

Effectiveness of alcohol prevention program for pre-adolescents

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Summary

Aim. The aim of this research was to assess the delayed effects of a two-year alcohol prevention program implemented in Polish primary schools.

Method. The program comprised two curricula implemented the school and in family houses: Program Domowych Detektywów and Fantastyczne Możliwości. Both curricula were the Polish versions of two American school-based prevention programs which belonged to Project Northland. The initial study sample (N=802) comprised 10 to 11 years old pupils (fourth and fifth-grade) from eight primary schools in Warsaw. Schools were randomly assigned to the intervention (n=421) and the reference group (n=381). A self-completion questionnaire was administered to students four times: at the baseline, seven, fifteen and twenty seven months after.

Results. The program had an expected influence on the students' attitudes, knowledge and resistance skills towards alcohol. The effects on the participants' initiation of drunkenness and their first experience in alcohol use with their peers have also been reported. Most of the positive effects remained significant over time.

Conclusions. The effectiveness of the program, as shown by the outcome evaluation, supports an argument for its wide implementation in Polish schools. Further progress in the field of alcohol and drug prevention in Poland depends on overcoming the existing barriers in this area of public health.

Key words: prevention, program effectiveness, youth

Introduction

In the 1990's a significant increase in the use of alcohol and other substances among adolescents [1] led to the development of prevention programmes in Poland. However, most of these preventive programmes were not informed by either theoretical concepts or empirical studies. The most popular prevention programmes had no documented impact on adolescents' behaviours [2, 3]. In order to change this situa-

tion we were looking for effective model solutions in the field of alcohol prevention, adaptable in Polish schools. One of the more interesting programmes turned out to be the *Project Northland*, a comprehensive community trial designed and evaluated by a team from the University of Minnesota [4-7].

Project Northland is based on several theories, such as: the theory of reasoned action [8], social learning theory [9] and problem-behaviour theory [10]. Programme also takes into account empirical knowledge on the etiology of under-age drinking and conclusions derived from reviews of studies of the prevention programmes [11]. The main prevention strategies used in the *Project Northland* are the modelling and strengthening of a desired behaviour of a child by involving the child's peers and parents in the prevention process. Authors of the programme state that under-age drinking is an "outcome of influences from multiple levels of the social environment (individual, family, peer group, school and community)" [7].

Polish version of the Project Northland school curricula

Measurable effects of the *Project Northland*, together with a recommendation from the US National Institute of Alcohol Abuse and Alcoholism, encouraged us to adapt the first behavioural curriculum, *Slick Tracy Home Team Program* ("Program Domowych Detektywów" (PDD) in Polish version). The accuracy of this decision confirmed our first outcome evaluation study showing that PDD can be effective in reducing alcohol use among younger adolescents and it would be accepted in Polish schools [12, 13].

It is known that long-term effects depend on a sufficient intensity of prevention programmes [14]. For this reason, we decided to adapt the second part of *Project Northland, the Amazing Alternatives!* programme for 11-12 year-old primary school students, named "Fantastyczne Możliwości" (FM) in Polish version.

The Polish version of the programmes was created on the basis of formative evaluation consisted of focus-group interviews with students, peer leaders and programme deliverers, observations of classroom sessions and open-ended questions for students and parents [15, 16]. Some modifications of the content and organization of both programs were essential due to cultural differences between the USA and Poland.

Characteristic of the programs

The school part of PDD comprises five sessions led by teachers and peer leaders. This is then combined with parent-child activities to be undertaken at home. Four booklets, one to be worked through each week, provide information on under-age drinking, alcohol advertising, peer pressure and the consequences of alcohol consumption. The booklets contain cartoons that describe the adventures of two young detectives who try to protect children from the problems. The activities in the booklets

are designed to facilitate parent-child communication about alcohol and to establish effective family rules to deal with under-age drinking. Peer leaders, trained by their teachers, introduce each booklet to their classmates and encourage them to participate in programme activities at school and at home. At the end of the programme a family evening for all participants are organized at which there are entertaining activities and students present posters to their parents, teachers and to local community officials. The entire programme is expected to take about 12-14 weeks.

