

DOI: 10.21767/2254-9137.100034

Planning Locally Tailored Interventions on Evidence Informed Policy Making – Needs Assessment, Design and Methods

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Abstract

Background: The integration of evidence and knowledge in policy making is crucial. The literature shows the importance of context in knowledge integration interventions, but methods for developing tailored interventions are lacking. The aim of this article is to describe the pre-intervention phase and intervention design and methods of a study investigating whether locally tailored interventions increase levels of knowledge integration in evidence informed policy making on health enhancing physical activity (HEPA).

Methods: Six policy cases related to HEPA in Denmark, Italy and the Netherlands were targeted. The Stewardship approach guided the interventions; thus, the interventions were designed on the basis of context- and needs assessments, and all activities were performed in close collaboration between researchers and policy makers. The Knowledge to action framework contributed by identifying the various steps necessary to integrate evidence and knowledge in the policy process. The needs assessment in each setting resulted in the design and implementation of six tailor-made interventions with the same overall goal: To increase the level of knowledge integration in evidence informed policy making. To properly address the identified needs and to take into account the context, the specific aims and contents of the interventions varied. The level of research evidence and knowledge use was measured with pre-, post- and 12-month post-post measurements via questionnaires among the intervention participants. In each setting, process evaluations were conducted to address the ways the interventions impact was achieved.

Discussion: This study is novel because it uses the Stewardship approach to build needs and context based policy interventions with close collaboration between researchers and policy makers. The key point in the study was to build tailored interventions based on common theories to achieve the same overall goal and use the same outcome measures but to allow for the intervention contents, processes and intensities to vary.

Keywords: Knowledge integration; Evidence integration; Context tailored interventions; Policy process; Policymaker-researcher collaboration

List of Abbreviations: REPOPA: Research into Policy to enhance Physical Activity; HEPA: Health Enhancing Physical Activity; K2A: Knowledge to Action; DK: Denmark; IT: Italy; NL: The Netherlands; RE-AIM framework: Reach, Effectiveness, Adoption, Implementation and Maintenance.

Received: May 02, 2016; **Accepted:** May 27, 2016; **Published:** May 31, 2016

Introduction

The integration of research evidence and other types of

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Citation: Maja B, Christina R, Natasa L, et al. Planning Locally Tailored Interventions on Evidence Informed Policy Making – Needs Assessment, Design and Methods. Health Syst Policy Res. 2016, 3:2.

knowledge (e.g., knowledge from stakeholders, knowledge of/on target groups) in the policy making process is crucial [1]. Within the field of public health and health promotion, the integration of research evidence in policy making is assumed to facilitate the development and implementation of the most appropriate and effective policies in relation to cost-effectiveness, the needs and wishes of populations and health status at the individual and population levels. However, this knowledge integration is not straightforward, and the development and evaluation of implementation strategies is necessary [1-3].

Multiple researchers have investigated public health and health promotion interventions to address such knowledge integration strategies. The conclusion of these studies is that context plays an important role when deciding how to best facilitate the integration of various types of evidence in policy making. In other words, no single strategy is effective in all circumstances, and it is important to consider different types of evidence and knowledge, the particular policy process, and the participants and organizations when planning an effective knowledge integration process [4-9]. Despite this conclusion, suggestions on how to establish an integration process in practice are still lacking.

One way to design and institute tailored knowledge integration processes involves using elements from the Stewardship approach, which builds on a close and equal collaboration between policy makers and researchers and emphasizes the importance of context [10]. Hence, the Stewardship approach focuses on promoting transparency, comprehensiveness and stakeholder involvement in relation to, for example, policy making processes. A key component of this approach is the thorough mapping exercises of needs, wishes and competencies among stakeholders/participants before planning an intervention [10-12].

In addition, the Knowledge to action (K2A) framework can contribute to understanding the complex process of integration of evidence in policy making. This framework focuses on key steps in knowledge integration - covering the identification of a problem/issue at stake, the assessment of knowledge integration determinants, selection, tailoring, implementing, and evaluating knowledge integration interventions and determining strategies for the sustained use of relevant knowledge [13,14]. Thus, K2A can be used to identify the concrete steps to be included in a tailored knowledge integration process.

Based on the above, pre-intervention activities (e.g., needs assessment and context analysis) must be performed before being able to develop tailored knowledge integration interventions. The results of these activities can later feed into the development of detailed interventions for knowledge integration.

