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Implementation Status of the German S3 Guideline for Schizophrenia and Barriers and Facilitators for a Living Guideline

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All co-authors have expressly consented to the use of the data for the dissertation. Compliance with citation rights has been thoroughly checked and it was quoted accordingly stringently. However, similarities in content cannot be completely avoided.

1 Introduction

1.1 Background

Schizophrenia is a serious and frequently lifelong disorder, being one of the top 20 causes of disability according to the latest Global Burden of Disease report [1, 2]. Around seven in every 1000 individuals will acquire the disorder throughout their lifetime, and compared with the general population, those with schizophrenia are two to three times more likely to pass away [3, 4]. The disorder is often linked to distress and impairment in areas like personal, family, social, educational, and occupational [5]. In Germany, schizophrenia incurs the highest costs per person affected, making it the most expensive mental illness [6]. Direct costs are accompanied by a multiple of indirect costs due to unemployment and increased mortality rates [6]. Because of the high burden of disease for individuals with schizophrenia and the high economic costs, it is of utmost importance to ensure that evidence-based treatment is implemented and ensured by evidence-based guidelines [2]. Clinical practice guidelines are described as systematically developed "statements that include recommendations intended to optimize patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options" [7]. They aim to assist clinicians in making informed decisions providing up-to-date treatments based on the best available evidence [8]. However, most individuals with schizophrenia worldwide do not obtain specialist mental health care [5]. Additionally, a considerable number of patients do not receive evidence-based treatment, but rather care that is needless, outdated or even potentially harmful [9-15]. This goes against one of the four main principles of medical ethics: non-maleficence [16, 17] also known as primum non nocere. As virtually all interventions in clinical practice have side-effects, it is not feasible to guarantee zero harm [8]. However, healthcare decisions must

guarantee that interventions result in more benefits and prevent any net harm from occurring [8].

There are numerous guidelines available worldwide, however, their implementation in clinical practice remains globally inadequate [9, 18, 19] as well as in Germany [2, 14, 20]. A recent study in Germany highlights that despite the high approval of the evidence- and consensus-based S3 guideline for schizophrenia published in 2019 [6], more than half of the healthcare professionals surveyed did not integrate the guideline into their daily clinical practice [14]. The development of evidence-based guidelines is a very complex undertaking. For instance, the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group, established in 2000, has devised a comprehensive method of appraising the confidence of evidence and the strength of recommendations [21]. Consequently, the research focus has moved from well-established guideline development processes towards the implementation of guidelines and identifying obstacles and facilitators to guideline adherence [12]. Nevertheless, evidence on effective implementation strategies is disparate [10, 20, 22]. There is widespread agreement that a multifaceted and structured approach is indispensable to reduce the evidence practice gap and that passive provision of guidelines is insufficient [2, 23-25]. It is also acknowledged that no single implementation strategy can be universally applied [10]. Significantly, the respective implementation context should always be considered, particularly for complex interventions like guidelines where the context and implementation are invariably interconnected [26, 27].

Against this background, how can guidelines be implemented more effectively in clinical practice, and how can barriers and facilitators to guideline adherence be identified? A variety of theoretical frameworks exist which allocate obstacles and potential solutions relating to guideline implementation to distinct categories [2, 14, 15]. One such framework is Cabana's Knowledge-Attitude-Behavior Framework, which specifies the three sequences of behavioral

change that should ideally precede adherence to guidelines [28]. The framework suggests that knowledge serves as the initial step towards adhering to guidelines, which then influences physician's behavior, driven by their attitude towards the guidelines. Each of these categories, including knowledge, attitude and behavior, is associated with various barriers unique to them. Identifying the respective barriers is crucial for determining when health care professionals deviate from the guidelines [14]. Knowledge-related barriers to guideline adherence include lack of awareness or experience, while attitude-related obstacles comprise lack of motivation or the perception that the guideline does not offer benefits for clinical work. Physicians' compliance can be hindered by external factors (e.g., rejection by patients), guideline-related issues (e.g., confusing layout, excessively lengthy or intricate versions) or environmental constraints (e.g., insufficient time resources) [28].

Another framework is the Awareness-to Adherence Model, which was developed in 1996 by Pathman et al [29]. The four-step model proposes that adhering to a guideline necessitates specific cognitive and behavioral stages: physicians must initially become aware of the guideline, then intellectually agree with it, adopt it (i.e., decide to follow the guideline for some patients) and finally adhere to the guideline (i.e., regularly follow it for most patients) [29]. Over the four steps, nonadherence usually increases progressively [15, 30].

An additional crucial factor affecting the implementation of guidelines is the challenge posed by the constant and fast-paced evolution of medical knowledge. The situation has been further complicated by the emergence of COVID-19 and the regular influx of new evidence. Consequently, conventional guidelines become outdated before their publication [2, 31-34]. The impact on guideline compliance must be considered, as it could be hypothesized that trust in recommendations from outdated guidelines is low. This difficulty could be addressed with the implementation of living guidelines. Living guidelines optimize the guideline development process by allowing updating of individual recommendations promptly upon emergence of new

evidence [31]. The traditional guideline model generally requires updating the entire guideline at specific intervals, such as less than five years in Germany, whereas living guidelines mandate at least an annual update [31, 35]. Continuous updating of guidelines demands transferring to digital online environments, such as the evidence ecosystem MAGICapp [36], which provides guidelines in a multi-layered format and covers all aspects of developing of a living guideline [37].

1.2 SISYPHOS project

An implementation project, the SISYPHOS project (Structured implementation of digital, systematically updated guideline recommendations for enhanced therapeutic adherence in schizophrenia) aims to convert the current German S3 guideline for schizophrenia into an evidence-based living guideline (funded by G-BA (Gemeinsamer Bundesausschuss) and with reference number 01VSF20024) [38]. German guidelines are categorized into four groups with an "S" designation. S1 guidelines are expert-based recommendations, while S2k guidelines are consensus-based, S2e guidelines are evidence-based, and S3 guidelines are evidence- and consensus-based [39]. The German schizophrenia guideline is classified as a S3 guideline, which involves a representative group developing it. The process includes systematic searching, selecting and evaluating evidence, as well as structured consensus building [39]. The SISYPHOS project endeavors to address the issue to inadequate guideline implementation, with the ultimate goal of enhancing patient care. To date, there is no living guideline in the field of psychiatry available [40]. Consequently, there is no specific concept suitable for the context of the German schizophrenia guideline [41]. The three-parted SISYPHOS project addresses the three levels of an idealtypical guideline implementation, that includes identifying barriers and facilitators, developing a concrete intervention plan, and evaluating and monitoring the process [41-43]. First, the current implementation status and the barriers and facilitators that healthcare

professionals encounter when adhering to guidelines are investigated as a prerequisite for a sustainable guideline implementation. Second, the superiority of a digital, internet-based system as compared to the classical print version of the schizophrenia guideline in terms of knowledge gain among healthcare providers is examined [41]. For this reason, the guideline has been incorporated into the evidence ecosystem MAGICapp, as such a digital, web-based system is required for continuously updating a living guideline [2, 15]. Third, a generic manual regarding the practical development of living guidelines has been developed, which is intended to aid the living guideline development process for further guidelines [41].

1.3 Aims of the thesis

The thesis centers on the first part of the SISYPHOS project, namely a survey of healthcare professionals. The thesis aims to elaborate:

- the present state of the German schizophrenia guideline's implementation, as of 2019, and four key recommendations,

- healthcare professionals' attitudes towards the concept of a living guideline,

- the barriers and facilitators to guideline adherence for both the classical print version of the German guideline for schizophrenia and the concept of a living guideline,

- healthcare professionals' preferences regarding the utilization of living guidelines.

Finally, general key issues regarding guidelines and proposals for necessary changes in their development, dissemination, and adoption will be discussed. The thesis broadens the scope to encompass diverse professional groups, such as medical doctors, caregivers (e.g., nurses), psychologists/psychotherapists, and psychosocial therapists, while taking into account that the (psychiatric) health care system consists of different professional groups, that may encounter varying challenges in implementing guidelines [14]. In addition to differences among professional groups, age groups, the working place (inpatient/outpatient setting) as well as the

amount of years of experience working in the field of psychiatry will be investigated in order to illuminate potential benefits of target specific guideline implementation [23, 44-46].

