

Appendix I: Process evaluation

A mixed methods approach (1) is used for the process evaluation based on standardised questionnaires and telephone interviews (see Table 2, Figure 2). Further, the outcome assessments of the main study are an important data source for the process evaluation. The process evaluation aims to clarify whether the intervention was delivered as intended (fidelity) and in which quantity (dose) the intervention was implemented (2, 3). Moreover, implementation barriers and facilitators will be explored. As shown in Table 2 and Figure 2, we will assess contextual factors, components associated with recruitment, delivery, responses and maintenance of centres and individuals (PwMS) as well as unintended consequences using different methods.

Sampling

Questionnaires will be provided to all participants. Interviews will be performed with 10 to 20 with PwMS from each study group until information saturation is reached. Of the healthcare providers, up to 10 neurologists and 5 radiologists will be interviewed based on a purposeful sampling strategy, i.e. aiming for a diversity of centres in organisational structure and size.

Timing

The process evaluation will be conducted in parallel to the main trial (see Table 2 for specific timing of assessments).

Data analysis

First, the process evaluation and trial data will be analysed separately. Afterwards, data will be combined and used to determine post-trial interview questions. Quantitative process evaluation data (questionnaires and evaluation forms) will be analysed descriptively using SPSS (International Business Machines Corporation (IBM), Armonk, United States of America) or R (R Development Core Team) software. Subgroup analyses considering study outcomes and patient characteristics will be performed (for example, start of immunotherapy and decision type) in order to explore the impact of the intervention on different groups. Interviews will be analysed by thematic analysis (4) using MAXQDA (5).

References:

1. Cresswell JW, Plano Clark VL. *Designing and Conducting Mixed Methods Research*. Sage Publications, Inc. 2010;2.
2. Moore GF, Audrey S, Barker M, Bond L, Bonell C, Hardeman W, et al. Process evaluation of complex interventions: Medical Research Council guidance. *Brit Med J*. 2015;350:h1258.
3. Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M, et al. Developing and evaluating complex interventions: the new Medical Research Council guidance. *Brit Med J*.
4. Braun V, Clarke V. What can "thematic analysis" offer health and wellbeing researchers? *International journal of qualitative studies on health and well-being*. 2014;9:26152.
5. Kuckartz U, Rädiker S. *Analyse qualitativer Daten mit MAXQDA*. Springer VS. 2019.

Overview process evaluation POWER@MS1			
Domain	Objects of investigation	Ascertainment/Data collection tool	Time point
Context	Context factors in Germany (health system)	Description	Pre-intervention
	Centre-specific structures and processes	Questionnaire, interviews	Pre-intervention
Recruitment of centres	Centre recruitment	Documentation of recruited centres, phone calls or visits in interested centres	Pre-intervention
	Reason for study participation/ for non-participation (promoting factors and barriers)	Questionnaire (neurologists)	Pre- and during intervention
Delivery to centres	Delivery of information (study management) to neurologists, study nurses and radiologists (participation, reach)	Provision of study materials about the intervention programme, initiation of study centres	Pre-intervention
	Delivery of the study monitoring platform access to all centres	Provision of access data	Pre-intervention
Response of centres	Attitude (neurologists, study nurses and radiologists) regarding the study procedures (e.g. administration, recruitment, clinical visits, MRI frequency) and the intervention	Evaluation forms, interviews	During and post-intervention
Maintenance of centres	Study centres: recruitment of patients	Documentation of recruited patients, evaluation forms, interviews	During and post-intervention
Recruitment of individuals	Recruitment of PwMS	Information video (provided online via YouTube and stakeholder websites/ social media/ network distributors/ magazines), study information leaflets, recruitment in the centres (screening lists, baseline questionnaires)	Pre-intervention
Delivery to individuals	<u>Intervention group</u> : delivery of the intervention to individuals (EBPI about lifestyle factors in MS combined with a complex behaviour change programme)	Provision of access (login) data, e-mail and text message reminders, monitoring of programme usage, evaluation forms, interviews	During and post-intervention

	<u>Control group</u> : delivery of the control intervention to individuals (web-based information on lifestyle factors consisting of optimised standard care material)	Provision of access (login) data, e-mail and text message reminders, monitoring of programme usage, evaluation forms, interviews	During and post-intervention
Response of individuals	E.g.: Satisfaction with the study procedures (e.g. frequency of MRIs and clinical visits) and the intervention, knowledge, attitude, empowerment, change in behaviour, barriers and facilitators	Questionnaires (primary and secondary endpoints RCT), evaluation forms, interviews	Post-intervention, after reaching the primary endpoint
Maintenance of individuals	<u>PwMS</u> (users of the programme): knowledge, empowerment, change in behaviour and reasons for usage	Questionnaires (primary and secondary endpoints RCT), evaluation forms, interviews	During and post-intervention
	<u>PwMS</u> (non-user of the programme): knowledge, empowerment, change in behaviour and reasons for non-usage	Contacting participants via e-mail or telephone, questionnaire, interviews	During and post-intervention
Unintended consequences	<u>Patients</u> : anxiety, depression, negative impact on disease specific quality of life	Evaluation form, interviews, secondary outcome measurement	During and post-intervention
	<u>Neurologists</u> : professional relationship to patients, barriers for implementation	Evaluation form, interviews	During and post-intervention
	<u>Study nurses</u> : stress, professional relationship to patients, barriers for implementation	Evaluation form, interviews	During and post-intervention
Theory	EBPI, TDF, TPB, Empowerment	Application during study planning and the development of study materials, used in evaluation forms, in the programme and in secondary outcome measurement	Pre-, during and post-intervention
EBPI = evidence-based patient information; MRI = magnetic resonance imaging; MS = Multiple Sclerosis; PwMS = Persons with Multiple Sclerosis; RCT = randomised controlled trial; TDF = Theoretical Domains Framework; TPB = Theory of Planned Behavior			

Table 2: Overview process evaluation POWER@MS1

Figure 2: Process evaluation POWER@MS1: questions and methods

