaluate the health education programme from the aspect of both the actual hard effects of the anti-nicotine programme (changes in behaviour), and indirect effects – soft (knowledge, skills) which are a basis for the potential verification of the programme in order to increase its effectiveness.

Key words

anti-tobacco programme, junior high school adolescents, tobacco smoking, health education

INTRODUCTION

The World Health Organization (WHO) estimates that every day 1.1 billion people worldwide smoke cigarettes, which is 1/3 of the adult world population [1]. In Poland, according to the Global Adult Tobacco Survey (GATS) of 2010, daily, 33.5% of adult males (5.2 million) and 21% of adult females smoked tobacco (3.5 million), a total of 27% (8.7 million) of the adult Polish population [2]. Also, the character of the habit of Polish smokers is alarming, because they smoke a large number of strong cigarettes daily. Males smoke on average 18 cigarettes daily, while females – 16 cigarettes. In addition, the mean time of duration of the habit constantly increases, and for males this is currently 23.3 years, and for females – 21.7 years [2].

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Tobacco smoking by underage adolescents is especially alarming. It is estimated that every day approximately 500 Polish children reach for their first cigarette, initiating the habit of regular smoking [3]. According to the Polish edition of the studies of health behaviours of school adolescents, in the HBSC of 2010 as many as 38.1% of boys and 26.5% of girls aged 13-14, and 56.5% of boys and 52.3% of girls aged 15-16 years have tried smoking cigarettes [4]. Within the last ten years in Poland, a decrease has been observed in the frequency of tobacco smoking among boys aged 13-15; however, among girls at this age these changes have not been that clear [5, 6, 7, 8].

Tobacco consumption among adolescents may be reduced or delayed in time by the prevention of smoking initiation and promotion of the discontinuation of smoking. The majority of intervention projects reported to-date concerning tobacco smoking among young people focused on prevention. They covered programmes undertaken at school, interventions with the use of the mass media, population interventions,

and interventions for the reduction of access by preventing illegal sales of tobacco to children and teenagers [9].

Schools obligatorily carry out health education; therefore, in the Polish realities, school programmes of health education should be one of the main instruments for the prevention of tobacco initiation [10]. An anti-nicotine educational campaign, together with the development of the concept of health promotion, has adopted an environmental character in which should participate: schools (schoolchildren, teachers, parents of schoolchildren), as well as social organizations and cultural, political, administrative and non-government institutions.

The essential tasks of contemporary health education are also the development and implementation of an effective research methodology concerning evaluation of the educational activity. Development of evaluation studies concerning health education programmes results from the need for the provision of evidence that the actions are conducted efficiently, are effective, lead to the attaining of goals and success. Knowledge acquired in the process of evaluation should indicate the degree of effectiveness of health education programmes and serve an improvement in their quality. In Polish literature, examples of interventions may be found, focused on the prevention of anti-health behaviours among adolescents. However, the experts emphasize that the weakness of these studies is the lack of evaluation [9, 11].

OBJECTIVE

The objective of the study was the recognition and evaluation of the effect of a two-year anti-nicotine health education programme on the change in the level of knowledge, attitudes, and behaviours of adolescents attending junior high schools in Białystok, Poland.

MATERIALS AND METHOD

The anti-nicotine health education programme was originated in May 2007 and covered 859 first-year schoolchildren from eight public junior high schools in Białystok, Poland. In the school year 2006/2007, a total number of 3,318 schoolchildren who attended the first grade classes in 33 schools were selected by means of two-stage stratified sampling with consideration of two groups: 1) experimental – covered with the educational programme, and 2) control – where education was not carried out. The experimental group covered 417 schoolchildren, while the control group – 442. At the onset of the project in the first grade classes of junior high schools, the schoolchildren in the study were not only adolescents aged 14, but also older and younger respondents, which resulted from the specificity of the educational process.

The study consisted of two sections: 1) educational – Project 'Non-smoking junior high school adolescent – healthy secondary school student', and 2) evaluative – pre-test and post-test.