The findings of the SISYPHOS serve as a crucial foundation for a sustainable guideline implementation. They are not only relevant for the conversion of the current print version of the German schizophrenia guideline into a living guideline format. On the contrary, this methodological approach to guideline implementation can also be a model for the sustainable development of further guidelines, and thus ultimately contribute to improved, evidence-based patient care.

2 Design and methods of the SISYPHOS project – survey among healthcare professionals

2.1 Subjects and recruitment

The cross-sectional online survey was conducted for four months between January and April 2022 [2, 15]. 17 hospitals specializing in psychiatric, psychotherapeutic, and psychosomatic care in southern Germany, along with the Berufsverband Deutscher Nervenärzte e. V, a professional association of German neurologists and psychiatrists, participated in distributing the survey link to the survey and study details to their personnel [2, 47]. The list of participating hospitals is presented in Table 1 below.

Table 1. *List of participating hospitals.*

City	Participating hospital
Munich	Klinik für Psychiatrie und Psychotherapie, LMU
Munich	Klinik für Psychiatrie und Psychotherapie, TU München
Munich	MPI für Psychiatrie
Munich East	kbo München Ost Haar
Munich Nord	kbo-Isar-Amper-Klinikum München-Nord
Augsburg	BKH Augsburg, Klinik für Psychiatrie, Psychotherapie und Psychosomatik, Universität Augsburg
Wasserburg	kbo Inn-Salzach-Klinikum Wasserburg
Garmisch-Patenkirchen	kbo-Lech-Mangfall-Klinik Garmisch Partenkirchen
Agatharied	kbo-Lech-Mangfall-Klinik Agatharied
Landsberg am Lech	kbo-Lech-Mangfall-Klinik Landsberg am Lech
Taufkirchen/Vils	kbo Isar-Amper-Klinikum Taufkirchen/Vils
Fürstenfeldbruck	kbo-Isar-Amper-Klinikum Fürstenfeldbruck
Günzburg, Ulm	BKH Günzburg, Universität Ulm
Kempten	BKH Kempten
Kaufbeuren	BKH Kaufbeuren
Memmingen	BKH Memmingen
Donauwörth	BKH Donauwörth

Note. Table 1 adapted from [15].

A follow-up email was sent approximately three weeks after the initial contact. The questionnaire was conducted using the licensed LimeSurveyR version 5.3.4+ (LMU hospital) and LimeSurveyR was used to administer the survey and to ensure anonymity of respondents [2, 15]. The data protection officer of the University Hospital Munich reviewed the survey and the local ethics committee approved the project (reference number 21-0780) [2, 15].

2.2 Survey structure

First, the survey aimed to determine the status of implementation of the current schizophrenia guideline and four crucial recommendations. An adapted awareness-to-adherence questionnaire by Pathman et al was employed for this purpose [15, 29]. Table 2 exhibits the four key recommendations, that were selected beforehand by the editors of the German schizophrenia guideline, based on their high level of evidence, the strength of the recommendation and practical importance [15].

Table 2. *The four selected recommendations of the schizophrenia guideline.*

Number of recommendation	Content of recommendation	Recommendation	Strength of recommendation
1	Dose of antipsychotics	We recommend offering antipsychotics at a dose that is within the range recommended by the respective international consensuses and is as low as possible and as high as necessary (lowest possible dose). Particularly in first episodes of the illness, we recommend choosing the dose in the lower range because people with a first episode have a higher sensitivity for side effects and an overall better response to a lower dose [48].	A
2	Relapse prevention	After an individual risk-benefit evaluation has been performed, we recommend offering people with schizophrenia (first episode and multiple episode) antipsychotic treatment for relapse prevention [48].	A
3	Metformin for severe weight gain	If there is strong weight gain and it is necessary to continue the current antipsychotic medication, after performing the specified	A

| 4 | Psychotherapy - Cognitive behavioral therapy | psychotherapeutic and psychosocial interventions we recommend offering treatment with metformin (first choice) or topiramate (second choice) for weight reduction, taking into account the risks of an additional drug treatment [48]. | |
| | | We recommend offering people with schizophrenia cognitive behavioral therapy [48]. | A |

Note. Number of recommendation 1 corresponds to recommendation 22 in the schizophrenia guideline, number 2 to recommendation 36, number 3 to recommendation 56 and number 4 to recommendation 61; Strength of recommendation 'A' represents a strong recommendation ('we recommend/we recommend not to') and is based on a high level of evidence [49]. Table 2 adapted from [15].

Regarding the entire guideline and the four crucial recommendations, respondents of the survey were questioned about their *awareness* of them, their *agreement* with the guideline or recommendation, and their perception of appropriateness and feasibility (Pathman: *adoption*) [15]. They were also asked to estimate the percentage of patients receiving treatment according to the guideline/respective recommendation in question (Pathman: *adherence*) [15]. These four questions were assigned to Pathman's four categories of awareness, agreement, adoption, and adherence (Please see the questionnaire in the Appendix (10.2), questions 13-32).

Respondents were grouped as being aware if they were 'familiar' or 'very familiar' with the guideline (question 13) or a particular recommendation (questions 17, 21, 25, 32) using a 5-point Likert scale [15]. Participants' agreement with the guideline (question 14) or recommendation (questions 18, 22, 26, 30) was assessed using a nominal scale with 'yes' and 'no' [15]. Healthcare professionals were classified as adopters if they 'agreed' or 'strongly agreed' with the guideline (question 15) or recommendation (questions 19, 23, 27, 31) and deemed it appropriate and feasible on a 5-point Likert scale [15]. Finally, participants who reported that 90% or more of their patients received a treatment in accordance with the guideline (question 16) or the specific recommendation (questions 20, 24, 28, 32) were classified as adherents [2, 15].

Second, participants' attitudes towards the concept of a living guideline underwent evaluation through a 5-point Likert scale (1 = strongly disagree, 3 = neutral, 5 = strongly agree). User-friendliness (questions 33, 34, 36 – e.g., whether the layout is appealing and the content clearly presented) clinical practicality and relevance (questions 37, 38, 39 – e.g., whether the living guideline seems more practical and informative compared to the printed version) and the general attitude towards the living guideline in comparison to the printed version (questions 40 and 41) were assessed [15]. As a living guideline for mental disorders was not available during the study [40], a living guideline concept was introduced through an explanatory text and screenshots of the guideline for schizophrenia, which was digitally integrated into the evidence ecosystem MAGICapp [2, 15], see Figure 1 for an overview of the living guideline concept.
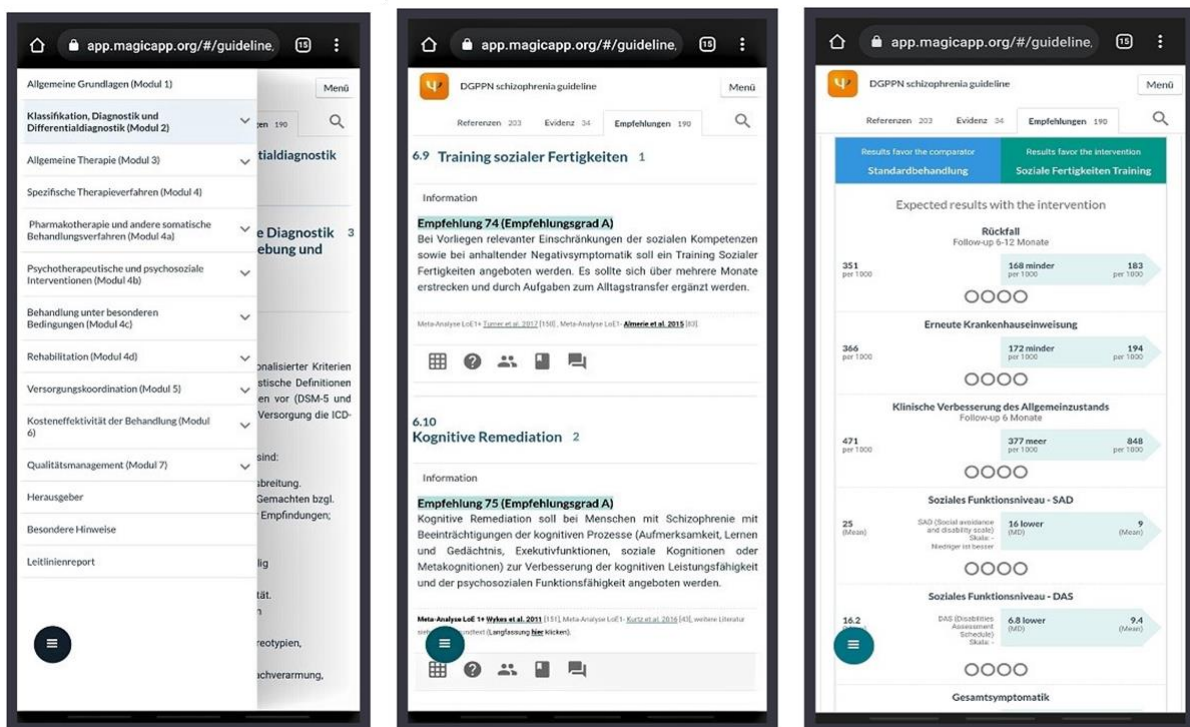
Figure 1. Presentation of the concept of a living guideline: Screenshots of the German schizophrenia guideline digitally prepared in the evidence ecosystem MAGICapp. From left to right: Table of contents, two examples of recommendations as well as a graphical comparison of two treatment options. For more details, please see the questionnaire in the end of the Appendix. Screenshots are taken from the questionnaire [15].

