REPORT

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Motivational interactive prevention in outpatients with ischemic heart disease

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Abstract

Working women suffering from ischemic heart disease (IHD), who receive ambulance cardiology treatment, have completed their training course at our Health School (HS), and their medical examination data have been compared with those in the reference group representing women with IHD, employed by the same enterprise, who have not attended HS. The training course program has included 5 training lessons, 60 minutes each. The educational training material was presented in the interactive form. To monitor the state in the trained outpatients within one year, used were telehealth technologies including teleconsultation sessions held every week. The clinical effect was monitored and assessed upon expiration of 12 months with the use of the respective closing medical examination. It has been found that in the HS group outpatients the levels of arterial pressure, total cholesterol and scores of anxiety depression syndrome are much lower than those identified in the reference group. The adherence to the administered therapy in the reference group was recorded to be less than 50%. It is reported that the implementation of the motivational prevention program has demonstrated its feasibility for the Employer: the cost effect has been assessed as the return rate at the level of Rbl. 1,4 per Rbl of investment not only due to reduction in paid sick leaves, but also due to an increase in labor productivity.

Keywords

Health School, Ischemic heart disease, Women, Cost effectiveness, Motivational interactive prevention

Imprint

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Introduction

The salient feature of the modern healthcare economy is the most adequate decision-making, when allocating financial resources in order to provide the highest social and economical effect. One of the most advantageous areas of the healthcare investment is prevention of cardiovascular diseases (CVD): first and foremost we should mention in this case Ischemic Heart Disease (IHD) that shall be of principal concern in education of the primary healthcare staff [1]. When analyzing the cost effectiveness in cardiac pathology prevention management models in primary and secondary healthcare, unfortunately, we are not able to find the relevant international reference sources [2,3,7], while a number of the Russian national research reports can offer not only assessments of clinical efficacy, but also an analysis of the cost effectiveness of the applicable prevention management models [4-7].

Materials and methods

We have conducted an observation of 200 women with IHD, employed by the same enterprise. Among the whole cohort, 100 female outpatients, receiving the relevant cardiology therapy, have attended and completed their training courses at our Health School (HS) according to the Methodological Management Record [6], while the other 100 non-attending women, suffering from IHD, have been considered as the reference group of the observed outpatients.

Training provided by our HS is a method of rational phsychotherapy, which represents a health management program consisting of 5 lessons to cover the basic topics connected with IHD. In order to complete the training program for the employed women, we have additionally involved the following medical staff: a Doctor of Physical Therapy/Sports Medicine and an Endocrinologist. The duration of every lesson has been scheduled to be 60 minutes. The training material has been offered in the interactive form; electronic presentations have been displayed; the training scenarios implied switching from every information module to a discussion of the presented information, treating

of some clinical cases or role-playing. To monitor the current state in every of 200 female outpatients, a dedicated electronic resource has been developed that has been used every week for online consultation within the one-year period, furnished with an option of feedback and an option to schedule an appointment at a doctor's office, if required, for the purpose of the office visit consultation.

Monitoring of the clinical effect upon expiration of 12 months have been provided in accordance with the assessment procedure of clinical efficacy & cost effectiveness of the given interactive prevention program. Upon expiration of 12-month-observation period, all participants of the motivational prevention program versus the reference group have been subjected to the proper closing medical examination. Our assessment of the clinical effect made by the HS motivational training versus the reference has included the following:

- the dynamics of arterial pressure (AP) in the above groups;
- the levels of blood total cholesterol (total cholesterol) and blood glucose ;
- body mass index (BMI) and waist circumference values;
- psychoemotional risk factors (RF) (acc. to the Hospital Anxiety and Depression Scale (HADS));
- PROCAM risk scoring.

Results

All the above outpatients have been under observation for the one-year period. We can notice that the dynamics of the data on the clinical metabolic and neuropsychological status in the outpatients has been recorded (see Table 1 herein). So, upon expiration of 12 months, the group of the HS motivated outpatients has demonstrated in their screening that the levels both of systolic and diastolic AP are significantly lower than those recorded initially, i.e. the effects established by the administered therapy and the HS preventive measures have been maintained for a long period of time. As to the reference group, upon expiration of the 12-month period, we have not identified any significant dynamics of the systolic and diastolic AP values. Recorded has been a pronounced change pattern of lowering of total cholesterol within the one-year period due to the respective 3-month hypolipid medication as well as due to the high adherence to the statin therapy.