The FM programme activities focus on the development of adolescents' skills to identify and resist pressure to drink alcohol. The classroom part of the programme comprises six sessions based on audio-taped stories told by teenagers (two boys and two girls), who are describing their life events, sharing their feelings and opinions. In a similar way to the PDD programme, selected peer-leaders facilitate small-group discussions in the classroom and introduce problem solving activities, games and role-playing. Themes of the sessions include: transition to middle school, the important values and goals of teenagers, the reasons for teenage drinking, the social and personal consequences of the under-age drinking, peer pressure, effective resistance skills, methods used in alcohol advertising and attractive alcohol-free leisure time activities.

The home part of the programme is based on four booklets containing the information on adolescence and under-age drinking as well as suggestions for parents' activities. At the beginning and at the end of the programme, family evenings are organized with the active participation of students, parents, teachers and local community officials. The entire programme is expected to take about 12-15 weeks.

The aim of this research was to assess the effectiveness of a two-year alcohol prevention programme (PDD and FM) implemented in Polish schools. This paper summarizes results of the outcome evaluation and examines the following research questions:

1. Does the two-year programme have a long-term (one year after implementation) impact on students' alcohol use?
2. Does the two-year programme have a long-term impact on intermediate variables associated with students' alcohol use?

Additionally, the short-term results obtained after completion the subsequent parts of the two-year prevention program are presented.

Material and methods

Measures

Behavioural variables. *Alcohol use* was measured by a four item scale (Cronbach's $\alpha = 0,66$) adapted from Project Northland Questionnaire [17]: "How often did you drink alcoholic beverages (champagne, beer, wine or vodka...) 1/ during the lifetime, 2/ during the last year, 3/ during the last month, 4/ during the last week?" with answers:

“none” = 0, “one time” = 1, “two” = 2 and “three times or more” coded as 3. The definition of “drinking alcohol” was given as “more than one sip of beer, wine, vodka or champagne”. The scale was created by summing the responses to four questions.

Initiation of alcohol use with peers and *initiation of drunkenness* were measured by single questions: “When (if ever) did you drink an alcoholic beverage in the company of peers for the first time?” and “Have you ever gotten really drunk so you fell down or got sick?” [17], coded as: 0 – before initiation, 1 – after initiation. The answers over time allowed to calculate any increase in the number of students who got drunk or drank alcohol with peers for the first time. It was assumed, that asking about drunkenness was inadequate for 10-year olds children, because it was really difficult to find someone among them who had such experiences. So, this question was added to the questionnaire in the next school year (follow-up 1), when students were some older.

Intermediate variables. According to the extant theoretical concepts the programme should affect the variables associated with alcohol use. Eight such variables (scales) were analyzed in the study: intention to drink alcohol (3 items, $\alpha = 0,69$); peer norms related to alcohol (6 items, $\alpha = 0,66$); perceived resistance skills (5 items, $\alpha = 0,74$); pro-alcohol attitudes (15 items, $\alpha = 0,86$); parent – child communication about alcohol (9 items, $\alpha = 0,69$), knowledge about consequences of drinking (12 items, $\alpha = 0,63$); family rules related to alcohol use (10 items, $\alpha = 0,90$) and subjective norms around alcohol (6 items, $\alpha = 0,87$).

Socio-demographic variables. *Gender, grade, age* and *family structure* were used in the statistical analysis. An indicator of *family structure* was developed based on the question “Who do you live with?” and two categories of response meant: “0” – complete families – “I live with my mom and dad“, “1” – all other types of family structure, e.g. “I live with my mother (or father) only”, “I live with step-parents”, etc. The variable *age* identified students who were older than the expected average age for the grade level.

Participation in the prevention activities. Students were asked about their personal participation in the prevention programmes concerning the alcohol, tobacco or illegal drugs. Among the various answers respondents could select participation in the PDD and/ or FM programme. This gave the opportunity to create a binary variable, where “0” = lack of participation in our programs, and “1” = participation in the PDD and/ or FM.