Third, the survey aimed to identify perceived barriers (questions 42-55) and facilitators (questions 56-70) to guideline adherence for both the print and living version of the guideline. The barriers and facilitators were classified into Cabana's three categories of behavioral change: knowledge, attitude, and external [2, 28]. The questionnaire examined knowledge-related barriers, inquiring about topics such as familiarity with the guideline (question 43), attitude-related barriers assessing potential improvements in clinical work by using the format (question 47), and behavior-related barriers, investigating concerns about potential restrictions to therapeutic freedom by employing the corresponding guideline format (question 49) [2].

Examples of knowledge-related facilitators from the questionnaire comprise a desire for a definitive implementation of the guideline in training and further education (question 61). Attitude-related facilitators were explored with questions such as whether clinical conditions (e.g., comorbidities, complex courses) should receive more consideration in the guideline's content (question 62). Finally, behavior-related facilitators included requests for concise and clear treatment checklists (question 67) [2]. Barriers and facilitators were assessed using a 5-point Likert scale (agreement: 1 = strongly disagree, 3 = neutral, 5 = strongly agree). An overview of Cabana's Knowledge-Attitude-Behavior Framework is presented in Figure 13.

Fourth, healthcare providers' preferences when using living guidelines were examined (questions 71-79). This included their desired time interval for updates of a living guideline, inclinations towards notifications of new research findings, the perceived support/pressure in clinical practice regarding yearly updates to recommendations and resource preferences for leaning about evidence-based treatment [2]. The complete questionnaire can be found in Appendix under 10.2.

2.3 Statistical analysis

All statistical analyses were conducted using IBM SPSS for Windows (version 29) with a significance level of $\alpha = 0.05$. For binary data, descriptive statistics were presented with frequency and percentage distributions [2, 15]. For continuous data, means and standard deviations were presented and additionally medians for categorical data [2, 15]. Chi^2 tests for binary data was used to assess differences between groups. For categorical data, such as that obtained from a Likert scale, Mann-Whitney-U tests, Kruskal-Wallis or Wilcoxon signed-rank tests were used. Mann-Whitney-U tests were applied for differences between two groups (independent samples) and Kruskal-Wallis tests for between-group analysis in the case of three or more groups (independent samples). In case of significant differences between groups, Dunn-Bonferroni post-hoc tests for subgroup analyses were performed. For dependent samples within subjects, Wilcoxon signed-rank tests were utilized [2, 15]. Bonferroni correction was employed for post-hoc tests, in order to avoid alpha error cumulation.

In addition to the three age groups of mental healthcare professionals (young: 20-34 years old, middle-aged: 35-49 years old and older : 50-66 years old), comparisons between different professional groups were made [2, 15]. These intergroup comparisons included medical doctors, psychotherapists / psychologists, psychosocial therapists and nurses [2, 15]. Moreover, we analysed work settings (inpatient/outpatient) and years of work experience (0-14 years; 15-29 years; 30-45 years).

Note. As this dissertation is related to two publications [2, 15], the presented methods section is similar to the methods used in the mentioned papers.

3 Participants' characteristics

309 respondents completed the survey. Originally, 524 participants participated in answering at least one question. Exclusions from the analyses were made for 85 participants due to either lacking experience in treating mental disorders (n = 22) or for failing to answer at least one substantive question (n = 63) [2, 15]. After excluding these 85 participants, 439 mental health professionals provided sufficient data for analyses, having completed the demographic questions and begun answering the content survey questions [2]. In addition, 130 participants discontinued their participation, where a "drop-out" was defined as a non-completion of the content survey [2]. All data until the point of discontinuation were incorporated in the analyses [2]. This resulted in 309 participants who completed the survey. Please refer to Figure 2 for the recruitment and study flow chart.
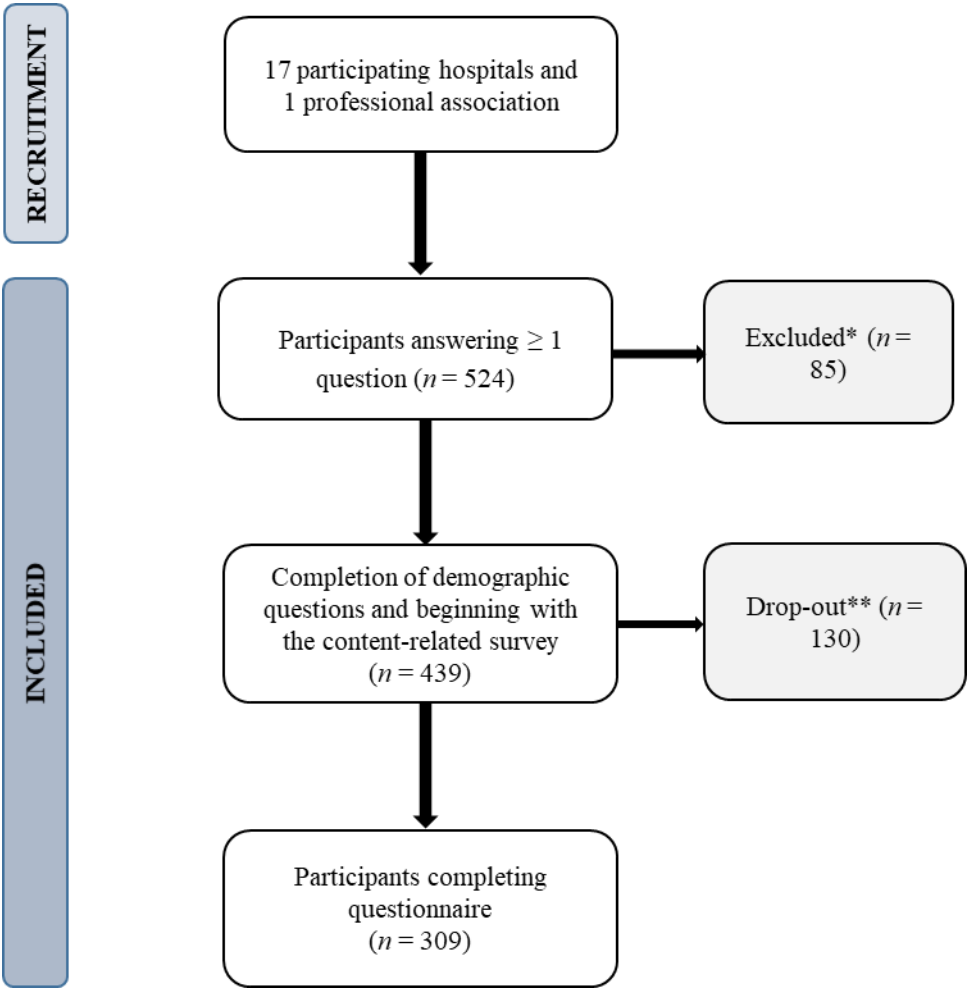
Figure 2. Recruitment and study flow chart. * Participants were excluded due to lacking experience in treating mental disorders (*n* = 22) or for failing to answer at least one content-related question (*n* = 63). ** "Drop-out" was defined as a non-completion of the content survey. All data until the point of drop-out were included in the analyses. Figure from [2, 15].