We have also recorded that the HS group outpatients have permanently used the special electronic resources, particularly e-mailing, where the consultation options have been available in order to discuss the biochemical screening data, including those on their values of cholesterol and transaminases. The reference group outpatients, who have been administered with hypolipid drugs, have demonstrated their low adherence to the medication. Upon their closing medical examination, it has been reported that less than 50% of them have maintained their adherence to the statin treatment. As to the recorded BMI values in the HS group, we have noted a significant reduction in their body mass and the maintenance of the tendency for 12 months; in this case we have observed the hypocaloric diet keeping level 20% higher against that recorded in the reference group. For the female outpatients in the motivated HS group we have reported a significant lowering of their anxiety and depression scores within the 12-month observation period as against insignificant growth of the same parameters in the reference group. To summarize the above, the motivated HS outpatients have shown in most cases the significantly decreased parameters in question (the AP level, total cholesterol and the level of the anxiety / depression syndrome) as compared to their respective initial values recorded.

A decrease in the total number of the hospital stay days for circulatory diseases (CD) has been identified in the HS group. We can also highlight that the number of the office visits to a cardiologist, an endocrinologist and a physician have been reduced. The frequency of the outpatients' visits to primary care offices in the reference group has been reported to be lower, but to a much lesser degree than it has been the case with the HS group: it might be attributed to the primary diagnostics, to revealing the IHD risk factors at an early stage and making the working women aware thereof. As to the motivated HS group, the number of the ambulance calls before their participation in the motivational interactive prevention program had reached 3,5, and after their participation no ambulance calls in total have been reported. It should be mentioned that the number of the recorded emergency calls in the reference group has decreased, too.

The HS outpatients have demonstrated a considerable reduction in paid sick leave days related to CDs, while for the reference group we have identified more paid sick leave days for these diseases that has involved a substantial growth of costs associated with the sick leave payment volume. It may be explained by the fact

Table 1
Dynamics of the obtained data in the HS group versus the reference group

Values, data	HS group		Reference group	
	Initially	Upon exp.of 12 months	Initially	Upon exp.of 12 months
SAP, mmHg	131,4±16,3	124,6±14,3[1]	128,5±24	130,0±13,4[1,2]
DAP, mmHg	90,3±23,9	81,3±13,7[1]	86,7±34,2	91,3±14,3[1,2]
Total cholesterol, mmol/L	7,6±2,4	5,2±1,4[1]	7,1±1,23	6,8±1,2[2]
Glucose, mmol/L	5,4±1,2	5,0±1,2[1]	5,5±1,2	5,6±1,4[2]
BMI, kg/m2	29,7±7,6	27,8±5,4[1]	28,6±3,5	29,7±4,8[2]
Anxiety, total score	9,0±3,4	6,5±3,4[1]	8,9±1,5	9,2±2,4[1,2]
Depression, total score	8,6±3,4	4,9±2,3[1]	9,1±1,8	9,2±2,5[2]
Menopause index,, score	24,5±3,4	19,5±3,5[1]	22,4±5,6	25,6±4,6[1,2]
PROCAM scoring (%)	46±8,5 (the 10-year risk is 10,5)	34±7,5* (the 10-year risk is 3,5)[1]	47±9,0 (the 10-year risk is 10,7)	49±12,3[1,2] (the 10-year risk is 13,2)

[1]p < 0,05 (intra-group differences, Mann Whitney U test)

[2]p < 0,05 (intra-group differences, Mann Whitney U test)

Table 2
Costs analysis in the HS group vs. the reference group within the one-year period

Cost item	HS group (n=100)		Reference group (n=100)	
	Initial	Upon exp. of one year	Initial	Upon exp. of one year
Direct costs				
Hospital stay days	22,1	12,1	18,2	21,7
Hospital stay costs, Rbl.	41 523	21640	37 495	41 121
Outpatient appointments, number of visits to outpatient office	24,3	4,3*	23,5	12,5*
Outpatient office visit costs, Rbl.	6070,0	1225,5	5697,0	3562,5
Ambulance calls, number	3,5	0	3,1	2,0
Volume of ambulance call costs, Rbl.	9837,4	0	7335,6	3456,7
Initial prevention examination, Rbl.	93 085		93 085	
Motivational interactive prevention, Rbl..	75 025			
Closing medical examination, Rbl..		93085		93085
Direct costs, total, Rbl..	225540,4	115950,5	143612,6	141225,6
Indirect costs				
Paid sick leave days	258,4	43,2	257,4	312,7
Paid sick leave days, volume of costs, Rbl.	234 056	56 134	245789	303345
Costs, total				
Total, Rbl.	459596,4	172084,5	389401,6	445570,5

that the reference group outpatients, who have not attended the HS training lessons, but who have been aware of possible CVD risks, had more often to use medical services.