The educational section was a two-year anti-nicotine educational programme consisting in the performance during the period analyzed of the following:

– four educational classes concerning the problem of nicotinism, aimed at the provision of knowledge, shaping of the attitude, skills, and in consequence, the shaping of a health-promoting life style. The scenarios of individual interventions were developed according to the methodological guidelines by Woynarowska [12], patterned on guidebooks for trainers carrying out education for teachers and other people working with adolescents. The scenarios contained, among others, general and detailed goals of interventions, the methods and techniques used, the course of classes and their evaluation. Students of the speciality of public health, within their training in health promotion and health education, participated in the process of development of scenarios of individual interventions. The interventions were conducted by the same students, prepared by university lecturers and under their supervision, in the presence of school pedagogues.
– two competitions (art and photography) concerning the scope of problems related to tobacco (with prizes), among others, under the banner: 'Thank you, I do not smoke, I want to be healthy'.

The educational programme received the recommendation of the Regional Chief Education Officer in Białystok and the Polish Association for Health Education.

The first intervention within the educational programme consisted of 90-minute classes with the use of activation methods (brainstorming, role playing, demonstration, study of cases, targeted discussion) concerning the negative effect of tobacco smoking on health. The second intervention also consisted of 90-minute classes referring to the World No Tobacco Day (arguing and encouraging schoolchildren who smoke to join this action, distribution of information leaflets) with the presentation of the film: 'Tobacco smoking and human physiology' developed by Zatoński and Przewoźniak [13]. The third intervention, which also lasted for 90 minutes, was devoted to the indication of positive aspects of non-smoking, and presentation of the consequences of inhaling tobacco smoke. The aim of these classes was also the shaping in the adolescents the skills of assertive refusal to those who encourage them to reach for a cigarette. The fourth intervention consisted of 45-minute classes in association with the World No Tobacco Day, during which schoolchildren who smoked were confronted with arguments, and encouraged to join this action. Information leaflets were also distributed, designed for adolescents and their parents, the Schneider motivation test to stop smoking was performed, as well as the Fagerström Test for Nicotine Dependence.

The evaluation section was aimed at evaluation of the effects of the programme. Therefore, the survey the questionnaire contained 48 open and closed questions, and concerned various aspects of nicotinism in the group covered by the educational programme and in the control group, prior to the onset of the programme and six months after its completion.

Tobacco smoking among such a young population is a socially unaccepted phenomenon, therefore, the researchers resigned from identification of the evaluation questionnaire in order to ensure the respondents a high degree of anonymity, and obtain reliable responses consistent with the actual state in such a sensitive problem as tobacco smoking by underage adolescents who disguise this fact from their parents and teachers. Thus, the evaluation performed covered the same schoolchildren from the experimental and control groups, without the possibility of connecting questionnaire information from the same respondent provided in two points in time.

In the study of effectiveness of the anti-nicotine project, three types of indicators of the effectiveness of educational programmes were used: indicators related with the acquired knowledge, indirect indicators (attitude, including skills and intentions), and direct – final indicators (behavioural).

In order to confirm the differences before and after the programme, and between the group participating in the programme and the control group, chi^2 Pearson test for independence was used. The statistical significance level was set at p=0.05.

RESULTS

In the study begun in May 2007, there participated 859 schoolchildren from eight randomly selected public junior high schools in Białystok. The anti-nicotine educational programme covered 417 (48.5%) school adolescents, whereas the control group were 442 schoolchildren (51.5%). After completion of the two-year educational programme, 371 adolescents from the group covered by the educational programme participated in the evaluation study (89.0%, compared to Study I), and 314 schoolchildren from the control group (71.0%, compared with Study I). Both in the study and control groups, the mean age of the school adolescents before starting the programme was 14.0±0.2.