Demographic information regarding the participants of the study is shown in the following Table 3.

Table 3. *Descriptive characteristic of participants.*	Total N = 439	
	n	**%**
Gender		
Female	299	68.1%
Male	140	31.9%
Profession		
Psychologist / psychotherapist		
Total	80	18.2%
Medical doctor		
Total	187	42.6%
Psychosocial therapist		
Total	67	15.3%
Caregiver		
Total	96	21.9%
Other profession	9	2.1%
Workplace / Setting[a]		
Inpatient setting		
University hospital	69	15.7%
Public hospital	320	72.9%
Non-profit hospital	28	6.4%
Private hospital	14	3.2%
Outpatient setting		
Practice with health insurance license	7	1.6%
Private practice private	4	0.9%
Practice within the framework of psychotherapy training	10	2.3%
Research	10	2.3%
Other	4	0.9%
		M (SD)
Age		
Years	439	41.41 (11.62)
	Mdn	**M (SD)**
Experience[b]		
Mental disorders	4.00	3.88 (0.91)
Schizophrenic disorders	3.00	3.43 (0.95)

Note. [a]Multiple answers were possible. [b]Participants were asked how they would rate their experience in treating people with mental disorders or schizophrenia (1 = *not at all experienced* – 5 = *very experienced*). *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians. Table adapted from [2, 15].

4 Implementation status of the schizophrenia guideline and of key recommendations

Overall, for the schizophrenia guideline as a whole and for the four key recommendations, there was a large gap between awareness and adherence, as well as between agreement and adherence [15]. Less than half of the mental healthcare professionals surveyed demonstrated awareness (40%), agreement (43%) and adoption (41%) of the schizophrenia guideline in its entirety [15]. Only 7% of respondents indicated compliance with the guideline. The awareness of specific recommendations varied from 38% for recommendation 3 (weight gain) to 81% for recommendation 2 (relapse prevention) [15]. While the adherence to recommendation 3 stood at a low 5%, approximately 40% of healthcare professionals asserted that they adhered to recommendation 2. Furthermore, recommendation 2 demonstrated the highest percentages across the four categories of awareness (81%), agreement (86%), adoption (70%), and adherence (40%) [15]. In contrast, recommendation 3 (weight gain) had the lowest rates of awareness (38%), agreement (36%), adoption (33%), and adherence (5%). The greatest disparity between awareness and adherence, as well as between agreement and adherence, was discovered amongst all health professionals surveyed for recommendation 4 regarding psychotherapy [15]. A total of 76% reported being aware of recommendation 4 and 81% agreed with it; however, only 7% adhered to the recommendation. This implies that 69% of the health professionals declined from awareness to adherence and 74% from agreement to adherence [15]. Table 4 below provides an overview of the percentages for all healthcare professionals

surveyed (total) and the mean response comparisons among professions regarding the implementation status of the schizophrenia guideline.

Table 4. *Mean response comparisons between professions regarding the implementation status of the schizophrenia guideline in general as well as of four key recommendations.*

	Total		PSY		MED		PST		CG		Chi Square Test		
	N	%Yes	N	%Yes	N	%Yes	N	%Yes	N	%Yes	X²	df	p
Awareness													
Guideline for schizophrenia [Q13]	439	40.1%	80	23.8%	187	57.2%	67	22.4%	96	33.3%	42.30	3	<0.001
Recommendation 1 [Q17]	409	79.0%	75	65.3%	182	94.5%	59	49.2%	84	82.1%	68.70	3	<0.001
Recommendation 2 [Q21]	390	81.0%	73	75.3%	179	94.4%	56	53.6%	73	79.5%	51.61	3	<0.001
Recommendation 3 [Q25]	376	37.8%	72	12.5%	174	59.2%	52	15.4%	70	28.6%	66.95	3	<0.001
Recommendation 4 [Q29]	370	75.7%	71	88.7%	173	85.5%	49	53.1%	69	58.0%	41.97	3	<0.001
Agreement													
Guideline for schizophrenia [Q14]	438	42.5%	80	31.3%	187	64.7%	67	17.9%	95	26.3%	68.57	3	<0.001
Recommendation 1 [Q18]	409	86.1%	75	88.0%	182	96.7%	59	64.4%	84	81.0%	44.56	3	<0.001
Recommendation 2 [Q22]	390	87.7%	73	93.2%	179	96.1%	56	60.7%	73	86.3%	54.31	3	<0.001
Recommendation 3 [Q26]	376	36.2%	72	19.4%	174	52.3%	52	17.3%	70	27.1%	38.83	3	<0.001
Recommendation 4 [Q30]	370	81.1%	71	93.0%	173	87.3%	49	59.2%	69	72.5%	30.26	3	<0.001
Adoption													
Guideline for schizophrenia [Q15]	436	40.8%	51	51.0%	166	66.3%	28	42.9%	56	46.4%	11.38	3	0.010
Recommendation 1 [Q19]	409	70.2%	75	69.3%	182	80.8%	59	49.2%	84	66.7%	22.98	3	<0.001
Recommendation 2 [Q23]	390	73.6%	73	68.5%	179	88.3%	56	48.2%	73	65.8%	42.30	3	<0.001
Recommendation 3 [Q27]	375	32.8%	72	23.6%	174	46.6%	52	11.5%	69	26.1%	29.53	3	<0.001
Recommendation 4 [Q31]	369	56.6%	71	78.9%	172	51.2%	49	53.1%	69	50.7%	17.64	3	<0.001
Adherence													
Guideline for schizophrenia [Q16]	287	7.3%	51	7.8%	155	8.4%	27	0.0%	50	6.0%	2.60	3	0.458
Recommendation 1 [Q20]	326	23.9%	54	25.9%	165	26.7%	36	16.7%	68	16.2%	4.08	3	0.025
Recommendation 2 [Q24]	304	39.5%	53	34.0%	162	48.1%	32	12.5%	54	31.5%	17.01	3	<0.001
Recommendation 3 [Q28]	218	4.6%	29	3.4%	138	5.1%	13	7.7%	36	2.8%	0.71	3	0.871
Recommendation 4 [Q32]	284	7.4%	58	10.3%	152	4.6%	28	10.7%	43	7.0%	3.00	3	0.392

Note. N = number of participants; *%Yes* represents the percentage of participants, who were aware of, agreed on, adopted or adhered to the recommendation; *df* = degrees of freedom; *X²* = Chi Square value. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. Total = all participants included, PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers. Recommendation 1 (dose of antipsychotics); Recommendation 2 (relapse prevention); Recommendation 3 (weight gain); Recommendation 4 (psychotherapy). For subgroup analyses see Appendix Table 1. Table from [15].

4.1 Group comparisons – professions

Chi^2 test of independence indicated that medical doctors possessed greater levels of awareness and agreement regarding the guideline as a whole than the other professions surveyed ($p <$ 0.001) [15]. No significant results were found between the professions for adoption and adherence. Please refer to Figure 3 for further clarification.
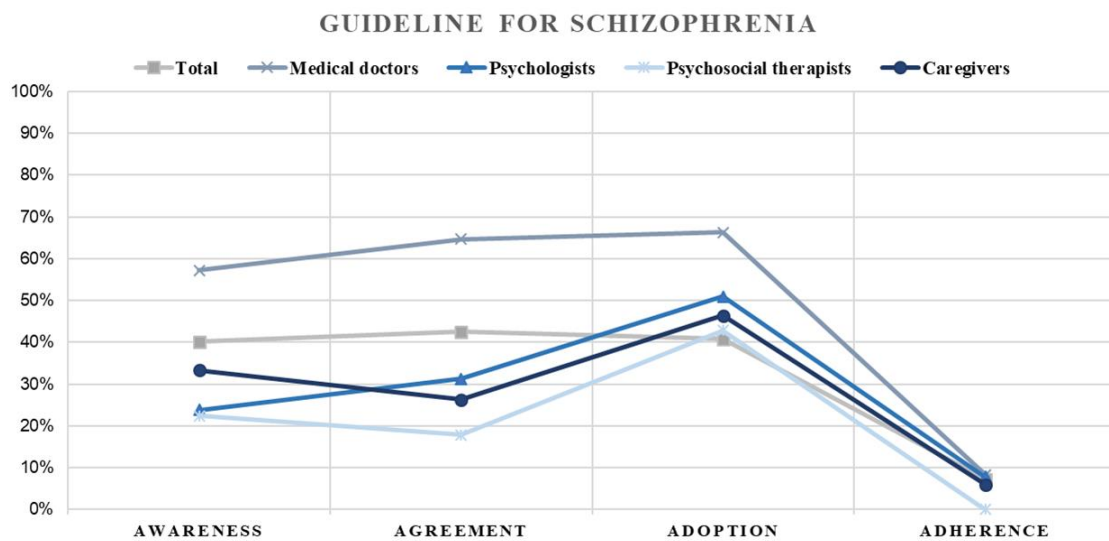
Figure 3. Status of implementation of the schizophrenia guideline among healthcare professionals. Figure adapted from [15].

