Primary prevention of eating-related problems in the real world

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Berger, Uwe[1]; Wick, Katharina[1]; Brix, Christina[1]; Bormann, Bianca[1]; Sowa, Melanie[1]; Schwartze, Dominique[1]; Strauss, Bernhard[1]

[1]*Institute of Psychosocial Medicine and Psychotherapy,*
Jena University Hospital, Friedrich-Schiller-University Jena,
Stoystr. 3,
D-07740 Jena

Corresponding author :
Uwe Berger
Phone : 03641 937790
Fax 03641 936546
E-mail: uwe.berger@uni-jena.de

Introduction

Promoting healthy eating and physical activity is one of the most relevant public health challenges in the 21st century, especially with a focus on children and adolescents as a target group (WHO 2000). Unhealthy eating and a lack of physical activity could be made responsible for two well known health problems, whose prevalence doubled especially for children within the last decade: overweight and obesity. Representative data from the KiGGS-Study (German Health Interview and Examination Survey for Children and Adolescents; N = 17,641), which was performed between 2003 and 2006, shows that 8.7% of the children and adolescents between the age of 3 and 17 years are overweight and another 6.3% suffer from extreme overweight (obesity; see Kurth and Schaffrath Rosario 2007, Schaffrath Rosario et al. 2010).

The other extreme, restrained eating, often accompanied by constrained physical exercise, ends in the most serious psychiatric disorder in girls and young woman: anorexia nervosa (AN). With a prevalence peak at the age of 15 years, about 0.3% of young females in Europe are suffering from AN (see Hoek and van Hoeken 2003; Bulik et al. 2006). Because AN is difficult to treat and because of its high mortality rate (between 5%, Steinhausen 2002, and 15.6%, Zipfel et al. 2000), especially this disease has gained much attention from the public, mass media, and all "social institutions", which are responsible for children's well being, such as parents, schools and educational ministries. A few years later, with a peak of incidence at the age of 18 years, another 1.0% is affected by the so called "bulimia nervosa" (BN), an eating disorder which is characterized by episodes of binge eating and subsequent purging behavior (e. g. vomiting). Without purging, the disorder is named "binge eating disorder" (BED). Because BED is not defined by the ICD-10, little is known about its prevalence. Rough estimates lay between 1% and 3% (see Grilo 2006). In contrast to AN and BN, from which males are affected at least three times fewer (see Treasure et al. 2010), the ratio of females and males having a BED is estimated about 2:1. Additionally, about twice as much adolescents and young adults are suffering from eating disorders with no definite diagnoses, so called "eating disorders not otherwise specified" (EDNOS). Besides these clinical relevant eating disorders 12.4% of adolescent girls and 4.6% of ado-

lescent boys report extreme weight control practices such as vomiting, taking diet pills, laxatives, or diuretics (Grilo 2006).

Examining the causes and consequences of eating related health problems offers a lot of well known starting points for preventive action, such as "eat fruit and vegetables five times a day" or "3,000 steps a day will prevent a heart attack". However, it remains unclear whether and how these advices will lead to a successful change in attitudes and behavior, especially in the above mentioned target group of (pre-) adolescents. Therefore, our intention was to develop a new approach for this group, constantly flanked by evaluation research. To give an impression of the "genesis" of our concept for the primary prevention of eating related problems, we describe the R&D-(research and development)-process step by step in its temporal progression, subsequently.

As described above, eating related problems are a serious and commonly perceived health threat to our youth. In 2003 a joint venture between the Jena University Hospital and the Ministry for Research, Education and Culture in Thuringia (TMBWK), Germany, was founded to counter that threat. With regard to the epidemiological data, our first aim was to prevent the onset of AN. We decided to develop a new school-based primary prevention program called PriMa (short for Primary Prevention of Anorexia Nervosa – named "Magersucht" in German everyday speech) because already existing programs did not meet all preconditions of the ministry for a wide program implementation. These preconditions were:

- PriMa should be addressed to all girls and not only to a preselected risk group,
- PriMa should be performed by teachers, not by external experts, to secure sustainability and corporate identity,
- PriMa should reach the girls long enough before the onset of AN (= primary prevention according to Caplan, 1964, with latest implementation at the age of 12 years),
- PriMa should be integrated within the normal curriculum to secure a socially equitable and low-threshold access, but on the other hand
- PriMa should be perceived easily as distinct from normal school lessons,
- PriMa should offer the opportunity for all participants to work on the issues body shape, weight concerns, figure problems and so on without having fear

of being teased by other pupils; therefore PriMa is addressed to girls, exclusively, and

- the participating schools should start with the program immediately after finishing program-development and offering PriMa to all Thuringian schools.