Participants

The initial study group (N = 802) comprised all fourth and fifth-grade students from eight Warsaw primary schools (34 classes). The school authorities accepted random assignment of the school to either the intervention or the reference group. In effect, eighteen classes (N = 421) were included to the intervention group: ten fourth classes

(N = 250) and eight fifth classes (N = 171). Sixteen classes (N = 381) were included in the reference group: eight fourth (N = 197) and eight fifth classes (N=184).

Self-completion, anonymous questionnaires were administered to the students four times: 1/ before the PDD implementation, March 2003 (*baseline*), 2/ four months after completion of PDD and prior the FM implementation, October 2003 (*follow-up 1*), 3/ immediately after the FM implementation, 15 months after the baseline, June 2004 (*follow-up 2*), 4/ one year after the FM was completed, 27 months after the baseline, June 2005 (*follow-up 3*).

Table 1. **Numbers of students in consecutive follow-ups**

Condition:	Baseline *	Follow-up 1 4 months after PDD, younger and older students (grade 4 and 5)		Follow-up 2 directly after FM, younger and older students		Follow-up 3 one year after FM, only younger students	
		N	Attrition	N	Attrition	N	Attrition
Intervention	421 (250)	388	33 (8%)	324	97 (23%)	202	48 (19%)
Reference	381 (197)	349	32 (8%)	330	51 (13%)	170	27 (14%)
Total	802 (447)	737	65 (8%)	654	148 (18%)	372	75 (17%)

* Numbers of younger students from fourth grades are in the parentheses

For organizational reasons, only half of the sample (N=372) participated in the last follow-up (Table 1). This group comprised younger students who were fourth graders at the baseline. Older students had moved to middle schools and were not available during the last follow-up.

Statistical analysis

Multivariate analysis of variance (*MANOVA*) for repeated measures (baseline and proper follow-up) was used to estimate effects of the programme on intermediate variables and alcohol use scale. Chi-square tests (2 x 2) were used to assess the impact of the programme on other behavioural variables: the initiation of alcohol use in the company of peers, the initiation of drunkenness and simple items describing alcohol use in a lifetime, during last year, last 30 days and last 7 days.

The first stage of statistical analysis was conducted based on complete data. But some students from the intervention group (10%) reported that they did not participate in the PDD and FM programme. However, in order to avoid bias in the results, data from these students were not excluded from the first stage of statistical analysis (inten-

tion to treat (ITT) analysis). Filtered data, which included the programme participants only from the intervention group, formed the basis for the second stage of analysis.

Results

Attrition

Attrition rates (8%, 18% and 17%) for consecutive follow-ups in relation to the sample size at baseline measurement were at an acceptable level (see Table 1). The fluctuation of students (changing classes or schools) and students' absence during questionnaire administration and during subsequent attempts to complete questionnaires were the main reasons of attrition. The level of attrition was usually some higher in the intervention group compared with the reference group, whereas socio-demographic variables had no bearing on the attrition rate.

Comparison intervention and reference group at baseline

The data from the baseline allowed to verify the similarity between the intervention and reference group. The intervention group included significantly younger students (60% from fourth grades) than the reference group (52%; $\chi^2 = 4,42$; $p = 0,035$). Other than this, the intervention and reference groups were very similar, both in terms of socio-demographic variables (gender, family structure and age), behavioural and intermediate variables (Table 2).

Table 2. Comparison of the intervention and the reference group at baseline

	Intervention	Reference	χ^2 -test/ t- Student's	p
Socio-demographic variables:				
Sex (boys)	49,3 %	50,9 %	0,126	ns
Grade (four)	59,5 %	51,8 %	4,422	0,035
Normative age (older than expected),	4,4 %	3,3 %	0,395	ns
Family structure (not completely or reconstructed)	15,3 %	13,3 %	0,454	ns
Alcohol use:				
Lifetime	60,2 %	59,9 %	0,001	ns
Last year	38,5 %	41,5 %	0,577	ns
Last month	7,8 %	7,0 %	0,071	ns
Last week	3,2 %	1,4 %	2,089	ns
Initiation of alcohol use with peers	6,1 %	7,3 %	0,289	ns

table continued on the next page

Initiation of drunkenness	Question was not included into the survey at baseline			
Scale of alcohol use (range 0-12, means)	1,93	1,94	0,058	ns

ns = not significant

It is worth noting, that the majority of 10-11 year-olds who participated in the survey (60%) consumed an alcoholic beverage at least once in their lifetime. Drinking alcohol in the last month and alcohol use in the company of peers was reported by 6-8% of the students.