In terms of recommendation 1 (dose of antipsychotics), medical doctors exhibited higher awareness and agreement rates than any other profession, $p < 0.042$ [15], see Figure 4 below.
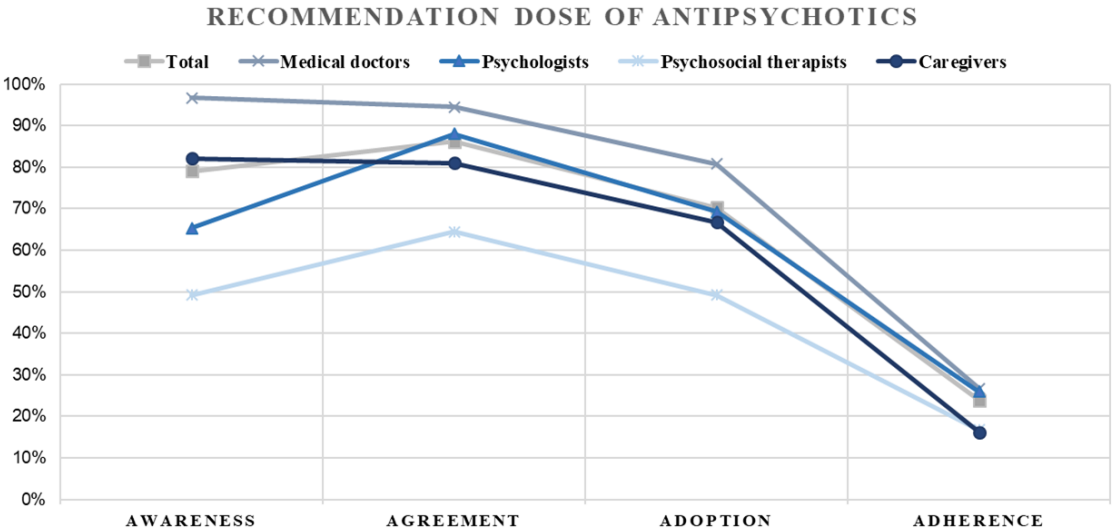
Figure 4. Status of Implementation of recommendations 1 (Dose of antipsychotics). Figure adapted from [15].

For recommendation 2 (relapse prevention), medical doctors showed greater levels of awareness and agreement than psychosocial therapists and nurses, $p < 0.030$. In addition, among all professions, medical doctors rated this recommendation as more appropriate and feasible ($p < 0.001$) [15]. See Figure 5 below.
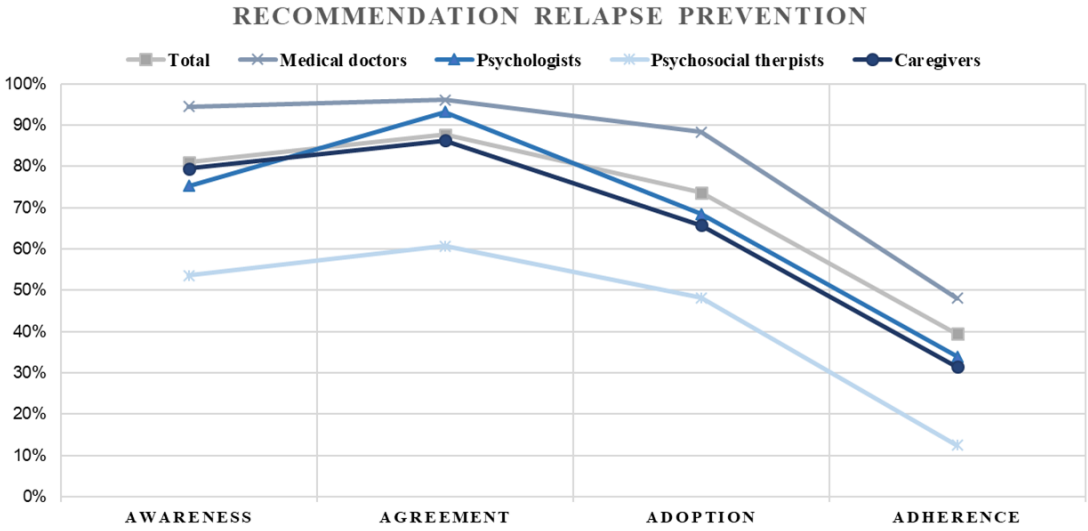
Figure 5. Status of implementation of recommendation 2 (relapse prevention). Figure adapted from [15].

Greater awareness, agreement, and adoption were detected for medical doctors compared to the other three investigated professions in relation to recommendation 3 (weight gain) ($p < 0.018$) [15]. See Figure 6 underneath.

RECOMMENDATION WEIGHT GAIN
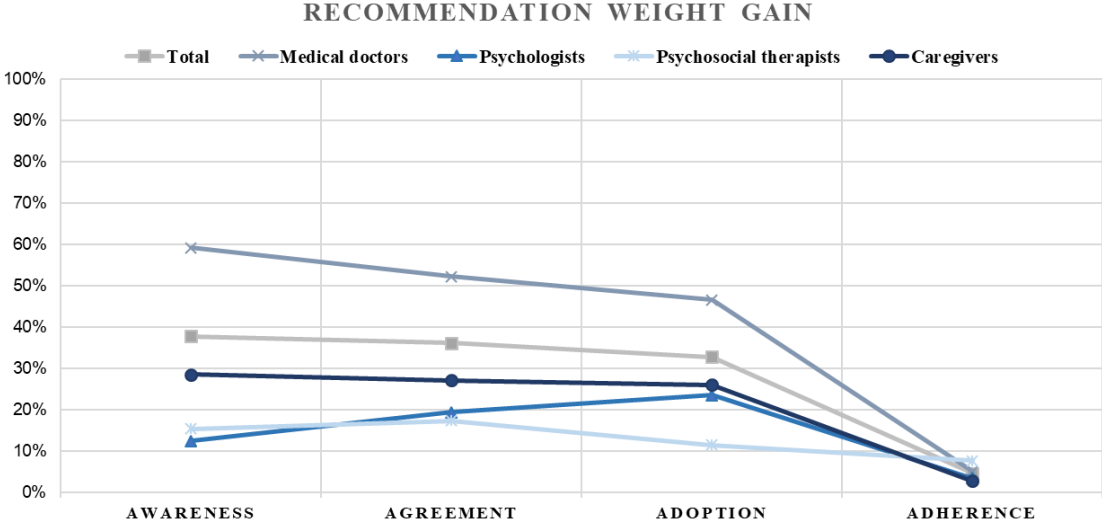
Figure 6. Status of implementation of recommendation 3 (weight gain). Figure adapted from [15].