Based on a multiple case design, the aim of this article was to describe the pre-intervention phase and the intervention design and methods of a study investigating whether locally tailored interventions based on the Stewardship approach and the K2A framework increase levels of knowledge integration in evidence informed policy making on health enhancing physical activity (HEPA). The hypothesis was that use of the Stewardship approach and the K2A framework would be a successful way of carrying out the pre-intervention phase and to design the set of knowledge integration interventions.

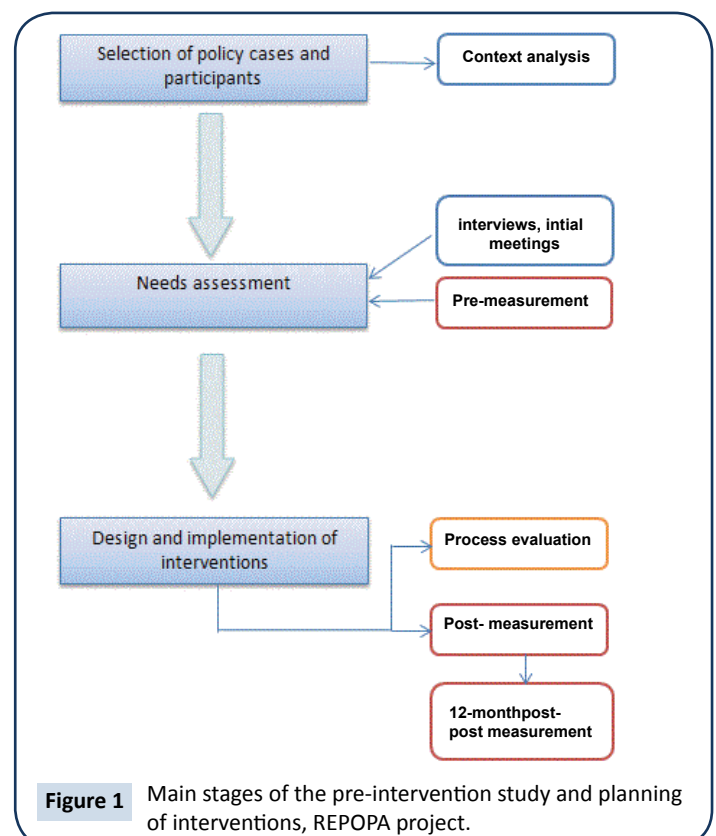
This study is part of the second phase of a larger program of research: Research into Policy to enhance Physical Activity (REPOPA; www.repopa.eu). REPOPA aims to integrate scientific research evidence and expert know-how with policy making processes to increase synergy and sustainability in promoting health and preventing disease among Europeans [15]. The countries involved in this part of the project are Denmark (DK), Italy (IT) and the Netherlands (NL).

Methods

The work of this intervention study was structured according to **Figure 1** and was inspired by elements from the Stewardship approach [10] and the K2A framework [13].

Pre-intervention phase

Selection of policy cases: This study was conducted in three countries with rather different characteristics. This was arranged to attempt to identify knowledge integration interventions in different contexts. The first step involved selecting policy cases for the interventions. Each country researcher team (DK, IT, and NL) selected two policy cases based on pre-defined obligatory and additional optimal inclusion criteria. The obligatory inclusion criteria for the policy cases involved placement in a local or regional setting, willingness of the responsible stakeholders to participate, having at least one vulnerable target group included and utilizing an intersectoral approach. The additional optimal inclusion criteria were an existing HEPA theme in the policy case and the policy case either initiating a new policy or changing an existing policy at the beginning of the intervention. The selected policy cases meet all of the obligatory and optimal criteria.



The selected policy cases were:

- Kolding (DK): Development of a strategy for physical activity
- Varde (DK): Development of a strategy for physical activity
- Rome (IT): “Municipaliadi”, Student Olympics of the school of the territory of Municipio XII
- Tuscany (IT): Healthy roads
- Utrecht West (NL): Strengthening the Neighborhood Sports and physical activity (PA) Plan of Utrecht West
- Utrecht (NL): Development of a strategy for PA for senior citizens (65+) in Utrecht

Selection of participants: In each policy case, the country researcher teams identified the relevant possible intervention participants via dialog with staff from the municipalities where the policy cases were chosen. The participants were included if they had a significant role in the policy case process. The number of participants and their profiles varied between the policy cases. However, all of the cases included local stakeholders such as policy makers and/or administrative representatives from different municipal sectors such as public health, physical activity, social services, care and welfare. Other participants were national stakeholders, researchers and media representatives. **Table 1** shows detailed information of the intervention participants in relation to each intervention.