The information obtained in the survey also allowed for the examination of the socio-economic and demographic characteristics of the studied adolescents, with the consideration of variables such as: gender, having siblings, education level of the mother (caregiver), education of the father (caregiver), material standard of the family and occupation of parents. Both before and after completing the two-year educational programme no significant differences with relation to the above-mentioned variables were observed between the group covered by the programme study and the control group. Also, no significant changes in the examined variables were observed in both groups two years after the beginning of the programme.

Knowledge concerning tobacco smoking. The effect of the two-year educational programme was evaluated on the level of school adolescents' knowledge concerning the negative effects of tobacco smoking, knowledge of anti-nicotine actions and campaigns carried out in Poland, and so-called 'internalized knowledge' presented in the form of conviction about harmful effect of tobacco (Tab.1).

A positive effect of the two-year educational programme was confirmed by the adolescents' knowledge of the number of negative consequences of tobacco smoking. After completion of the programme a significant increase – by 11.6%, was noted in the percentage of schoolchildren who could mention at least two negative effects of tobacco smoking. During this period, in the group of adolescents who were not covered by the two-year educational programme, the percentage of schoolchildren who could report at least two negative effects of tobacco smoking significantly decreased – by 7.9%. At the same time, with respect to knowledge concerning anti-nicotine actions and campaigns in Poland, the percentage of schoolchildren who possessed knowledge in this area, after 2 years, increased by 17.9 in the group covered by the programme, whereas in the control group no changes in this percentage were found. Also, with respect to so-called 'internalized knowledge', expressed in the form of conviction about the harmfulness of tobacco smoking, changes were observed after the completion of the educational programme. After two years of the educational programme, a significant increase was noted – by 4.4%, in the percentage of participating junior high school adolescents who reported that cigarette smoking is harmful, while in the control group no differences were observed during that period.

Table 1. Changes concerning knowledge, attitude and behaviour in the group of junior high school adolescents covered by the anti-tobacco educational programme, and in the control group after completion of the programme

Question	Pre-test/Post-test	
	Group covered by the programme	Control group
Behaviour		
Have you smoked at least one cigarette during the 2-month period before the study? *('**Yes**'/'No')*	13.4% vs.26.2% **p<0.001**	17.2%vs.29.9% **<0.001**
Knowledge		
Do you know any negative effects of tobacco smoking? *('maximum 1'/'**at least** 2')*	45.3% vs.56.9% **p=0.001**	44.8% vs.36.9% **p=0,031**
Have you heard about anti-tobacco actions or campaigns in Poland? *('**Yes**'/'No')*	53.8% vs.35.9% **p<0.001**	50.6% vs.48.9% p=0,648
How do you evaluate the effect of tobacco smoking on health? *('**hazardous**"/'not hazardous; I have no opinion')*	88.9% vs.93.3% **p=0.035**	90.0% vs.87.9% p=0.350
Attitude		
What is your attitude towards cigarette smoking by adolescents? *('**negative**'/'neutral; positive')*	62.5% vs. 56.3% p=0.081	63.3%vs.53.5% **p=0.007**
Do you have the courage to admonish someone for smoking cigarettes in your presence? *('**Yes**"No')*	77.5% vs.87.9% **p=0.001**	76.6% vs.89.5% **p<0.001**
Do your friends who smoke impress you? *('Yes'/'**No**')*	95.7% vs.97.3% p=0.309	96.8% vs 96.4% p=0,830
Can you refuse when a friend offers you a cigarette? *('**Yes**'/'No')*	95.1% vs. 92.9 p=0.216	94.2%vs. 91.0% p=0.101
Do you find it annoying if you have to stay in a room full of smoke? *('**Yes**"No')*	68.7% vs.69.5% p=0.793	67.5%vs.63.0% p=0.198
Would you want to give up smoking at present? *('**Yes**'/'No')*	85.1% vs.70.7% p=0.068	74.4% vs.76.9% p=0.709

Attitudes towards smoking. While evaluating the attitudes of the schoolchildren in the study, six elements were considered which, at the same time, satisfied the criteria of indirect indicators of the educational programme. The effect of the programme was examined on: adolescents' attitude towards tobacco smoking, impressing by smoking friends, staying in a room full of cigarette smoke, skill of refusing when a friend offers a cigarette, admonishing someone against smoking and willingness to quit smoking.