Some of these preconditions contradict the findings from meta-analysis to conduct successful eating disorder prevention programs (e. g. Stice et al. 2007). For example, Stice et al. found programs to be more successful if they were performed by external experts, starting at the age of 15 years and including high risk individuals, only. Particularly critical is the last precondition: Although the ministry explicitly wished to perform a comprehensive evaluation study in order to ensure the quality of the intervention, they wished not to establish a waiting list to conduct a randomized control trial (RCT). The argument was not to discourage schools by telling them: Surely, AN is a big threat and we should fight against it as soon as possible with all efforts, but scientific belongings are always more important.

How Barbie helps to prevent anorexia

PriMa as well as the other programs of our comprehensive toolbox for the promotion of healthy eating and physical activity in schools, which will be referred to later, were described in detail in a German book (Berger 2008) as well as in several research articles with a special focus on program evaluation (Wick et al. 2011; Berger et al. 2008). To give an overview, basic contents of PriMa as well as the other programs will be briefly outlined in two tables (Table 1 and 2) as an application of first, the so called "circular HEPS quality model" and second, the "HEPS quality checklist" offered from the "HEPS inventory tool" (HEPS = "Health Promoting School Approach", see Dadaczynski et al. 2010; Stewart-Brown 2006). The circularity of the Model depicted in Table 1 is obtained, when using the overall intervention quality as starting point for the improvement of all single quality dimensions. After the first PriMa study (see Berger et al. 2008), whose main outcomes will be reported at the end of this section, we were able to realize this procedure.

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The central idea of the PriMa-intervention was to use the well known Barbie doll as an identification cue for the 12-year old girls participating in the program. To give an impression how PriMa works, the nine consecutive lessons could be characterized briefly as follows (see also Figure 1). The intervention PriMa tells the story of a girl on her way deeper and deeper into AN. This girl was depicted by the well known Barbie doll on specially designed posters, which were presented to the class at the beginning of the lesson. Each lesson deals with special risk factors and protection factors, which were derived from scientific literature (e. g. Jacobi et al. 2004) as well as from reports of patients suffering from AN. The AN specific issues of PriMa were divided into three categories: lesson 1-3 deals with issues that could be described as normal behavior shown by many adolescent girls, for example to favor a thin body ideal. In lesson 3-6 the girls were confronted with behaviors that were "conspicuous" but not necessarily associated with eating disorders. Some authors named such behavior "subclinial", others called them "disordered eating" (e. g. Ricciardelli and McCabe 2004). An example would be repeatedly dieting or trying to abstain from sweets despite a compelling greed. Finally, lessons 7-9 focus on clinical relevant eating attitudes such as being preoccupied with dividing foods into "good ones" and "bad ones", counting calories or controlling their weight several times a day.

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Each lesson begins with the discussion of the poster. The specific content of the depicted scene on the poster becomes clear when the girls read the quotation from a peer suffering from AN, which is printed on the poster. For example: "If one day the scale indicated less than the day before, I went to the supermarket and filled my pockets with my favorite candy to reward myself - not to eat them - I took them to a secret place and then I imagined how I would scoff them all together in a wonderful eating orgy (Natalie, 14 years)". The contrast between the naive smiling Barbie doll sitting on a pile of sweets and this quote is intended to provoke a cognitive dissonance. The dissonance is used to induce the girls' intention to resolve it on their own. The expected result is a voluntary change in attitudes (see i. e. Stice et al. 2003; Roehrig et al. 2005). It is important that the

change occurs voluntarily. Otherwise the risk of reactance as response emerges, as it would be with frightening pictures.

As mentioned in the introduction, it was a matter of particular concern to evaluate every step of program development and program implementation. To test the feasibility of PriMa we conducted a process-evaluation including

- the evaluation of the parents information workshop before the program started in the project schools
- the evaluation of the teacher trainings and
- the evaluation of every single lesson from the teachers point of view as well as from the pupils perspective.