Context analysis: When planning an intervention study that uses approaches tailored to specific contexts as suggested by the Stewardship approach, it is important to be transparent regarding the details of the contexts. For example, it is important to pinpoint in which contexts a specific intervention did/did not provide certain effects when later analyzing the results. Therefore, detailed context mapping was performed for each of the policy cases. This was completed based on a framework inspired by Brownson et al [1] (**Table 2**). The context mapping included information on the political system, community characteristics, the investigated policy and its context including physical activity level, the policy development group and dissemination channels imbedded in the policy case setting. The context mapping was mainly performed by document analysis.

Needs assessments: For each policy case, the country researcher teams performed a needs assessment that was conducted in two steps: 1) identification of the needs and aspirations in relation to the integration of research evidence, other types of knowledge and the policy making process of the participants through initial meetings and qualitative interviews, and 2) measurement of current evidence/ knowledge use (evidence from research, knowledge from stakeholders, knowledge of/on target groups) among participants via a questionnaire.

Initial meetings and qualitative interviews: Each country researcher team was responsible for arranging the initial meetings and qualitative interviews related to the two policy cases in their country setting (**Table 1**). The initial meetings consisted of informal discussions of current situations and wishes for further development in relation to the integration of knowledge in policy processes. The interviews were semi-structured and focused on

exploring perceived challenges in the integration of knowledge in the policy processes and ideas for future improvement. The country researcher teams developed the meeting minutes and interview summaries.

Questionnaires: The participants completed a questionnaire measuring current state of knowledge use. The questionnaires contained tailored needs assessment questions for each policy case. For example, the questions could ask about the relevance of and how to contribute to an intersectoral HEPA strategy, satisfaction with the present level of intersectoral collaboration between administrations, and roles of, knowledge of and use of networks when developing a HEPA strategy. More information on the development of the questionnaire is provided later under the header “Intervention process and effects measurements”.

Needs assessment findings:

- Kolding (DK): The needs assessment indicated a high degree of support for the idea of a common strategy for physical activity. The participants also mentioned the need for a more systematic and structured implementation to create ownership and to move physical activity further up on the agenda of all administrations. Only one-third of the participants indicated that they were satisfied with the present level of intersectoral collaboration. In particular, there was a need for better communication across municipal sectors. The most important need was to take advantage of the relatively high focus on physical activity and the level of research evidence use in policy making within each sector and to spread and coordinate it throughout the organization.
- Varde (DK): In the Varde municipality, there was room for improvement in relation to intersectoral collaboration. Only 4 out of 11 participants were satisfied to a high degree with the intersectoral collaboration. In particular, the lack of communication and coordination between sectors were perceived as barriers. However, the participants were in general positive towards the development of an HEPA related strategy.
- Rome (IT): The interviews with people working in Municipio XII in Rome showed that no infrastructure existed for the use of research evidence in the organization. Most of the knowledge used for the development of this policy came from stakeholder inputs such as physical activity teachers or school principals. Policy makers did not have time to find access or use research evidence, and administrative staff lacked the necessary skills to study the available evidence. Researchers were often believed to be unaware of the real contexts, but their results were regarded as very important for policy makers. The participants wished to nurture the relationship between policy makers and researchers.
- Tuscany (IT): The reports of the “Healthy Roads” project did not mention scientific references regarding the benefits of HEPA, but tacit knowledge on existing risks for health from air pollution, car accidents and sedentary behavior was mentioned as the motivation for action. In the document for territorial planning, “Regulations for bio-eco sustainable housing”, there were references related to

Table 1 Description of the participants in the pre-intervention phase (qualitative interviews and questionnaire), REPOPA project.