A positive effect of the programme was observed on the attitude of junior high school students towards tobacco smoking by adolescents. In the control group, the percentage of schoolchildren who showed a totally negative or rather

negative attitude towards tobacco smoking by adolescents significantly decreased within two years by 9.8 percent, whereas in the group covered by the educational programme no significant differences were observed. Thus, the effect of the educational programme was an inhibition of the downward tendency in the percentage of schoolchildren participating in this project who had a total or rather negative attitude towards tobacco smoking.

The subsequent analyzed aspect of the attitude was admonishing someone against smoking cigarettes in the presence of an adolescent. Within the period of two years, both in the group covered by the programme and in the control group, the discussed percentage of schoolchildren significantly increased – by 10.4% and 12.9%, respectively.

With respect to the remaining elements of adolescents' attitude, i.e. impressing by smoking friends, staying in a room full of cigarette smoke, skill of refusing when a friend offers a cigarette, and willingness to stop smoking, within the analyzed period of two years, no significant differences were noted in the percentages of junior high school adolescents, neither in the group covered by the programme nor in the control group.

Behaviours concerning tobacco smoking. Evaluation of the schoolchildren's behaviour pertaining to cigarette smoking, both in pre-test and post-test, referred to the period of two months preceding these tests. After completion of the two-year educational programme, in the group covered by this programme, a significant increase was observed in the percentage of junior high school adolescents who smoked – by 12.8%. During this period, in the control group, a significant increase was also noted in the percentage of schoolchildren who smoked – by 12.7.

DISCUSSION

The results of studies evaluating the effect of two-year anti-nicotine educational programme on knowledge, attitudes and behaviours of junior high school adolescents in Białystok showed mainly an increase in knowledge of the adolescents participating in the project. In the group covered by the programme, a significant increase was observed in the percentage of schoolchildren who knew a number of the negative effects of tobacco smoking on health, knowledge of anti-nicotine actions and campaigns carried out in Poland, as well as an increase in the percentage of adolescents convinced about the harmfulness of tobacco smoking.

Considering indirect variables, such as attitude, including skills and intentions, the programme was not so effective as in the case of increase in knowledge. From among six variables describing attitude, only with respect to one variable – the schoolchildren's attitude towards tobacco smoking by adolescents – the educational programme brought about a positive effect. Unfortunately, despite these changes, there was no success in obtaining the major goal of the project, i.e. a decrease in the percentage of smokers.

In Polish literature there is a lack of complete studies evaluating health projects concerning the inhalation of tobacco smoke among adolescents. Only Marmon, based on an example to two anti-tobacco projects, undertook the problem of the effect of educational programmes on the changes in adolescents' knowledge and attitudes towards cigarette smoking [14, 15]. The first programme was addressed to classes VI and VII of elementary school, while the second – to classes I and II of secondary school. Approximately five months after completion of the project, the researcher, while generalizing the results obtained, cautiously expressed her opinion concerning the effectiveness of the programmes, and stated that there are some tendencies towards an improvement of knowledge, especially pertaining to the knowledge of hazardous substances present in cigarettes, and awareness of the fact that one may become addicted to cigarettes; and with respect to the change of schoolchildren's attitudes mentioned that in many cases the direction of changes in attitudes was of a positive character.

The effect of educational actions on the change in mainly adolescents' knowledge concerning nicotinism, documented by own studies, is also consistent with the results of studies of school prophylactic programmes pertaining to alcoholism and the use of psychoactive substances performed by the Laboratory for Adolescents Prophylaxis 'Pro-M' at the Institute of Psychiatry and Neurology in Warsaw: 'Noel+Second Primer', 'Programme for Home Detectives', and its continuation 'Fantastic Possibilities' [16, 17, 18, 19, 20, 21]. The programme of alcohol prevention also covered the problem of tobacco smoking, 'Noel+ Second Primer' was carried out among 845 adolescents aged 13-16, who attended classes VII and VIII elementary schools in Warsaw. The programme increased the level of adolescents' knowledge, with the lack of change in their attitudes, and exerted a negative effect on the frequency of cigarettes smoking in the group covered by educational actions [16].