The process evaluation showed evidence for a high acceptance of PriMa by teachers and girls. One interesting finding was a significant correlation between the perceived gain of the program and the "fun" the girls had during the performance of PriMa (see also Berger et al., 2008). On the basis of the process evaluation we optimized some parts of the program as well as the program implementation. For example, flanking secondary preventive actions were established such as a telephone hotline to provide information about several treatment possibilities of eating disorders, close to ones place of residence. Another example was the improvement of our teaching manual with respect to the feedback of the teachers concerning more flexibility in the implementation of the PriMa program. Although this contradicts the fidelity of the implementation process, it was possible to adapt the program implementation to "real world" conditions. Therefore, a concept for the application of PriMa as workshop within a so called "project week" was added to the teaching manual. Furthermore, we added several optional exercises to give the teachers the opportunity to "enrich" each PriMa lesson on demand. Subsequently, the duration of the entire performance of the program varied immensely between schools, with a minimum of three days and a maximum of several months. However, the results of the first PriMa study were controlled for class size and program implementation (weekly vs. workshop) and no significant confounding could be stated.

To evaluate the effectiveness of PriMa, we conducted a controlled study in 2004 with 1,006 girls from 42 schools, of which 20 schools took part in the PriMa-program and 22 schools served as controls. Using mainly standardized measures, the girls in the intervention group showed significant improvements in eating atti-

tudes and other relevant variables, particularly within the high-risk subgroup. Encouraged by these results and because of the high recipient's acceptance of the PriMa-program, we decided to disseminate PriMa throughout Thuringia. Therefore, we offered all Thuringian middle schools and high schools (about 600) the opportunity to establish PriMa in their 6th grades. To test the success of this intention as well as the effectiveness of the PriMa-approach under "real world conditions" – without the extra-motivation of the "early-bird-schools" in the pilot-study – we conducted an additional controlled study in 2007 with 1,553 girls from 92 Thuringian schools. As mentioned before, no randomized group allocation could be realized. Instead, we applied a post-hoc parallelization in this study to control for possible confounders such as age (age range was 11 to 14 years), type of school and time period between pre- and post-measurement (see Wick et al. 2011). To sum up, we found significant effects of the PriMa-intervention on AN-related knowledge and body self esteem again, but no improvements on eating attitudes. Therefore, it becomes clear, that focusing on AN is only the beginning of preventive action in the realm of eating related problems.

The flip side of the coin

Eating disorders are indeed very serious health threats, especially to adolescents, but this kind of threat is only one side of the coin. As denoted already in the introduction, unhealthy eating in combination with a lack of physical activity leads to an energy imbalance and increases body weight, subsequently. Obesity is associated with numerous serious health problems (for an overview see i. e. Daniels et al. 2005). Even more important from the perspective of the affected children and adolescents may be the fact that being obese means often being teased, bullied and discriminated almost every day. This so called "obesity stigma" was recently discussed in detail with reference to public health belongings by Puhl and Heuer (2010). These experiences result in a so called vicious circle, as described for example by Swinburn and Egger (2004). The psychological part of this circle starts with negative experiences as a consequence of reactions of peers and others (e. g. parents and teachers) concerning the obese body shape. To avoid these reactions, children phase out from their social contacts as much as possible. Their social withdrawal ends very often at home, on the couch in front of the TV, PC and play station. Following the WHO-study Health Behavior in School-aged Children

(HBSC), especially adolescents between the age of 11 and 15 years show a lack of physical activity (Haug et al. 2009). As a consequence of their minimal physical activity as a "couch potato", the children's weight increases further.
When we established PriMa in Thuringian schools, teachers were enthused and rated almost all components of the program significantly "good" (2 on a six-point scale from 1 "very good" to 6 "insufficient"). An often expressed criticism was that PriMa could be performed by girls, only. Furthermore, PriMa focused on the risk to become too thin. Teachers agreed that AN is a serious disease. However, the reported prevalence rates show that AN is rare even in the most affected group of female adolescents. In a school class there is a twenty times higher probability to find an obese girl rather than an anorectic one. Furthermore, the prevalence rate of obesity in girls and boys is approximately the same.

