Relevance of SDMT changes in the daily life of multiple sclerosis patients – a real world study

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Background

- Since cognitive changes can occur early in multiple sclerosis (MS) and are considered an important prognostic factor indicating a negative disease course, regular assessment of cognitive status is recommended [1, 2, 3].
- One of the most prominent cognitive functions declining early in MS is slowing of information processing, which can be objectively assessed by the Symbol Digit Modalities Test (SDMT). SDMT is a validated, sensitive, and widely used test for early detection of changes in cognitive processing speed and working memory. A clinically significant change has been defined as a 4-points difference in SDMT raw score or a difference of 10% compared to the previous assessment[3]. More recently, an 8-points change has been suggested reliable when compared to healthy controls[4].
- Whether and to what extend a clinically significant change in SDMT can provide information about a relevant change in patients‘ quality of life or psychosocial functioning has not been sufficiently investigated yet.

Objectives

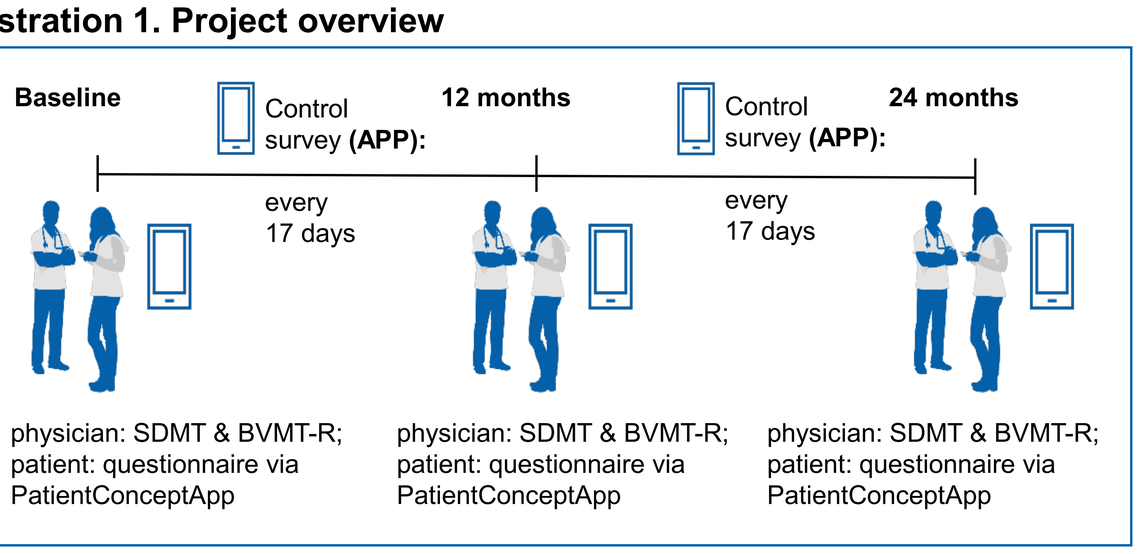
- SDMT-PRO aims to assess the relevance of SDMT changes to everyday problems of patients with advanced **relapsing-remitting MS (RRMS)** and **secondary progressive MS (SPMS)**.

Methods

Study design

- Approximately 175 MS patients will be enrolled in the study, data from the first 154 patients is shown here.
- Patients are assessed at baseline and at 12 and 24 months follow-up using SDMT and BVMT-R, as well as by digital patient-reported outcomes (PROs: HADS, MSIS-29, EQ5D) using the PatientConceptApp at the respective time points. In addition, each domain of the PROs is continuously recorded throughout the study using a visual analog scale (VAS) via the app (**Illustration 1**).

Illustration 1. Project overview



Results

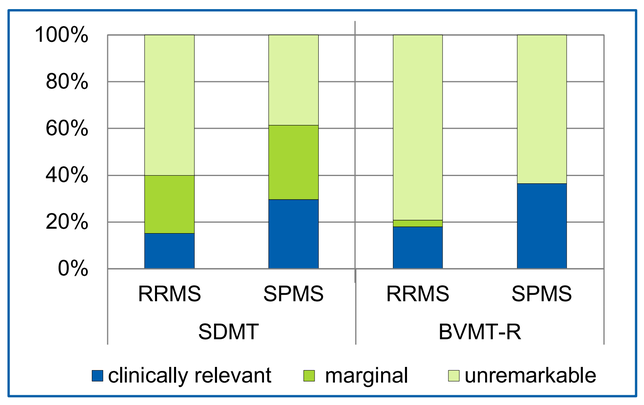
- Most commonly, the patients included at data extraction (N=154) were diagnosed with advanced RRMS and the mean time since initial diagnosis was 15 years (**Table 1**).