Similarly, evaluation of the effect of a two-year programme for alcohol prevention, addressed to 10-12-year-old schoolchildren and consisting of two parts: 'Programme for Home Detectives', and its continuation 'Fantastic Possibilities', showed that the frequency of alcohol consumption increased in both the experimental and control groups, despite the changes observed concerning knowledge and attitudes of schoolchildren covered by the programmes [17, 18, 19, 20, 21].

While reviewing international literature concerning the evaluation of anti-nicotine programmes, the publication by Wiehe deserves attention [22], in which the effects of school programmes for tobacco prevention were evaluated based on 9,525 reports published from 1966 – 2003 and contained in the databases: MEDLINE, CINAHL, Embase, ERIC and PsycINFO. Eight programmes which fulfilled the criteria specified by the researcher were selected for the study. For all the programmes analyzed, the follow-up study was conducted at least 12 months after completing the intervention. It was found that only one study confirmed a significant effect of the programme reflected by the reduction in the percentage of smoking adolescents.

Similarly, Dobbins [23] compiled the results of the studies evaluating the effectiveness of school anti-tobacco programmes published in reviewed journals in English during the period 1985-2006. From among 10,163 studies identified, the researcher selected 31 of the most important programmes, and evaluated them according to a 10-point scale as: poor, mediocre and best. Analysis of 12 programmes which were evaluated in most positive terms showed that behaviours concerning tobacco smoking were presented in 11 reports, including six reports indicating the positive effect of anti-tobacco actions, two reports pointing to a positive direction of changes, however, with no significant differences

observed, and three reports where no significant effect of the programme was noted on the change in behaviours. The researcher also emphasized that the effectiveness of school anti-tobacco programmes was influenced, among other things, by the schedule currently performed at school, social standards and social support, as well as possessing the skills of assertive refusal.

School prophylactic programmes are among the instruments of an environmental approach to the prevention of tobacco smoking initiation, or the reduction in the frequency and intensity of inhalation of tobacco smoke, as well as total discontinuation of smoking. The evaluation of the two-year health educational programme 'Non-smoking junior high adolescent – healthy secondary school student', and the review of Polish and international literature, confirmed the effect of anti-nicotine education on the improvement of schoolchildren's knowledge [24, 25, 26, 27]. According to Ostaszewski, positive results, mainly in the form of an increase in knowledge, are typical of school prophylactic programmes [21]. Simultaneously, both own studies and investigations by other researchers show that an effect of actions on the change of an attitude was not so clear and unequivocal as in the case of expanding knowledge. Changes in the percentage of smoking participants after the completion of a programme are considered as the most obvious and, at the same time, the strongest indicator of their effectiveness. In this context, own project performed was not successful, because during the two-year educational programme the percentage of adolescents who smoked cigarettes significantly increased by 12.8%. Hence, a simple conclusion might have been drawn that the educational programme caused an increase in the percentage of smokers, if not the situation noted in the control group. After two years, in the group not covered by the programme, the percentage of smokers also increased by 12.7%, which should be considered as a natural trend associated with the effect of many varied factors. Nevertheless, this trend was not inhibited by the participation in the anti-nicotine programme. Therefore, the evaluations of the above-mentioned programmes conducted among adolescents by many researchers, as well as the results of own studies, confirm that the performance of school programmes preventing nicotinism may be related with the lack of effects or the occurrence of the effects contrary to those intended. e.g. in the form of an increase in the percentage of smokers.