Policy case	Sector	Qualitative interviews, Total (n=29)	Questionnaire, Total (n=74)
Kolding (DK)	- Social Services and Health	1	4
	- Children and Education	1	2
	- Senior Citizens	1	2
	- City and Development	5	11
Varde (DK)	- Children and Youth	2	3
	- Planning, Culture and Technical Services	3	3
	- Social Services, Health and Employment	1	5
Rome (IT)	- Municipality Policies	1	1
	- Municipality Education, Cultural and Intercultural, Sport and Wellbeing Policies	1	1
	- Municipality Communication with Stakeholders	1	1
Tuscany (IT)	- Director, LV Health Society		3
	- Civil Servant, Local Health Authority	1	3
	- Medical Director, Local Health Authority	1	3
	- Medical Director, Researcher, Hospital		3
	- Researcher in Medicine, University		2
Utrecht West (NL)	- Policy maker Sports Stimulation		1
	- Policy maker and employee Hearts for Sport		2
	- Researchers/knowledge institute: National Institute of Sports and Physical Activity		1
	- Care provider: Owner/ Co-owner	1	1
	Physiotherapist,	2	1
	Daily management partnership		1
		2	
	- Welfare: Cesar therapist, owner, lifestyle coach		2
	- Sports: Technical director sports club		
	Owner sports club		1
		1	
Utrecht (NL)	- Policy maker Sports Stimulation		2
	- Policy maker and employee Hearts for Sport		1
	- Research/knowledge institute: National Institute of Sports and Physical Activity		
	- Sports Facility owner		1
	- (Residential) Care provider: Project leader		1
	HEPA social worker	1	1
	Treasurer	2	1
	Physiotherapist	2	1
	Director/owner GP GP/head of joint practice		1
	Location manager residential care facility		1
			1
	- Welfare: Social broker		1
	Executor walking activities		
	Teacher HEPA for elderly		1
Neighborhood sports coach		1	
		1	
- Region manager Public Health		1	

Table 2 Context mapping.

Denmark	
Political system	<ul style="list-style-type: none"> - Modern welfare state with decentralized system administration; - Central level provides guidance and policies for regional and local level; Regional level is responsible for health care services and psychiatry; Municipalities are responsible for health promotion; - Municipalities are autonomous authorities with elected councils and have a high degree of decision-making freedom
Kolding - Community characteristics	Varde - Community characteristics
7 th largest city in Denmark, 190,000 inhabitants; 5 administrations: Senior citizens, City and Development, Social Services and Health, Children and Education and Central administration	50,000 inhabitants 4 administrations: Children and Youth, Planning, Culture and Technical services, Social services, Health and Employment, Central administration
<u>Relevant health indicators:</u>	<u>Relevant health indicators:</u>
<ul style="list-style-type: none"> - Prop. of citizens engaging in moderate/heavy physical activity in spare time: 27,3% - 16% of citizens have still sitting spare time activities; 70% of those want to be more active - 67% of citizens are regularly physically active - Body Mass Index (BMI) > 30: 10% 	<ul style="list-style-type: none"> - Proportion of citizens engaging in moderate/heavy physical activity in spare time: 26,6% - 14% of citizens have still sitting spare time activities; 63% of those want to be more active - 71% of citizens are regularly physically active - BMI > 30: 10%
Sources: (22-25)	
Italy	
Political system	<ul style="list-style-type: none"> - Centralized system with the Ministry of Health being primarily responsible for health promotion - Local Health Authorities (LHA) operate under the National Health Service (NHS), and their task is to ensure the essential levels of assistance provided by the national health plan, delivery of benefits and services, assistance provided by the municipalities in the local implementation plans, the socio-medical highly integrated health, and the management of health and social services
Municipio Roma XII – community characteristics	Società della Salute (SDS), Valdarno Inferiore, Tuscany – community characteristics
Roma XII is one of 15 sub-municipalities in Rome; 142,983 inhabitants (5% of Rome); Sub-municipalities are dependent on the central administration of Rome but have their own elected president and council; they may cover health issues indirectly in cross-sector policies addressed to schools	SDS Valdarno Inferiore, an Association for health promotions composed of 4 Municipalities (Santa Croce, San Miniato, Castelfranco di Sotto, Montopoli) and their local health authorities; total population: 66,994; scattered industrial and business areas, residential area is centered, inefficient public transportation
<u>Relevant health indicators:</u>	<u>Relevant health indicators:</u>
<ul style="list-style-type: none"> - 29% of the population is overweight, 8% obese, those with lower education are more often overweight; income is not related to overweight - 37,4% of the population is physically inactive, 33,1% is partially active - Those with a lower socioeconomic status and women are more often inactive 	<ul style="list-style-type: none"> - 41% of adolescents are overweight, 8,5% are obese - 21% of the general population is sedentary - 34% of the general population engage in intense and prescribed HEPA, 45% engage in moderate HEPA
Source: (30)	
The Netherlands	
Political system	<ul style="list-style-type: none"> - Decentralized system with part of the tasks transferred from the central to the local level, which affects health- and HEPA policies on national and local (municipal) levels - The government chooses to have limited legislative interference (focus on information dissemination, accessible facilities for people to make the healthy choice the easy choice) - Health related priorities in national policies must be considered in local policy plans <p>(Municipalities) characteristics/responsibilities after the new health reform:</p> <ul style="list-style-type: none"> - Municipalities are responsible for support, assistance and home care - National level criteria for access to residential care will be more strict - Funds from 2015 were released from secondary medical care for extra district nurses - Responsible for youth care tasks (before Ministry of Health, welfare and Sport) - More autonomy on decisions of how to implement decentralized provisions - Currently determining how to adapt to the new laws and requirements
Utrecht - Community characteristics	
<ul style="list-style-type: none"> - 4th most populous Dutch city; 318,000 inhabitants - Strong focus on sustainability within public health ('People, Planet, Profit') - Topic of Utrecht's public health policy is 'feel healthy, be healthy and stay healthy' 	
<u>Relevant health indicators:</u>	
<ul style="list-style-type: none"> - Half of the citizens have one/more chronic disease(s) - People without chronic disease in the Netherlands who reach the HEPA standard: 60,9% - People with one/more chronic disease in the Netherlands who reach the HEPA standard: 54,6% - 31% of citizens in Utrecht do not meet HEPA norms; this should be reduced to 25% in 2016 - 60% of 80+ citizens do not meet HEPA norms - Proportion of inactive citizens in home care: 76%; in residential care: 89% - 17% of the citizens in Utrecht West over the age of 55 experience barriers in performing their daily activities and barriers in doing housekeeping - 45% of the citizens in Utrecht West between 19-54 years old have 1 or more chronic diseases 	
Sources: (26-30)	