Recommendation 4 (psychotherapy) revealed greater awareness and agreement rates among psychologists/psychotherapists than among psychosocial therapists and nurses ($p < 0.036$). Furthermore, psychologists found this recommendation to be more appropriate and feasible than any other surveyed profession ($p < 0.018$) [15], as illustrated in Figure 7 below.
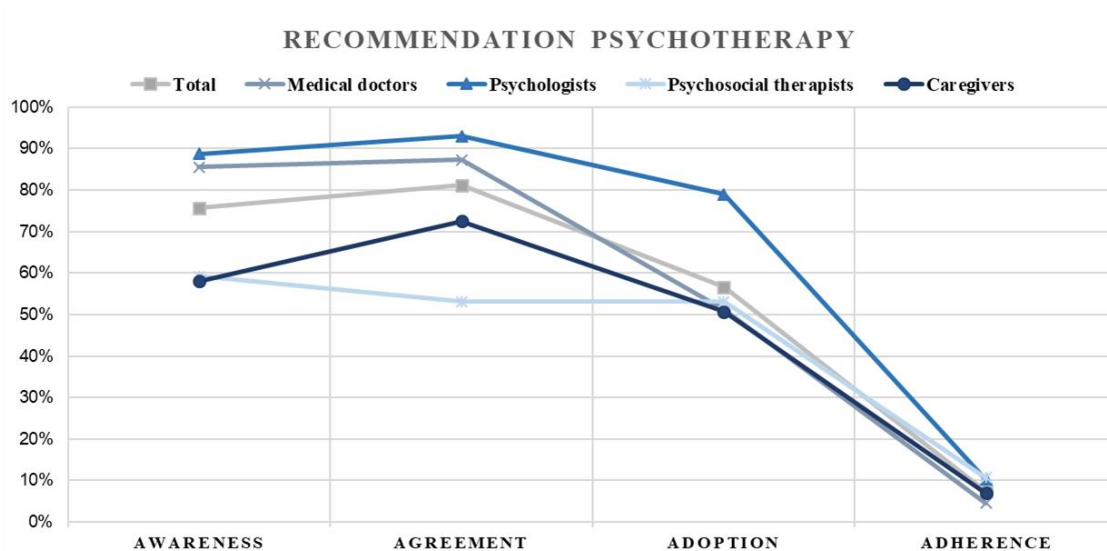
Figure 7. Status of implementation of recommendation 4 (psychotherapy). Figure adapted from [15].

For complete test statistics see Appendix Table 1.

4.2 Group comparisons – age groups

The Chi^2 test of independence showed significant contrasts between different age groups in terms of the implementation status of the schizophrenia guideline. There was greater awareness of the schizophrenia guideline among older healthcare professionals than younger ones ($p = 0.003$). In addition, older respondents exhibited higher levels of awareness of recommendation 1 (dose of antipsychotics) than middle-aged healthcare professionals ($p = 0.039$). In relation to the schizophrenia guideline, middle-aged and older professionals were more inclined to agree than their younger colleagues ($p < 0.027$). Moreover, middle-aged professionals showed higher levels of adherence to the schizophrenia guideline compared to younger healthcare professionals ($p = 0.030$). Figure 8 provides an overview of the overall implementation status of the schizophrenia guideline across different age groups. For comprehensive test statistics, please refer to Appendix Tables 2 – 3.
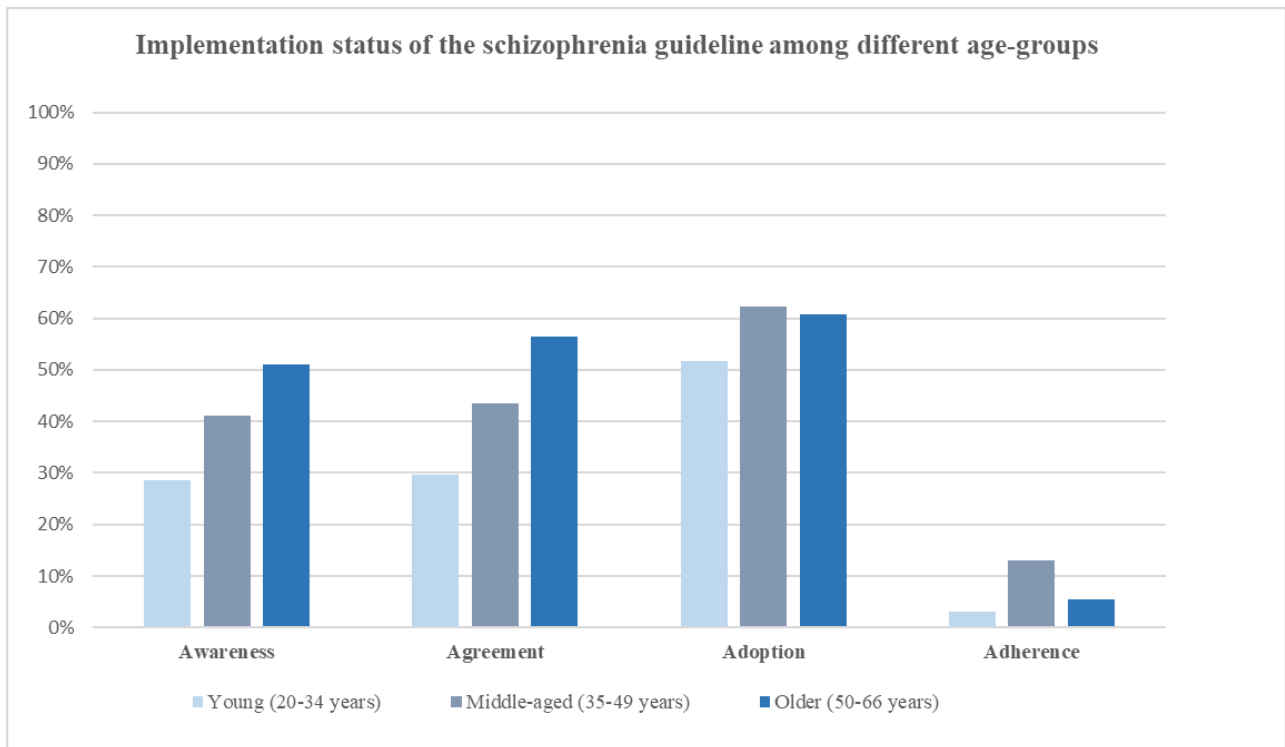
Figure 8. Status of implementation of the schizophrenia guideline as a whole by age group (young, middle-aged and older). In terms of *awareness,* older healthcare professionals are more aware of the guideline than younger professionals. In terms of *agreement,* older and middle-aged professionals are more in agreement with the guideline than younger professionals. Middle-aged professionals are more compliant with the schizophrenia guideline than younger professionals.

5 Attitude towards the living guideline for schizophrenia

Regarding the usability of the living guideline, the presented screenshots of the schizophrenia guideline converted to MAGICapp indicate that 68% of the surveyed healthcare professionals reported that they found the layout appealing and the content clearly presented and around three-quarters (77%) stated that they could imagine getting along well with the living guideline [15]. In terms of clinical usability and relevance, just 39% of healthcare professionals judged the living guideline to be more informative compared to the previous printed version. Though, 62% of those surveyed found the living guideline to be more practical than the printed version, with 80% believing that it would be a beneficial resource in everyday clinical practice [15]. The participants exhibited a positive disposition towards the use of a living guideline: 75% expressed awareness of the benefits offered in comparison to the printed version, and

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approximately 64% expressed a preference for the living guideline [15]. Mean levels of agreement with the living guideline for schizophrenia are shown in Table 5 below.

Table 5. *Mean level of agreement: Attitude towards the living guideline for schizophrenia*

	N	%Yes	Mdn	M (SD)
User-friendliness				
I find the layout appealing and the content clearly presented. [Q33]	335	68.1%	4.00	3.69 (0.83)
I can imagine getting along well with the Living Guideline. [Q34]	334	76.6%	4.00	3.87 (0.76)
The Living Guideline seems clearer than the previous print version. [Q36]	335	51.9%	4.00	3.61 (0.82)
Clinical practicability / relevance				
The Living Guideline seems to be more informative than the previous print version. [Q37]	334	39.2%	3.00	3.40 (0.72)
The Living Guideline seems to be more practical than the previous print version. [Q38]	333	61.6%	4.00	3.77 (0.80)
I can imagine that a Living Guideline would be a valuable tool in my everyday clinical practice. [Q39]	333	80.2%	4.00	3.98 (0.76)
General attitude				
The advantages of a Living Guideline over a print version are evident to me. [Q40]	333	75.1%	4.00	3.92 (0.82)
I would prefer a Living Guideline to the previous print version. [Q41]	334	63.8%	4.00	3.80 (0.89)

Note. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). *%Yes* represents the percentage of participants, who *agreed* or *strongly agreed* to the statement. *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians. Numbers of questions are displayed in square brackets. The complete questionnaire is shown in the Appendix under 10.2. Table from [15].