Results of 27-month follow-up (younger students)

These results did not confirm the impact of the two-year programme on alcohol use, measured by the scale and single items. The alcohol use rate in the intervention group was lower than in the reference group, but these differences on the scale of alcohol use were too small to be of statistical significance and the value of F -test did not exceed the threshold ($F_{(S=1, M=1/2, N=138)} = 1,21; p = 0,307$).

The intervention and reference group were compared in terms of increase of the number (percent) of students who got drunk for the first time. These rates were 6% in the control group and 1,3 % in the intervention group one year after completion of two-year programme (27-months follow-up). This difference between groups was significant and it suggests a positive effect of the programme in delay of drunkenness initiation ($\chi^2 = 4,62; p = 0,032$; absolute risk reduction (ARR) = 4,7%; relative risk reduction (RRR) = 78%). This result was obtained for the filtered data due to real participation of students from intervention group in the programme.

Beneficial effects of the two-year programme have been identified for the set of the intermediate variables as a whole ($MANOVA, F_{(S=1; M=3; N=155\ 1/2)} = 3,64; p < 0,001$) and for the particular single variables. Significant expected changes were identified in participants' pro-alcohol attitudes ($F_{(1, 320)} = 4,12; p = 0,043$), knowledge about consequences of drinking ($F_{(1, 320)} = 18,82; p < 0,001$) and perceived own resistance skills ($F_{(1, 320)} = 9,89; p = 0,002$). The programme had no effects on the remaining intermediate variables (Table 3).

Table 3. Results of the consecutive follow-ups

Outcome variables ^e	Results of:		
	Follow-up 1 4 months after PDD younger and older (grade 4 and 5) n = 737	Follow-up 2 directly after FM younger and older students n = 654	Follow-up 3 one year after FM only younger students n = 372
Behavioral variables:			
alcohol use scale ^f	ns	ns	ns
alcohol use single items ^f (lifetime, year, month & week)	ns	ns	ns
Initiation of drinking with peers ^f	ns	$\chi^2 = 3,92$ p = 0,048	ns
Initiation of drunkenness ^f	not analyzed	$\chi^2 = 4,69$ p = 0,030	$\chi^2 = 4,62$ p = 0,032
Intermediate variables: analyzed together in MANOVA	F = 5,02 p = 0,000	F = 4,50 p = 0,000	F = 3,64 p = 0,000
Pro-alcohol attitudes	F = 05,84 p = 0,000	F = 14,31 p = 0,000	F = 4,12 p = 0,043
Alcohol-related knowledge	F = 26,41 p = 0,000	F = 23,94 p = 0,000	F = 18,82 p = 0,000
Perceived resistance skills	ns	F = 3,01 p = 0,050	F = 9,89 p = 0,002
Intention to use alcohol	ns	ns	ns
Parent-child communication	ns	ns	ns
Pro-alcohol peer norms	ns	ns	ns
Family rules	ns	ns	ns
Subjective norms against alcohol use	ns	ns	ns

e = all significant over time changes of variables values in expected direction

f = filtered data – only students who reported their participation in the program
(from the intervention group)

ns = not significant

There were no significant changes in the results when the socio-demographic variables were entered into the multivariate analysis of variance as control variables.

Supplementary results

The results of all consecutive follow-ups are presented in Table 3. This summary shows that the delayed effects measured at follow-up 3 are not accidental, because all these effects have been identified immediately after completion of the two-year programme (measured at follow-up 2).

One direct effect did not persist over time. The results of the bivariate analysis based on data obtained just after the programme was completed (follow-up 2) suggested a significant delaying alcohol use initiation in the company of peers among students in the intervention group ($\chi^2 = 3,92$; $p < 0,05$; $ARR = 6,3\%$; $RRR = 32\%$). However, this effect was not statistically significant one year after implementation of whole programme (follow-up 3).

It is worth noting that immediately after the completion of the second part of the program (FM, posttest 2) appeared effect on the *perceived own resistance skills*, which was not observed after the implementation of the first part of the programme (PDD, posttest 1).