Table 1. Baseline characteristics

Patient data (N = 154)		
Age [years] (average ± SD)		47.5 ± 11.3
Sex [%]	female	78.6
	male	21.4
Education [%]	No grade/secondary school (kein Abschluss/Hauptschule)	12.3
	Intermediate maturity (Mittlere Reife)	48.7
	Grammar school (Gymnasium)	39.0
Diagnosis (N =142)		
MS sub =[%]	Advanced RRMS	69.9
	SPMS with superimposed relapses	17.0
	SPMS without superimposed relapses	13.1
Time since first diagnosis [years] (mean ± SD)		15 ± 8.1
Number of previous DMTs (mean ± SD) (N=150)		2.6 ± 1.4
EDSS (mean ± SD) (N=142)		3.7 ± 1.7
T2 lesion load [%] (N=63)	mild	13.6
	moderate	21.4
	severe	24.0
	not specified	40.9
Localization of lesions [%] (N=63)	supratentorial	24.0
	infratentorial	0.6
	both	34.4
	not specified	40.9

RRMS: relapsing-remitting multiple sclerosis; SPMS: secondary progressive multiple sclerosis; DMT: disease modifying therapy; EDSS: expanded disability status scale

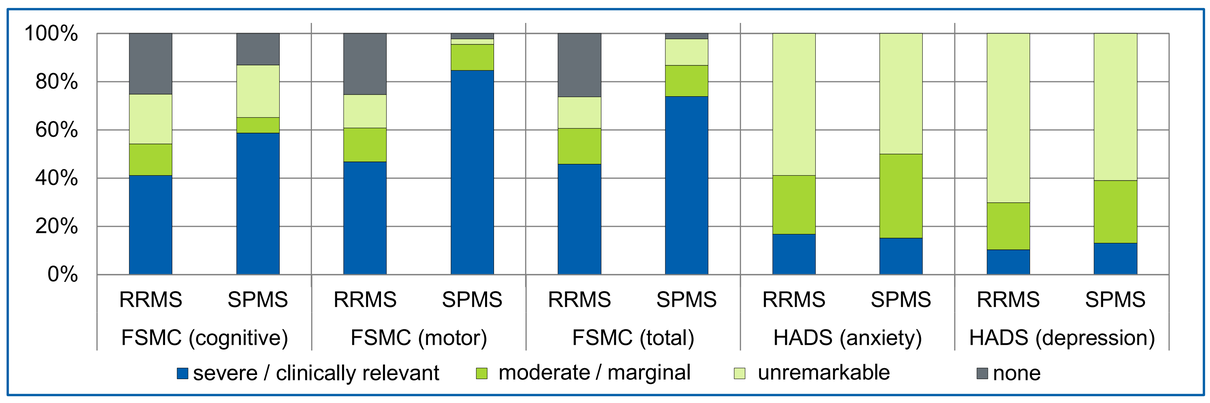
Figure 1. Cognition by MS subtype at baseline (N = 153)



SDMT: Symbol Digit Modalities Test; BVMT-R: Brief Visuospatial Memory Test-Revised

- While 40% of the study participants with RRMS and approximately 61% of those with SPMS had clinically relevant/severe or marginal SDMT (values) scores, 80% of RRMS patients and about 60% of SPMS patients defined their BVMT-R state as „unremarkable“ at baseline (**Figure 1**).
- FSMC (Fatigue Scale for Motor and Cognitive Functions) revealed that approximately 60% of the RRMS patients and approximately 87% of the SPMS patients suffered from moderate or severe fatigue (**Figure 2**).
- In contrast, regarding HADS, depression and anxiety scored rather low in both MS subgroups, and the subtype of MS had only slight impact on the prevalence of anxiety and depression (**Figure 2**).