epidemiological research and studies on climate change, in addition to World Health Organization publications referring to the interdisciplinary sector involved in urban planning. Physical activity was mentioned together with other determinants of quality of life. There were no

references to policy makers' need for the use and/or creation of research evidence. However, the documents mentioned possible future studies and statistical research to evaluate the work performed and the improvements in public health. The participants had a good knowledge of

research evidence regarding physical activity.

- *Utrecht West (NL)*: In general, citizens, and among these the chronically ill, had reasonably good access to community sports activities. However, chronically ill individuals often used the physical activity offer of physiotherapists based on their insurance coverage and stopped exercising as soon as their guidance and coverage stopped. Those chronically ill individuals often did not participate in regular sports activities in the neighborhood because of the lack of trust and communication between local care and welfare/sports professionals. In particular, citizens with low health literacy did not learn how to manage their health and lifestyle (citizen level). However, physical activity professionals from the different sectors (sports, welfare and care) showed a low level of cooperation and communication with one another.
- *Utrecht (NL)*: Two prior developments influenced the needs assessment process. A national plan was established to inspire policy makers to create strategies for physical activity in health care facilities for the elderly by 2015. Simultaneously, another law restricted access to these facilities. The latter development affected the needs of the stakeholders on the local level, which is reflected in the following two statements: *"How can we keep track of the elderly who have to live on their own in the future, instead of in a residential care facility"* and *"We have to work together with all the parties in a community!"*. Moreover, based on the needs assessment, there was an obvious lack of intersectoral collaboration, involvement of vulnerable groups and others interested in the policy-making process, evaluation of existing programs, evidence informed policy making stakeholder definitions and the capacity to work in different contexts.

Development of tailored interventions

In the next step, the tailored interventions for increasing the integration of evidence in each policy making process were planned. The aim was to build interventions that could secure a close interaction between researchers, policy makers, possible (vulnerable) target groups and other relevant stakeholders in connection with knowledge production and integration as suggested by the Stewardship approach.

Firstly, the aims of the interventions were defined based on the identified needs:

- Kolding (DK): The identified need for intersectoral communication and coordination of a common strategy led to the aim of developing an internal tool to promote intersectoral collaboration on PA policy strategies.
 - Varde (DK): The identified need for systematic intersectoral collaboration and cross-sector communication led to the aim of developing an intersectoral HEPA policy strategy for certain target groups.
 - Rome (IT): The identified need for knowledge and experience exchange between researchers and policy makers led to the aim of fostering communication, increasing awareness on multi-sector approaches, and framing knowledge and values of stakeholders.
 - Tuscany (IT): The identified need for communication between health professionals, administrators, researchers and citizens led to the aim of fostering communication and knowledge exchange and building a participative research experience.
 - Utrecht West (NL): The identified need for strong intersectoral collaboration and communication led to the aim of developing an intersectoral network in Utrecht West and to strengthening professionals' knowledge of the health literacy of citizens.
 - Utrecht (NL): The identified need for knowledge sharing on existing activities and good practice led to the aim of supporting HEPA policy development for senior citizens in Utrecht.
- Secondly, based on the information derived from the needs assessments, the content of the interventions was tailored to each policy case. Thus, all of the interventions had the same goal (increasing the level of evidence informed policy making) but utilized different aims and means following the principles of standardization by function and not by form [16].
- The main characteristics of the six interventions are summarized in **Table 3**. More detailed information on the intervention contents is described below:
- *Kolding (DK)*: The intervention focused on strengthening intersectoral collaboration and increasing the use of knowledge across sectors. This way conducted in two ways: the intervention participants participated in an intersectoral working group, and the perceived barriers and facilitators for intersectoral collaboration were explicitly investigated and addressed during the intervention. Furthermore, the intervention activities indirectly focused on the facilitation of competence exchange and strengthening existing HEPA promotion projects – for example, by mapping all of the existing municipal initiatives that had an effect on physical activity levels. The content of the intervention was planned in close collaboration with the principal organizers of the HEPA policy and occurred through four workshops organized as a combination of facilitated discussion groups, case based group work and knowledge input from researchers.
 - *Varde (DK)*: The intervention focused on providing and translating research evidence, on strengthening intersectoral collaboration and on increasing the use of evidence and knowledge across sectors. The researcher team supplied evidence and knowledge based on the process through oral and written presentations during the four working group meetings. The aim was to provide participants with a more qualified basis for working with the strategy by collecting, summarizing and transferring evidence and knowledge on selected themes related to physical activity. The intervention participants comprised an intersectoral working group, and the researcher team operated as a discussion partner for project leaders between actual meetings by providing oral and written feedback on the process and draft outputs of the policy.
 - *Rome (IT)*: The intervention focused on raising awareness of and interest in integrating best available research

Table 3 Intervention characteristics

	Kolding (DK)	Varde (DK)	Roma XII (IT)	Tuscany (IT)	Utrecht West (NL)	Utrecht (NL)
Policy included	Development of a strategy for physical activity	Development of a strategy for physical activity	Student Olympics in the schools of the territory of Municipio XII	Healthy Roads	Strengthening the Neighborhood Sports and HEPA Plan of Utrecht West	Development of a strategy for HEPA for senior citizens (65+) in Utrecht
Needs	Lack of systematic intersectoral collaboration and cross-sector communication	Lack of intersectoral communication and coordination of a common strategy	Lack of knowledge and experience exchange between researchers and policy makers	Lack of communication between health professionals, administrators, researchers and citizens	Lack of strong intersectoral collaboration and communication	Lack of knowledge sharing on existing activities and good practice
Aim of intervention	Development of an internal tool to promote intersectoral collaboration on HEPA policy strategies	Development of an intersectoral HEPA policy strategy for certain target groups	To foster communication; to increase awareness on the multi-sector approach; Framing knowledge and values of stakeholders	To foster communication and knowledge exchange; To build a participative research experience	Development of an intersectoral network in Utrecht West; Strengthen the professionals' knowledge on health literacy of citizens	Supporting HEPA policy development for senior citizens in Utrecht
Intervention period	Feb 2013 - Apr 2014	Sep 2013 - Apr 2014	Feb 2013 - Apr 2014	Apr 2013 - Feb 2014	Dec 2012 - Jun 2014	Dec 2012 - Mar 2014
Main theme/s	Focus on physical activity and intersectoral collaboration	Focus on physical activity policy strategy	Improve and strengthen contacts and experience sharing among researchers and policy makers at different levels	Plan and implement Pedibus for school children; implement a Participated Health Care Agreement; build a participated Health interactive Mapping	Intersectoral common knowledge development on HEPA-situation, -needs, -tasks and -common language Intersectoral support Intersectoral network building	Increased level of knowledge on situation, needs and stakeholders regarding HEPA for senior citizens (65+) Intersectoral network building
Policy phase	Initiation phase of a new policy	Initiation phase of a new policy	Initiation phase of activities; knowledge creation, problem identification	Implementation and evaluation	Monitoring & evaluation of current policy until tackling assessed barriers	Problem definition and agenda setting
Intervention format	Workshops, meetings	Workshops, meetings	Delphi-like consultation procedure	Participatory research	Multi-component: knowledge transfer capacity building (Health Literacy), community setting development, strengthening a network (intersectoral action)	Multi-component: knowledge transfer, community setting development, strengthening a network (intersectoral action), policy development