5.1 Group comparisons – professions

Kruskal-Wallis tests revealed significant variation among professions regarding the usability, clinical practicality/relevance and general perception of a living guideline. Medical doctors discovered the living guideline more use-friendly than nurses and psychosocial therapists ($p < 0.010$). Psychologists/psychotherapists were more in agreement with the clinical practicability than nurses and psychosocial therapists ($p < 0.014$). Medical doctors rated the living guideline as more clinically relevant than nurses and psychosocial therapists ($p < 0.007$). Psychologists ($p < 0.006$) and medical doctors ($p < 0.039$) had a generally more positive attitude towards the

concept of a living guideline compared to psychosocial therapists and nurses. Please refer to Appendix Tables 4 and 5 for complete statistics.

5.2 Group comparisons – age groups

Kruskal-Wallis-tests revealed significant differences between age groups in all three categories. Younger healthcare professionals rated the living guideline as more user-friendly and clinically relevant and expressed a more positive overall attitude towards the concept of a living guideline compared to older healthcare professionals, $p < 0.006$ [15]. For full test statistics see Appendix Tables 6 and 7.

6 Barriers and facilitating factors to guideline adherence

The perceived barriers and facilitators were categorized into Cabana's three categories: knowledge, attitude and external. Concerning barriers to the print version 'lack of time resources' emerged as the most important barrier (63%), followed by 'lack of training' (53%) and 'too long/complex versions' (48%) [2]. The most frequently reported barriers to the concept of a living guideline were knowledge-related: More than two-thirds of the participants cited 'lack of experience' (80%), 'lack of awareness' (64%) and 'lack of knowledge about access' (64%) as obstacles to utilizing the upcoming schizophrenia living guideline [2].

With regard to factors that assist in guideline adherence, those surveyed have indicated that the provision of treatment checklists (living: 90%; print: 88%) is the most crucial factor in implementing the schizophrenia guideline in both living and print formats [2]. In addition, concise versions that provide essential treatment recommendations (living: 72%; print: 70%) and guidelines tailored to individual cases (living: 67%; print: 64%) were noted as facilitating factors. Please see Appendix Tables 8 (barriers) and 9 (facilitators) for complete test statistics.

6.1 Group comparisons – print versus living

Wilcoxon tests revealed greater knowledge-related implementation barriers with the living guideline than the print format, $p < 0.001$ [2]. Conversely, the print version of the schizophrenia guideline had measurably higher agreement scores on attitudinal and external barriers ($p \leq 0.001$) [2]. Figure 9 below provides an overview of the barriers for the living guideline compared to the print format. For full test statistics see Appendix Table 8.
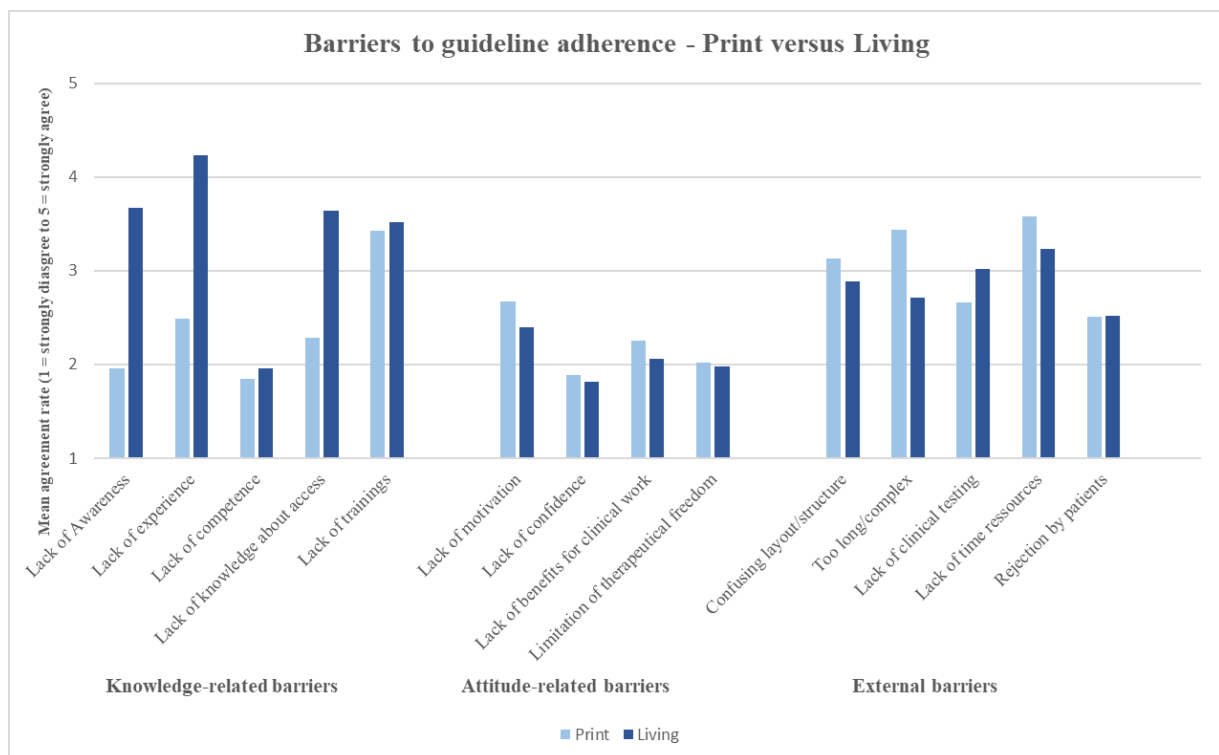
Figure 9. The bar chart shows that the concept of a living guideline is associated with more knowledge-related barriers than the print version. The print version, however, has more attitude-related and external barriers than the living guideline.

Dependent samples Wilcoxon signed rank tests indicated a higher demand for facilitators among mental health practitioners whilst implementing the living guideline in comparison to the print version [2]. A greater level of agreement was observed for knowledge-related and external facilitating factors, $p < 0.001$ [2]. In comparison, the reliance on attitude-related facilitators for adherence to the print version of the schizophrenia guideline was greater than for the concept of a living guideline ($p < 0.001$) [2]. Figure 10, displayed below, shows

facilitators for adherence to the living guideline compared to the print format. Please refer to Appendix Table 9 for complete test statistics.
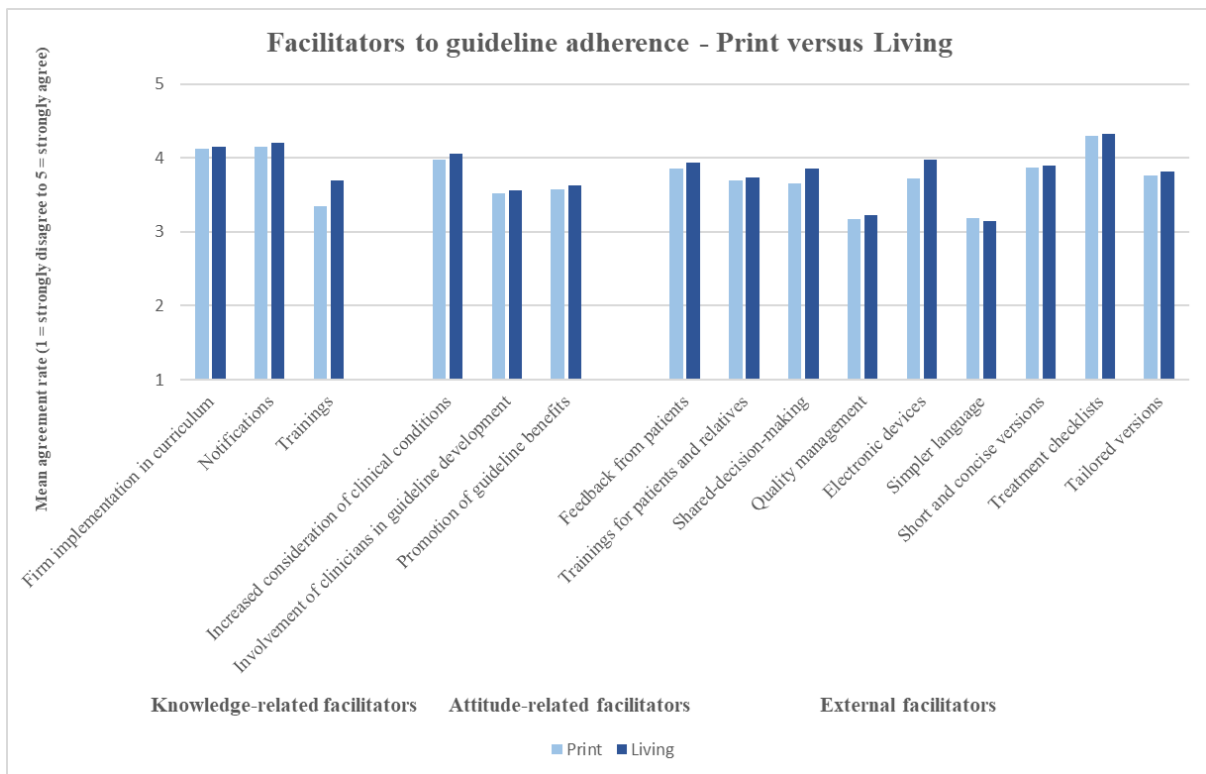
Figure 10. The bar chart shows a higher need for knowledge-related and external facilitators regarding adherence to the concept of a living guideline compared to the print version. Concerning attitude-related facilitators, there was a higher need in the context of the print version of the schizophrenia guideline.