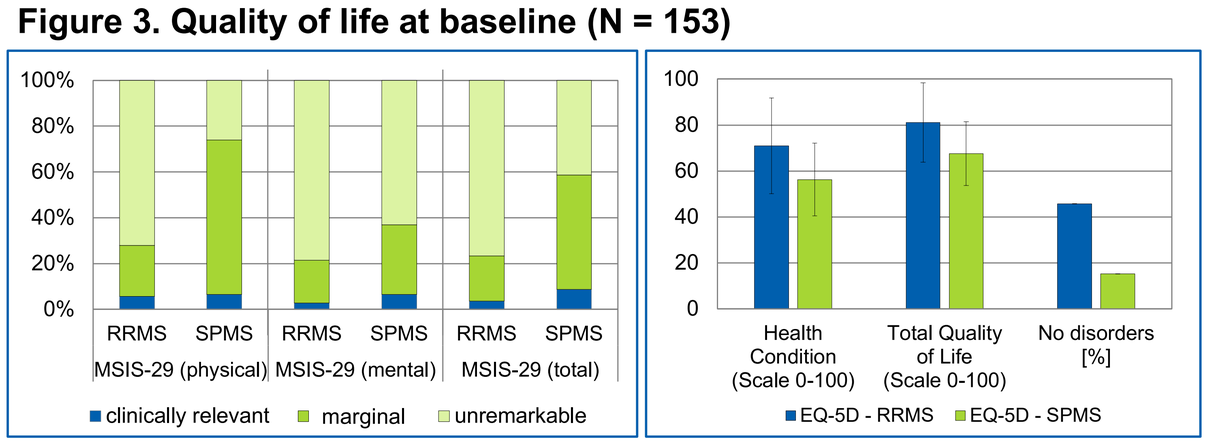
Figure 2. Fatigue, anxiety, and depression at baseline (N = 153)



FSMC: Fatigue Scale for Motor and Cognitive Functions; HADS: Hospital Anxiety and Depression Scale

- Concerning quality of life (QoL), SPMS patients rated more physical and mental impairment compared to RRMS patients. This is indicated by higher MSIS-29 values in SPMS, especially concerning the gradings reflecting moderate physical and total impairment (**Figure 3, left**).
- In addition, the EQ-5D values associated with global QoL and Health condition were lower in the SPMS group and fewer patients were free of disorders (**Figure 3, right**).

Figure 3. Quality of life at baseline (N = 153)



MSIS-29: Multiple Sclerosis Impact Scale-29; EQ-5D: questionnaire to measure health-related quality of life

Conclusions

Baseline characteristics underline that cognitive deficits and fatigue problems are highly prevalent in advanced RRMS and are even more pronounced in patients with SPMS, while psychological and mental self-ratings seem to be less affected. Quality of life is also impaired in both patient groups, suggesting a crucial influence of cognitive performance and fatigue on quality of life, partly detached from psychological factors. The SDMT-PRO project will further investigate this complex pattern of influences on QoL in MS. Continuous recording of SDMT changes and other parameters relevant to patients‘ daily lives will allow to assess the impact of cognitive performance changes on daily life of MS patients.

References

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Disclosures

Iris-Katharina Penner I hereby declare that since November 1, 2020, I have had or currently have business, personal, or material relationships with the following industry entities, consulting firms, or payers or sponsors of medical facilities: Speaking fees, active participation on advisory boards, consulting activities from Adamas Pharma, Almirall, Bayer Pharma, Biogen, BMS, Celgene, research grant from DMSG, Genzyme, Janssen, Merck, Novartis, Roche, and Teva.
Marie Wolter I hereby declare that since November 1, 2020, I have had no business, personal, or material relationships with industry entities, consulting firms, or payers or sponsors of medical facilities.
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Herbert Schreiber: I hereby declare that since November 1, 2020, I have had or currently have business, personal, or material relationships with the following industry entities, consulting firms, or payers or sponsors of medical facilities: Speaking fees, active participation on advisory boards, consulting activities from Almirall, Alnylam, Biogen Idec, Novartis, Roche, and Teva.
Yekta Kus und **Veronika E. Winkelmann** are employees of Novartis Pharma GmbH.

Poster presented at the 38th congress of the European Committee for Treatment and Research in Multiple Sclerosis RAI Amsterdam, Amsterdam, Netherlands, 26th – 28th October, 2022.

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