Couch potatoes aren't cool: How to become a TOPP-guy

In response to the desire of the teachers for more support in the prevention of overweight, we firstly decided to create a new intervention for boys according to the special situation that only girls participated in PriMa. Furthermore we made an important observation during the implementation of PriMa: Over 80% of the girls who participated in PriMa reported that they would never have discussed problems related to their body, figure or weight if boys would have been in the classroom. If this is true for girls, why should it be different for boys? Even at the beginning of puberty, it is difficult for both sexes to talk about body related issues in mixed groups. On the other hand, the teachers as well as the girls reported a large benefit from discussions in the "girls only" situation. Another advantage of a program for boys, exclusively, was the facilitation of program implementation for the participating schools. During the implementation of PriMa, the schools had to deal with the problem, how to "employ" the boys adequately when the girls performed the PriMa lessons. TOPP stands for "Teenage Obesity Prevention Program" and was developed in parallel to the PriMa program with the same duration of the program as well as the same theoretical basics, e. g. the use of dissonance-induction: one of the posters, presented at the beginning of a lesson, shows a typical "couch potato" sitting in front of the TV, looking sad and bored; the picture is entitled "Sitting there with my friends coke, chocolate, potato chips and remote-

control – that's really funny!". In contrast to PriMa, more games were included within TOPP to give the boys the possibility to act in small groups and to reflect on their group status.

To evaluate the effectiveness of the TOPP-intervention, we conducted a controlled study, with 1,199 boys from 84 Thuringian schools, similar to the reported PriMa-studies. Melanie Sowa (first author of TOPP) found out in her unpublished dissertation that the boys in the intervention group could significantly improve their knowledge about healthy eating and health promoting physical activity (Schwartze et al., in print). Unfortunately, none of the other included variables showed significant effects. However, these findings correspond to the central result of a recently performed meta-analysis by Gonzalez-Suarez et al. (2009) comprising 19 school-based interventions on childhood obesity: interventions could reveal significant effects on BMI only if they were implemented for more than two years and with strong involvement of the social environment (structural prevention).

With PriMa and TOPP some important problems belonging to healthy eating and physical activity were picked up within the school setting. Although the advantages of the so called 'target group approach', i. e. performing prevention programs in the field of eating disorders separately for girls and boys, were pointed out by several authors (e. g. Levine and Smolak 2006; Stice et al. 2007), evidence for the benefit of coeducational action is found. This result led to the idea to create an additional program with a focus on themes, which are relevant for both sexes.

Why not fight together: The Torera-approach

As reported in the introduction section, eating disorders with uncontrollable binge eating attacks (BN and BED) are more common than AN, which is defined by self-induced weight loss as a diagnostic criterion according to ICD-10 (F50.0). If one translates the term "bulimia" literally, it means "hungry as a bull". In our opinion, a wild black bull is an intuitive catchy symbol of an imminent threat – irrespective of the fact that the term "bulimia" only describes one half of the diagnostic criteria of BN (F50.2), but leaves out the purging behavior. To continue this idea: to fight against the bull is a powerful symbol for preventive action concerning BN and BED. A person who professionally fights against bulls is named "torero" in the Spanish tradition. Because females are more often affected by BN

than boys, we choose the female form "torera" as the name of our program, which is addressed to girls and boys attending 7th grade. In the first three lessons of the Torera program, the girls demonstrate the boys what they have learned in the PriMa lessons and vice versa; the boys sum up their experiences from the TOPP-lessons. The five subsequent Torera lessons deal with BN, BED and obesity related themes, such as being teased, or coping with aggressions against oneself, e. g. self induced injuries by a razor blade, as well as aggressions against others. The most important tools to face up these themes are role plays. In the last lesson, the adolescents watch a musical play which was performed and recorded by peers from another Thuringian school. The aim of the last lesson is to initiate own actions to critically deal with the threat of eating disorders and obesity in school classes. To consolidate the experiences made through the participation in PriMa, TOPP and Torera, we developed a short booster session (90 minutes) for 8th graders, called STARK. This idiom means "strong" in German and is an abbreviation containing letters from the long version of the title of this program "rotation work: competent in healthy eating and physical activity". Torera and STARK were implemented in Thuringian schools since 2007 with the participation of 750 girls and boys. The evaluation was conducted in the same way as the evaluation of PriMa and TOPP. The report of the results is still pending.

