Invited Commentary

Implementation evaluation of school-based obesity prevention programmes in youth; how, what and why?

In an ideal world, one combats public health problems with theory- and evidence-based programmes. In the real world, evidence-based programmes are often lacking and programmes that are developed and implemented are mainly practice-based. In the last few decades, governmental and other funding agencies have prioritized the development and evaluation of evidence-based obesity prevention programmes to combat the major public health problem of childhood obesity[1]. Consequently, a large variety of healthy nutrition and physical activity promotion programmes targeting youth have been developed and evaluated in more or less controlled and real-world settings[2–5]. Unfortunately, the real-world effectiveness of many programmes is disappointing, especially in the long term[6,7].

This lack of effectiveness could be because the programme was not effective in itself or because it was not implemented as intended[8]. It is therefore of obvious importance to evaluate if and to what extent a programme was implemented as intended. Implementation evaluation research can provide insight into the dynamic nature of implementation processes and key factors that are expected to be critical for achieving effectiveness of overweight and obesity prevention programmes during implementation.

Three important generic implementation research questions in the context of programme evaluation are: (i) how to promote implementation as intended; (ii) what happens during implementation; and (iii) why did my programme (not) work? In the present invited commentary we discuss these three questions, enriched by our experiences with the school-based obesity prevention programme DOiT (Dutch Obesity Intervention in Teenagers)[9,10].

How to promote implementation as intended?

Moving too quickly from science to the real world may result in implementation of programmes that are not yet ready for implementation. Moving too slowly from science to practice may lead to implementation of interventions that are easy to implement but that are not evidence-based. Therefore, both science and practice need to collaborate to facilitate the development of theory and feasible evidence-based programmes for implementation.

Schools are regarded as a convenient and practical setting to implement programmes targeting children's and adolescents' health behaviour[11]. In such programmes, teachers are often intermediaries delivering the programme. Implementation of such programmes requires that teachers change their daily routines. However, change often does not occur automatically or simultaneously among all teachers within a school[12]. If one teacher is enthusiastic to implement a new programme, this does not mean that all teachers in that school are willing to work with the programme as well.

A growing body of evidence has identified a large variety of factors that may explain the transition of implementers from non-use to sufficient use through stages of innovation, i.e. adoption, implementation and continuation[13,14]. Regarding school-based overweight and obesity prevention, primary determinants of behavioural change of teachers are: (i) contextual factors, such as the extent to which a programme fits the existing school health policy; (ii) organizational factors, such as the decision-making process in the school, available time and budget; (iii) individual factors, such as teachers' knowledge, skills, self-efficacy and intention to implement the programme; (iv) characteristics of the programme, such as compatibility and flexibility of the programme; and (v) characteristics of the implementation strategy, such as programme training, feedback on implementation and implementation materials.

These factors can either facilitate or impede implementation. For instance, if teachers are not continuously supported to prepare, implement and evaluate the lessons, they might deliver only a small part of the programme or refuse to implement the programme at all. Barriers to implementation may lead to negative adaptations or even termination of the programme. Therefore, it is important to identify and then address these factors in order to ensure optimal implementation.

As these factors can change over time, an implementation plan, tailored to the potential implementers at both organizational and individual levels, should be developed to support implementers throughout the process of adoption, implementation and continuation. The first step towards such an implementation plan is to address the potential mismatch between a programme and its implementers by identifying facilitating factors and barriers for implementation[15].

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For example, intervention developers might think that a standardized multi-component programme is most effective, while teachers may prefer flexibility during implementation. Close collaboration with implementers and other practice stakeholders during the development of the programme and the implementation plan can provide insight into programme-specific factors that need to be addressed, such as duration, compatibility and flexibility of the programme.

The next step is to define essential elements and strategies for implementation. Examples of essential elements are a favourable school climate including a supportive programme coordinator, supportive colleagues and available time for implementation[16]. Several programme delivery strategies have been shown to promote implementation; for example, providing materials and training[14,16], providing regular feedback on implementation behaviour[12,17] and technical assistance to support implementation[18–23]. Together with the potential implementers, the best applicable strategies need to be selected. In DOiT, for example, we used a person-to-person approach by installing a 'DOiT support office', based on the advice of teachers and stakeholders. The contact person in this support office was available for support and advice for implementers of DOiT throughout the school year.