Source: (31)

evidence in policy processes and facilitating competence exchange. This was conducted by means of Delphi-like discussion groups aimed at strengthening communication, discussion and the exchange of knowledge and experiences between stakeholders from different fields and subjects – hereby increasing their awareness on the importance of a multi-sector and multi-stakeholder approaches (17). This process led to the consideration of new points of view, knowledge of new experiences, lessons learned on problems and solutions, and change or evolution of criteria for policy assessment. The intervention involved participants from the Municipality in charge of the “Municipaliadi” policy and stakeholders chosen from among public health doctors, researchers, politicians and journalists.

- *Tuscany (IT)*: The intervention focused on raising awareness of and interest in integrating best available research evidence in policy processes, on strengthening stakeholder involvement related to the synthesis, exchange and application of knowledge to improve HEPA and provide more effective services, and on providing and translating research knowledge. The participants identified

the following three actions for intervention: A) The definition of indicators for HEPA intervention evaluation: Evaluation of children’s health performance using a Holter motor-metabolic SENSE WEAR Armband (Body Media Inc.), together with questionnaires on quality of life before and after the completion of the period of monitoring. B) A one-day training activity for the SDS Valdarno personnel in which REPOPA concepts were illustrated, together with elements of Evidence Informed Policy Making and the K2A framework. C) A twinning activity to disseminate the experiences on the Pedibus project to promote similar initiatives in other settings.

- *Utrecht West (NL)*: The intervention focused on strengthening intersectoral collaboration and increasing the use of evidence and knowledge across sectors and on strengthening a systematic approach. The intervention participants were in an intersectoral working group that promoted HEPA among citizens in the neighborhood. Furthermore, the intervention focused on strengthening stakeholder competences related to the synthesis, exchange and application of knowledge to improve HEPA and provide more effective services, on

providing and translating research knowledge, and on strengthening intersectoral collaboration and increasing the use of knowledge across sectors. This was done by networking, providing information and training the different stakeholders. The specific content of the multi-faceted intervention was the creation of an information letter about the neighborhood sports coaches and HEPA-activities, health literacy training and formats for questionnaires and collaboration with the researcher team as facilitators/trainers.

- *Utrecht (NL)*: The intervention focused on supporting dissemination activities, on strengthening intersectoral collaboration and increasing the use of evidence and knowledge across sectors, and on strengthening a systematic approach. The researcher team established a new intersectoral network to enhance HEPA among the elderly. The specific content of the multi-component intervention included a network meeting on HEPA among the elderly in Utrecht for participants from (residential) care, sports and welfare, a presentation of the results of the pre- and post-measurement of activities for the policy makers and a policy brief on HEPA and the elderly in Utrecht. All of the activities were facilitated and supported by the researcher team.

Intervention phase

The interventions were implemented in the time period of 2012-2014. The specific intervention periods are presented in **Table 3**. The interventions were evaluated in relation to process and effect.

Intervention process and effects measurements

Pre-, post- and 12-month post-post measurement: The questionnaires were used to measure the effects of the interventions. The measurements were performed before the start of the interventions, at the end of the interventions and 12 months after the end of the interventions (**Figure 1**).

The questionnaire was developed based on the framework established by Satterfield et al (2009) [18], which highlighted three different sources of evidence and knowledge that should be included in evidence informed policy making. The categories in the questionnaire were as follows: use of evidence from research; use of knowledge from stakeholders; use of knowledge of/on target groups; taking into account values and priorities of target groups; and barriers and facilitators related to knowledge application. The distinction between conceptual and instrumental knowledge use [19] and between different stages of knowledge utilization [20] was used as inspiration to capture different levels of knowledge understandings and applications in the questionnaire. Hence, for all categories, the following perspectives were explored: how and to what extent were efforts made to search for and review research findings and other solid forms of knowledge to inform policy development; the translation of knowledge to local needs; the request of knowledge use by politicians; procedures for knowledge use; and the influence of (translated/adapted) knowledge on final policy decisions.

A five-point Likert scale was applied, and open text response options were given for comments. The questionnaire was first

developed in English by all of the country researcher teams, led by the DK team. The questionnaire was then pilot tested in each country separately for issues related to understanding the questions. Next, the questionnaire was translated to the three local languages by each country researcher team and pilot tested again in each country separately. The generic English language version of the questionnaire can be found in the additional file.