While searching for explanations why the performance of a prophylactic programme among adolescents leads to the effect opposite to that intended, the problem of the phenomenon of 'health resistance' in health education undertaken. According to Cylkowska-Nowak [28, 29], resistance to health education and health promotion is prevalent in the total population with respect to the basic health behaviours, such as: nutrition, alcohol consumption or tobacco smoking. The explanation of the phenomenon of 'health resistance' requires reference to the concept of psychological reactance by Brehm, who described psychological reactance as a force aroused by threats to a person's freedom. Pressure to change behaviour on the part of health educators and promoters may push individuals to unexpected behaviour. This phenomenon is defined as the 'boomerang effect'. Therefore, if the efforts of the performers of health education and promotion are perceived as an attempt at imposing or censoring behaviours, according to the theory of reactance this message will actually increase the tendency to push back (motivation to do something opposite), i.e. undertaking anti-health or risky behaviours. Cylkowska-Nowak [28, 29] considers that those who participate in various health programmes may not want to be perceived as good, moral or correct in the way proposed by health educators and promoters. In the environment of adolescents this often seems 'out of fashion and out of date'. Hence, anti-health behaviours gain some importance and may be the manifestation of rebelling against dominant social and cultural values.

As a result of the above-mentioned facts, it should be presumed that some components of prophylactic programmes may reinforce anti-health behaviour obtaining the effect opposite to that intended in educational and promotion programmes, especially in the environment of adolescents. In addition, teenagers who smoke cigarettes have not yet experienced any negative health or social effects, and for this reason may reject the contents of educational classes, and do not focus on distant negative consequences of the inhalation of tobacco smoke, because of the 'effect of reactance' is dominant. In their personal experience, tobacco smoking is very often associated with various attractions: parties, meetings with friends, socializing. Thus, the participation in prophylactic classes may deprive adolescents of the 'comfort of smoking', and in consequence, may meet with the rejection of educational contents [16].

In health promotion programmes, in order to increase the sole educational component, apart from educational actions, various forms of support should be considered – environmental, organizational, and legal [12]. Referring to the description of own project 'Non-smoking junior high adolescent – healthy secondary school student', its image should be supplemented by information concerning supportive actions. In the educational programme carried out for two years, school-managerial staff, teachers, school pedagogues and psychologists were engaged, as well as parents and the media. Parents accepted the participation of their children in the programme by expressing a written consent. Thanks to the kindness and generosity of sponsors who funded attractive prizes in kind (bicycles, cameras, mp3, books) it was possible to carry out two anti-tobacco competitions. For the total duration of the anti-tobacco educational programme, the Chief Education Officer in Białystok and the Polish Association for Health Education cooperated with its organizers and performers. However, this support was possibly insufficient, because educational effects were obtained only in some areas.

For more than dozen years in Poland, a dynamic development of educational programmes has been observed designed to be conducted in schools, and the evaluation aspect and assessment of their effectiveness should be its inseparable element. This point of view found its reflection in recommendations concerning the development of correctly designed and effective programmes and a health project scheme by the Agency for Health Technology Assessment, based on European standards [30]. Within this convention, considering the essence of evaluation and the usefulness of the resulting conclusions, the programme described in the presented report was planned and conducted.

CONCLUSIONS

1) The two-year educational programme increased the level of schoolchildren's knowledge concerning the negative effects of tobacco smoking, knowledge of anti-tobacco actions and campaigns in Poland, and increased the percentage of junior high school adolescents convinced that smoking is harmful, compared to those who did not participate in the programme.
2) The educational programme exerted a positive effect only on one from among six variables describing attitude, which manifested itself in a negative attitude towards tobacco smoking by adolescents.
3) Despite changes in knowledge and one of the components of attitude, in the group participating in the programme, the anti-tobacco educational programme did not change the trend towards the intensification of nicotinism, which also occurred in the control group.
4) It is necessary to perform an evaluation of anti-tobacco educational programmes conducted in schools which assess not only the final, hard effects of the programme in the form of change of behaviour, but also indirect, soft effects, i.e. knowledge ands skills, which are a basis for the potential verification of the programme in order to increase its effectiveness.

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