Lessons learned

When planning comprehensive health promotion action in the field of eating disorders and obesity, there are manifold international programs to get an orientation which contents should be addressed (for an overview see Stice et al. 2007; Gonzalez-Suarez et al. 2009). In Germany, several programs were developed, too (see Berger et al. 2008; Brandt et al. 2010). Unfortunately, most programs were tested only in pilot studies with only a few participating schools. Following the recommendations of the Society of Prevention Research (SPR, see Flay et al. 2005), a quality ensured program implementation should be done in three steps: level 1 'efficacy' (testing the program under ideal conditions), level 2 'effectiveness' (implementing the program under real world conditions), level 3 'broad dissemination' (establishing organizational structures for program acquisition).
Supported by a grant of the German Federal Ministry for Education and Research (#01EL0602, 2006-2009), we tried to follow these standards as accurate as possi-

ble. In this process we experienced the greatest problems encountering at level 3. To make our experiences transparent, we describe our way to create logistics for a broad dissemination of our programs in the following. This implementation process cannot be described on the basis of common rules. Even within every single federal state in Germany (Thuringia is one of 16 states), conditions for preventive actions differ strongly. Our efforts to secure sustainability of PriMa and our other "health promotion tools" (see Table 1) resulted in three different ways of program logistics. Each way was realized at a different phase of the implementation process.

In the first implementation phase we produced only a small quantity of project materials (manuals, posters, work-books, DVDs and CDs) funded by a sponsor (a health insurance company), just enough to equip our 20 pilot schools participating in the PriMa pilot study. Materials were distributed directly to the project teachers and remained in their property. This strategy secured a high corporate identity within the project. One remarkable disadvantage of this approach was that we had high production costs in conjunction with no discount. In the second phase, when the PriMa-program was transferred into routine operation, we offered the materials to the teachers within a teacher training. At this point of the project the participating teachers were defined as multiplicators who had to pass the materials to other teachers if they don't perform the program any longer by themselves. With this approach it is more obvious that the health intervention is initiated by the school as an institution and not by a single dedicated teacher. The main disadvantage concerning this way is a lack of flexibility in the material improvement in consequence of the program evaluation (in the sense of the Donebedian "Plan-Do-Check-Act-Circle"). To secure sustainability of our health promotion efforts, at last we decided to establish a third way for program distribution. Because in Germany every of the 16 federal states is independent with reference to educational belongings, this way had to be different for Thuringia and the other states. In Thuringia, the TMBWK decided to produce as much material as needed to equip all 22 so called "media centers" of which schools can rent the teaching material for a small amount of money and a limited time period. As a consequence, the face to face teacher trainings are going to be offered as DVD-tutorials, only. To make it possible for schools in other German federal states to acquire the program materials and to register for the teacher training, we started a joint venture with

the private firm “Heidelberg Prevention Centre” (www.h-p-z.de). The HPZ has an extensive expertise in program dissemination based on several years of experience with the distribution of “Faustlos” (which is the German adaption of the social competence approach “Second Step”, Frey et al. 2000). The disadvantage of the joint venture with the HPZ is the general dependency of (small) private firms from the present economic climate.

In our opinion, no “best practice” of program dissemination could be recommended. As our experiences show, each way has specific advantages and disadvantages.

As described at the beginning of the article, it is a great challenge to implement a comprehensive health promotion concept for healthy eating and physical activity in schools. From a scientific point of view, it is difficult to evaluate the project as a whole. To ensure the quality of our concept, we first applied the so called CONSORT-Statement (Schulz et al. 2010) to make the evaluation of every single program evaluation transparent (see Wick et al. 2011). Following the Oxford levels of evidence grading system, our evaluation studies reached evidence level 2b “Individual cohort study” on the scale from 1a “Systematical Review of RCTs” to 5 “Expert Opinion”, see e. g. http://www2.cch.org.tw/ebm/file/CEBM-Levels-of-Evidence.pdf). Second, we used the HEPS Quality Checklist to describe the fulfilment of every quality aspect (see Table 2).

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As shortly described in Table 2 most of the quality aspects, referred to in the HEPS checklist, were fulfilled by our health promotion concept. The overall score of 64 points (out of a maximum of 74 points) indicates a high intervention quality. However, some problems still remain unresolved.