Discussion

The implementation of the programme resulted in a delay in adolescent's initiation of getting drunk, reduction of pro-alcohol attitudes and in an increase in alcohol-related knowledge as well as in the reinforcement of perceived resistance skills. Expected changes in reducing alcohol use rates were not proved. Our expectations were based on the findings of the previous study on PDD in Polish schools and the evaluation of Phase 1 of the original *Project Northland*. The previous evaluation of PDD proved a short-term positive effect on the alcohol use rate, showing a reduction by 14% in this area [13, 18]. The evaluation study of the original *Project Northland* intervention showed a statistically significant reduction in the onset and in the prevalence of drinking alcohol. Among U.S. students from the eighth grade, who participated in the three-year intervention, reductions by 29% of alcohol use within in the past-week and by 19% in the past 30 days use were recorded [6]. However, these positive effects disappeared after two years without an intervention programme [19].

The fact that expected changes on alcohol use scale were not recorded in our study can be explained by a poor quality of the two-year programme implementation. A process evaluation of the programme indicated low level of implementation fidelity and several organizational problems including: a very tight timetable for implementation of the programme in classrooms, lack of continuity in funding and supporting of preventive actions by local governments, relatively low level of teachers motivation to implement preventive actions, insufficient support for teachers (in their opinion) from their school principals [20-22].

To conclude, the two-year programme was implemented and tested in real-life conditions, which were far from optimal. Nevertheless, we were able to document some long-term effects of the prevention programme. Presumably these are the first long-term results documented in Polish studies on alcohol prevention programmes. From this perspective, the results of the outcome evaluation can be assessed as an important contribution to the studies of the domestic alcohol prevention. Both programs have been highly rated by European Monitoring Centre for Drugs and Drug Addic-

tion (EMCDDA) experts and included into the narrow and elite group of European evidence-based programs [23].

PDD was first implemented in Poland in 1999 [24] and it is now one of the most popular evidence-based prevention programmes for 10-11 year-olds in Polish primary schools. FM has been taking place in Poland since 2004. More than 100 000 students participated in these programmes, mostly from small towns and villages. Annually, approximately 8000 students take part in PDD and 2000 in two-year programme (PDD + FM). Unfortunately, it constitutes only a small proportion (1-1,5%) of 10-11 years-old Polish students. According to the State Agency for Prevention of Alcohol Related Problems (PARPA), the main stream of alcohol prevention consists of programmes prepared by teachers or school governors, one-time initiatives, special events, competitions and leisure time alternatives [25]. The evidence-based programs are used very rarely in practice. These observations have been recently confirmed by the Supreme Audit Office who prepared the Report on drug prevention activities in Polish schools and local communities [26].

The development and dissemination of effective, evidence-based prevention programmes face several barriers in Poland. Local community-based financial mechanisms promote bottom-up initiatives conducted by local NGOs and prevention leaders. Unfortunately, these initiatives are mainly based on personal beliefs rather than knowledge on effective prevention strategies. Moreover, the number of well-educated prevention specialists is insufficient to the purpose. In addition, prevention research around alcohol is not sufficiently prestigious within the Polish research community. As a consequence, financial support for this type of prevention research is very limited and studies on the effectiveness of prevention programmes are conducted very rarely [27, 28]. The principle of *evidence-based medicine* is commonly used in clinical practice, whereas *evidence-based prevention* remains little known area in prevention reality.

The study had some methodological limitations. The unit of analysis (student) did not correspond to the unit of randomization (school). There was no satisfactory solution for this problem. The number of schools participating in the project was too small to treat a school as a unit of analysis. The very modest nature of the research funds did not allow for any increase the sample size to address this deficit. In order to evaluate the full potential of these programmes future research should be conducted on a larger sample, in more favourable conditions.

Conclusions

The effectiveness of the program, as shown by the outcome evaluation, supports an argument for its wide implementation in Polish schools. Further progress in the field of alcohol and drug prevention in Poland depends on overcoming the existing barriers in this area. We need more long-term research projects, which would focus on the development of evidence-based prevention programmes.

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Potential conflict of interest

None.

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