An analysis of the paid sick leave data on effects produced by Health School training and treatment in social service teams supervised be the Employer is one of the most useful approaches to assessing the prevention effectiveness by the primary healthcare institutions.

Generally, the total annual costs connected with CVDs in the HS group outpatients have been found to be lower as compared with those in the reference group, and their total volume has been recorded as Rbl. 172 084,5 in the HS group versus Rbl.445570,5 in the reference group, respectively. During the HS group observation, we have recorded the following significant changes: a decrease in the SAP values by 6,0 mmHg, a decrease in the DPA values by 5,8 mmHg, and lowering risks according to PROCAM score by 10-15 due to an improvement in the HS outpatients' lipid profile.

Discussion

Decisions on visiting a health care office are more often made by women, and this category is known to use more intensively the health care resources. As to our observations, we can state that in the reference group the SAP values and PROCAM risk scoring have been increased, but no considerable DAP changes have been identified. When reviewing the effectiveness of the prevention program in the HS group, we have ob-

tained the data revealing that the specific cost of reducing the SAP level by each 1 mmHg per 100 employees has amounted to Rbl.12 152, and in case of DAP reducing under the same conditions the specific cost has reached Rbl.11 350, while for the reference group the specific cost under the same SAP reducing conditions has been reported to be approximately Rbl.25 000, with one or more drugs changed; as to the specific cost to reduce DAP in the reference group, they have be found ineffective in general. The specific cost volume to decrease hypercholesterolemia by 0,1 mmol/L of the entire group has amounted to Rbl. 21 083. The costs to reduce the CVD risk in the motivational interactive group have been reported to be rather high: they have run as high as Rbl. 60 450 in order to cover all major modified risk factors: arterial hypertension, obesity, high cholesterol level and hypodynamia. It should be mentioned, that at present no benchmarking criteria for assessing acceptable costs to achieve the specified clinical effect or the relevant cost effectiveness analysis can be found in the reference literature. Taking into account all the above, the outcome deduced from our analysis of the cost effectiveness in the context of the motivational interactive prevention can be considered as profitable, while in the reference group the total costs connected with rendering medical services and losses due to paid sick leave days have been found as substantially uncompetitive: the expenditures incurred have not led to any improvement in the predicted health condition, i.e. the use of the cost resources can be regarded as inefficient. The total costs have amounted to Rbl. 447 365 per annum. When analyzing the costs connected with the motivational prevention program from the point of view of the Employer, we make an attempt to calculate the return on investment (ROI). The total input cost of the investment has covered the costs of the initial prevention examination and the closing medical examination (the dynamics of the initial versus final data) focused on an identification of the major IHD risks, including the metabolism profile, plus the Health School training costs, so that the volume of which has reached Rbl. 261 195 per 100 outpatients in the HS group. Upon our analysis of the data on the paid sick leave days per Rbl. 100 000 at the enterprise, considering therewith the costs of the prevention investment, is has been found that, a total decrease in the number of the paid sick leave days by 88,4 days has been recorded for the full operating year. The detected tendencies in the paid sick leave data dynamics bear witness to the favorable effect produced by of the implemented Health School prevention program revealed for the working women. In general, the completion of the motivational interactive prevention program has been found as expedient and cost-effective from the point of view of the Employer, since we have recorded per Rbl.100 000 invested in the program a gross product output of Rbl. 140 314,2 not only due to the reduction in the paid sick leave days, but also due to an increase in labor productivity.

Conclusions

Our evidence data have shown that an effective prevention can be provided not only on the basis of the complete technological cycle of the relevant measures, and it shall not be limited to preventive examinations only: it also shall be accompanied by motivational interactions addressing actual demands, taking into account some gender- and team-related specificity. Our research has proven the feasibility of the implementation of the motivational interactive prevention program for a team of employees that is targeted at reduction of the VD exacerbation events from the point of view of the Employer.

Statement on ethical issues

Research involving people and/or animals is in full compliance with current national and international ethical standards.

Conflict of interest

None declared.

Author contributions

The authors read the ICMJE criteria for authorship and approved the final manuscript.

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