Conclusion

Derived from our experiences with the implementation of a comprehensive school-based concept for the promotion of healthy eating and physical activity over the last seven years, there still remain at least two not sufficiently resolved public health challenges. The first problem is related to the fact that the methodology for effectiveness evaluation is not really applicable within the prevention re-

search field. For example, when trying to publish our results of the two PriMa studies with controlled designs but no randomized group allocation, reviewers often couldn't believe that we have chosen this strategy due to the demands of our "practice partners". In other words, the "real world" conditions with necessary concessions and compromises were neglected from a scientific point of view. The second pending problem belongs to difficulties concerning the program dissemination. Especially in Germany, it is hard to bring both together, educational efforts and health concerns. Although health belongings are sometimes defined as concerns of national interest (e. g. the campaign "IN FORM – German initiative for healthy eating and physical activity", see www.in-form.de), concrete school activities are under supervision, with consensus of each ministry of education in every single federal German state, exclusively. This situation often leads to the paradoxical effect that the successful program implementation in one state does not facilitate the implementation in another state, in contrary, makes it more difficult. How can that be? The reason is quite simple: Ministries are governmental institutions and therefore more or less dependent from political interests. The implementation of a new program brings political "brownie points". To implement a program created by another political institution, or even worse by another political party, is not very useful to get votes at the next election – even if the program is really good and adequate. In short, health promotion needs more self-contained and scientifically accepted methodological tools like HEPS. Furthermore, health promotion needs political support which is independent from turnover of political staff and institutional rotations against the background of legislative periods.

The authors declare that they have no conflicts of interest.

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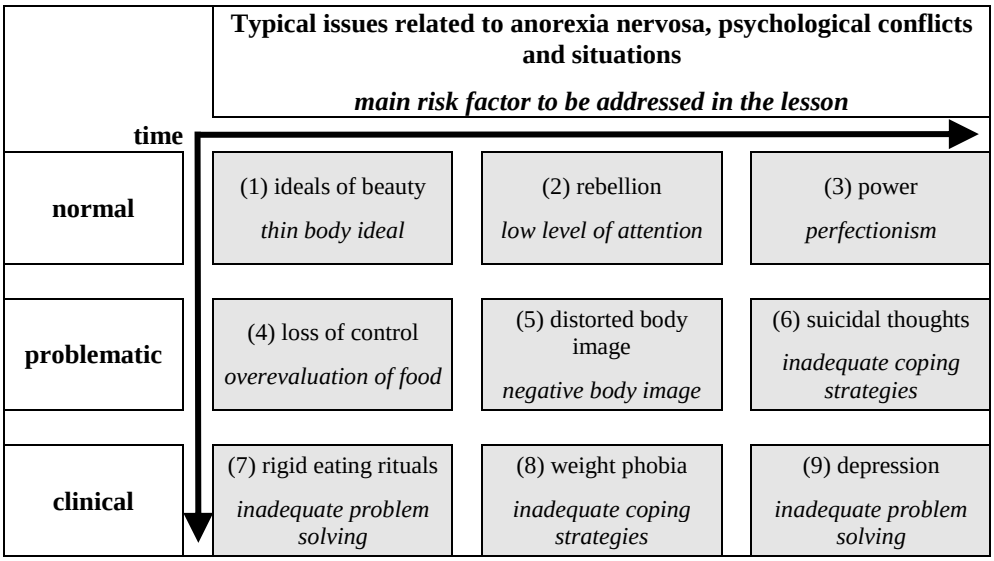
Figure 1: The ″Barbie-Matrix″: Concept of PriMa including the 9 main topics of the project.



Annotation: more detailed see Wick et al. (2011)

Table 1: Application of the "Circular HEPS Quality Model" (Dadaczynski et al., 2010).

Quality dimensions according to Donebedian			
Concept	**Structure**	**Process**	**Results**
• School-based comprehensive toolkit for promotion of healthy eating and physical activity[1] • Target groups: Girls and boys separated (6th grade: PriMa and TOPP) and coeducational (7th grade: Torera, 8th grade: STARK) • manual guided with posters, multi-media materials and template for workbook copies • interactive • theoretical background: dissonance induction, empowerment, positive learning	• Program development, contents, evaluation: Jena University Hospital • Material production, distribution: Thuringian Ministry TMBWK • Organization of teacher trainings: Thuringian Institute ThILLM • Project management, teacher trainings: 2 specially skilled teachers • Funding: German federal Ministry BMBF • German-wide distribution: Heidelberg Prevention Centre (www.h-p-z.de)	• Information session for parents and school staff including an expert talk to discuss ED related questions • 9 lections (PriMa, TOPP, Torera á 45 to 90 minutes – depending on the amount of the application of extra exercises), 1 booster-session á 90 minutes STARK • within the regular curriculum • performed by regular teachers after training (one day PriMa/TOPP, half day Torera/ STARK) • telephone hotline for teachers and parents	**Effectiveness** (controlled studies with pre-post-measures): • PriMa I (n = 1,006): sig. effects on eating attitudes, body self esteem, knowledge; ED risk group only[1] • PriMa II (n = 1,553): sig. effects on body self esteem, knowledge[2] • TOPP (n = 1,199): sig. effects on knowledge[3] • Torera, STARK[4] **Efficiency** (cost-evaluation only): • Implementation: - with buying material: about 1,000€ - with material rent: about 250€ - follow-up costs: 2.50€ per pupil