Data analysis

The data were analyzed primarily by use of descriptive methods because of the participants' sample size (n=64 in total for all six cases). For example, this included simple summary statistics about the sample and the observations that were made, use of bar charts and calculation of percentages and means. In addition, a qualitative analysis was performed based on the comments provided in the open text responses.

The results of the different measurement points are reported in another manuscript (under preparation).

Process evaluation

Process evaluation was tailored to the six policy cases included. The mutual aim was to collect input on the participants' feedback and satisfaction regarding the intervention's organization, structure, content and impact. Both DK and NL used a process evaluation questionnaire during the course of the intervention and added further questions to the post and post-post measurements. Further input was obtained from oral feedback, e.g., after sessions and through a document analysis such as workshop summaries and meeting minutes. Because of the small number of participants in the two Italian interventions, only oral inputs were collected. The data were analyzed using concepts of content analysis.

The results of the process evaluation are reported in another manuscript (under preparation).

Ethics

All of the participants in the interventions received written and oral information on the intervention contents, measurements and use of the data. They all signed informed consent forms before the interventions began. The ethics procedure followed the requirements of each participant country and the overall REPOPA specific guidelines for ethics [21].

Discussion

This paper introduced the pre-intervention phase and the design and methods of a study investigating whether locally tailored interventions can increase levels of evidence informed policy making in selected case studies on HEPA policies. The study followed the principle of standardizing by function instead of form [16] and is novel in how it uses the Stewardship approach to build needs- and context-based tailored policy interventions with close collaboration between researchers and policy makers.

Six interventions were implemented in three countries to learn whether tailored interventions increased knowledge integration in different contexts. Traditionally, standardizing all intervention components ensures fidelity and integrity, but in this study, the

standardization was performed by building the interventions on common theories [16]. Therefore, the interventions had the same overall goal to increase knowledge integration in evidence informed policy making and also used the same outcome measures; however, the intervention contents, processes and intensities varied according to the contexts. This has been a key point in this study, and this study can contribute insight regarding how to develop tailored knowledge integration processes in evidence informed policy making.

This study build evidence by showing a range of needs in knowledge integration in different physical activity policy making contexts. The differences in organizational structures, participants' experiences and existing levels of knowledge integration called for different tools and methods in the knowledge integration process. This study also brought new reflections on Stewardship approach conceptualization within policy interventions.

The interventions ran over a relatively long time period, which makes it possible to follow the development and sustainability of knowledge integration in the policy cases. Hence, the study period allowed for three data collections (pre, post and 12 months post-intervention). The long time span is a strength of the study but also makes it challenging to directly connect the results to the measurements. However, this was to some extent addressed by adding questions directly targeting perceptions of the intervention success to the participants. Furthermore, conducting interventions in "real-life" settings indicates that many other things – apart from the intervention – could affect the post and 12-month post-intervention findings. Another potentially critical issue was the small number of intervention participants and hence the small number of respondents to the questionnaires. This limited the possibilities in quantitative data analysis. However, in this type of study, quantitative measurements cannot stand-alone; this fact stresses the importance of the process evaluation of the interventions that were performed. The process evaluation highlighted the real potential to learn how the interventions were anticipated, unfolded, implemented and perceived by the participants as a result of the Stewardship approach.

Nonetheless, the results obtained in this study are likely to have an effect on our understanding regarding efficient ways to foster tailored knowledge integration in evidence informed policy making of actual value within the broad area of HEPA in different contexts. The analyses of the intervention outcome

results, the results of the process evaluation and the application of the RE-AIM (Reach, Effectiveness, Adoption, Implementation and Maintenance) framework will be presented in forthcoming papers and further feed into the evidence within this research area.

Competing interests

The authors declare that they have no competing interests.

Author contributions

MB drafted the manuscript. MB, MT, TS, and AA and were involved in the conception and design of the protocol and critically revised the manuscript. AA also initiated and coordinated the overall study and was the main recipient of the research grant. CR, NL, JJ, TC, AD, AV and LC were involved in reviewing and approving the final version to be published.

Acknowledgements

The research leading to these results within the Research into Policy in Physical Activity (REPOPA); Oct 2011-Sept 2016; has received funding by the European Union Seventh Framework Programme (FP7/2007-2013); grant agreement no 281532. This document reflects only the authors' views, and neither the European Commission nor any person on its behalf is liable for any use that may be made of the information contained herein.

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