The final step is to merge this knowledge on essential elements and strategies into an implementation plan that supports the process of implementation.

What happens during implementation?

The next task in implementation evaluation is adequate and systematic measurement of the implementation process. In recent years, the number of programme evaluations including a process evaluation has increased[12] and several models and frameworks have been used. A few examples are the Diffusion of Innovation Theory of Rogers (i.e. a theory that seeks to explain how, why and at what rate new ideas and technology is diffused)[24], the model developed by Steckler and Linnan (i.e. a guide for the conduct of a process evaluation)[25], the Process Evaluation Plan of Saunders et al. (i.e. a comprehensive and systematic approach for developing a process-evaluation plan)[26] and the RE-AIM framework (i.e. a framework designed to enhance the quality, speed and public health impact of efforts to translate research)[27,28]. By measuring process indicators, such as reach, fidelity and dosage, researchers can document if the target population (e.g. youth at the schools) was reached, if adaptations to the programme were made and what part of the programme was implemented[13,14].

However, the large array of impeding and facilitating factors, which can influence implementation, is only seldom part of evaluations. Examples of such factors are teachers' intention to implement the programme, available time for implementation and supervisors' support. These influential factors should be measured throughout the whole implementation process, including the phase preceding implementation. Since there is limited knowledge about mechanisms that underlie successful implementation, the combination of both process indicators and influential factors measured at multiple occasions can help to gain insight into the dynamic nature of implementation processes and into key factors for successful implementation.

Why did my programme (not) work?

In this next step of implementation research, interpretation of the different implementation measures is needed to assess at what level implementation occurred (e.g. degree of implementation) and how implementation affected programme effectiveness (e.g. was the programme successful in changing youth's energy balance-related behaviours and reducing overweight and obesity?). Youth cannot benefit from programmes they do not receive. Therefore, the first step is to define the degree of programme implementation. Some studies have reported the number of lessons that were taught as a single measure for the degree of implementation. Since implementation is a complex process, a combination of different process indicators such as dosage (e.g. how much time was spent on programme delivery, how many lessons, how many core activities), fidelity (e.g. to what extent was the programme delivered according to the teacher manual and what adaptations were made) and quality of delivery (e.g. skills, motivation of teachers and support within a school for implementation) at both the programme and the support level play a role[14]. Next, the association between the degree of implementation and programme outcomes can be explored; for example, did schools with a higher degree of implementation show more effects?

Translation into the real world

Finally, in order to maximize the public health impact and to successfully decrease childhood overweight and obesity prevalence rates, a blueprint for dissemination of the programme should be developed[17]. Since most programmes use a broad range of programme components and strategies, implementers often make changes to the programme; for instance, teachers adapt lessons to fit their teaching preferences. However, to promote programme effectiveness in real-world settings, we need to distinguish which combination of programme components contributes most to the beneficial health effects[5]. These effective components should be bundled into a so-called blueprint for replication of the programme. This blueprint should contain: (i) information on contextual conditions that are compulsory for implementation (e.g. support, available budget, available time); (ii) a description of core, or most essential, components of the programme; and (iii) a description of the most

critical, core components of the implementation plan that need to be executed in order to achieve effectiveness of the programme. This blueprint can be used to effectively implement the programme more widely. If there is, for example, insufficient support, time and/or budget for implementation, schools should not adopt the programme.

In summary

Answering the three proposed generic research questions can lead to better understanding of how to implement overweight and obesity prevention programmes effectively. It means that science has to collaborate with practice in order to develop an implementation plan. It also means that one should evaluate the process of implementation by addressing both process indicators, as well as facilitating factors and barriers. Moreover, one should explore the key factors that are expected to be critical for achieving effectiveness during implementation. Therefore, we call for more implementation research in the current overweight and obesity prevention field in order to promote not only adequate implementation of effective programmes, but also to increase knowledge of effective strategies.

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