[1] Details see Berger et al., 2008

[2] Details see Wick et al., 2011

[3] Details see Schwartze et al., in print

[4] publications pending; till now, evaluation results were reported in two master pieces in German language, only

Table 2: Application of the "HEPS Quality Checklist" (Dadaczynski et al., 2010).

Quality Dimension	**Example**	**Score**
1.1 Assessment & analysis	All program realizations based on epidemiological data as well as on risk studies and were developed due to school needs (formulated by the educational ministry)	2 x 2
1.2 Target group & objectives	Targets were adolescents, especially girls for AN prevention, boys for obesity prevention and both for BN and BED prevention; Objectives: reducing risk factors for ED and obesity	2 x 2
1.3 Principles & HEPS	Beside risk factors, there is a special focus on protection factors in the programs. All parts are interactive (e. g. group discussions, role plays). All pupils are included in the intervention (universal prevention approach). The school environment (e. g. food providers) was not sufficiently considered.	2 x 2 + 2 x 1
1.4 Intervention planning	Evidence for ED prevention is revealed from Stice et al. 2007, Smolak and Levine 2006). Parents were informed before the programs start and were addressed (although indirectly) within the programs performance. Every intervention is multi-component. Detailed plans for interdisciplinary program delivery were offered in the teaching manual. The whole concept is linked to the schools aim to develop a self dependent health strategy.	8 x 2 + 1 x 1
Summary	*Overall score indicates high quality of concept*	*31 (out of 34)*
2.1 Resources & qualifications	Costs were transparent at every stage of program implementation. Teacher trainings as well as teaching manuals and teaching materials (posters, DVDs) were available.	5 x 2
2.2 Networking & cooperation	Only a few partners outside the school setting (e. g. one health insurance company temporarily) could be involved in the project. Teachers get a structured guide with advices for the demand of help offers. A telephone hotline for parents and teachers was applied for flanking secondary prevention.	2 x 1
Summary	*Overall score indicates high quality of structure*	*12 (out of 14)*
3.1 Implementation & delivery	All interventions were implemented in the regular curriculum. Teachers and parents were informed before the programs start. The essential parts of each program were highlighted in the teaching manual. A telephone number for ongoing support was delivered to the teachers by a written information paper.	3 x 2 + 1 x 1
3.2 Monitoring & controlling	A written bulletin of the first PriMa study, including the	1 x 2

	results of the effectiveness as well as the process evaluation was delivered to all participating schools. PriMa and Torera were improved on the basis of the evaluation results.	+ 1 x 1
Summary	*Overall score indicates high quality of process*	*10 (out of 12)*
4.1 Effectiveness (see tab. 1)	The results of the PriMa studies are encouraging even though the effects were small and somewhat smaller in the second PriMa study. The TOPP study revealed effects on knowledge, only. Because of concessions due to our praxis partners, no RCT studies could be conducted.	2 x 2 + 3 x 1
4.2 Efficiency (see tab. 1)	Because of different distribution ways, costs could be adapted flexible to the schools budget. Costs for teachers training do not exceed the costs for normal teacher advanced trainings. The low follow-up costs of 2.50€ per pupil secure sustainability.	2 x 2
Summary	*Overall score indicates high quality of outcome*	*11 (out of 14)*
Overall Summary	*Overall score indicates high intervention quality*	*64 (out of 74)*

Annotations: Score “2 points = yes”, “1 point = partly”, “0 points = no”; Quality Dimensions “1 = Concept”, “2 = structure”, “3 = process”, “4 = results”; HEPS = Health Promoting School Approach