6.2 Group comparisons – professions

Kruskal-Wallis-tests yielded significant differences between professions regarding knowledge and attitude barriers to the print version, indicating that psychosocial therapists and nurses encountered more knowledge-related barriers to the print version compared to physicians and psychologists/psychotherapists ($p < 0.001$) [2]. Concerning attitudinal barriers to the print version, psychosocial therapists reported higher confirmation rates than psychologists/psychotherapists ($p = 0.002$) and physicians ($p = 0.002$) [2]. Figure 11 below displays the profession-specific obstacles to following the print version of the schizophrenia guideline.
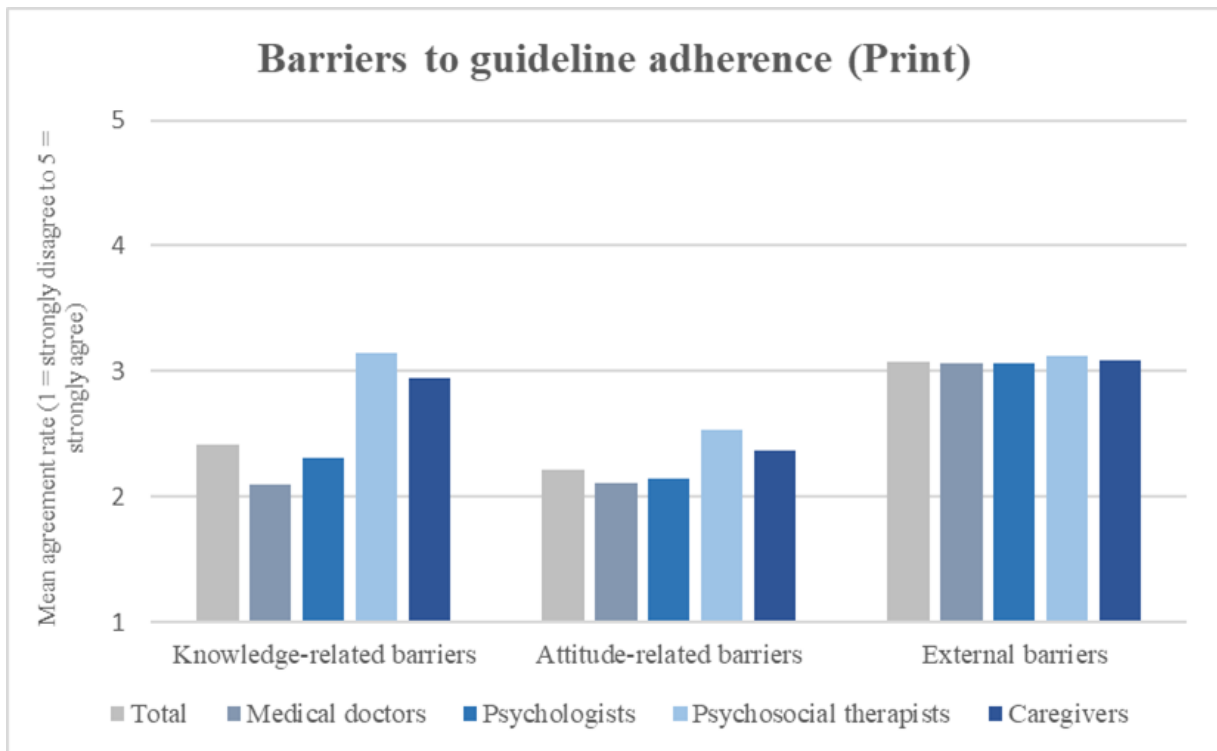
Figure 11. The bar chart depicts the barriers to guideline adherence of the print version of the schizophrenia guideline among different professions. *Knowledge-related barriers*: Psychosocial therapists and caregivers report more barriers than medical doctors. *Attitude-related barriers:* More barriers for psychosocial therapists than for medical doctors and psychologists. *External barriers:* No significant differences among professions.

There were no significant differences detected between professions in regard to knowledge-related barriers to the living guideline. Consistently, all professions displayed high levels of agreement for knowledge-related barriers [2]. However, psychosocial therapists and nurses showed higher levels of agreement than medical doctors and psychologists/psychotherapists for attitudinal barriers ($p \leq 0.004$) [2]. In addition, it was found that nurses encountered greater hindrance from external factors in embracing the concept of a living guideline than medical doctors ($p = 0.001$) [2]. Figure 12 below presents professional barriers to following the living guideline. For full test statistics see Appendix Tables 10 and 11.
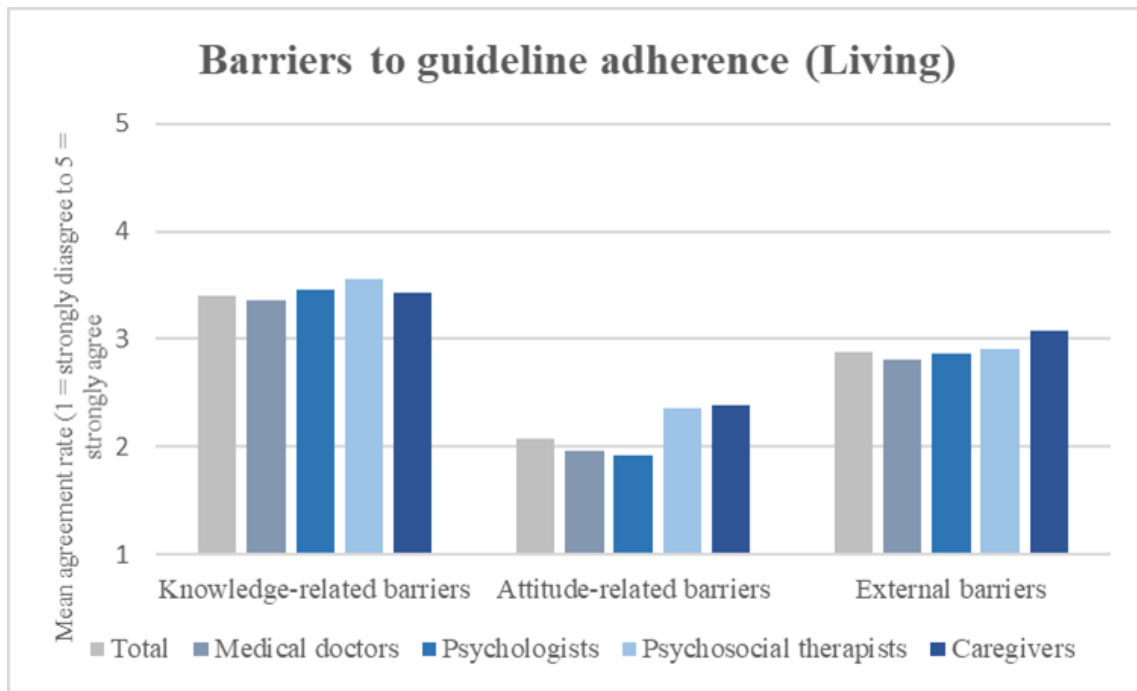
Figure 12. The bar chart shows profession-specific barriers to guideline adherence to the living guideline. *Knowledge-related barriers*: High agreement throughout the professional groups. *Attitude-related barriers*: More barriers for psychosocial therapists and caregivers than for medical doctors and psychologists. *External barriers*: Reported more by caregivers compared to medical doctors.

For factors facilitating guideline adherence, Kruskal-Wallis-tests did not find significant differences between professions for the print and living guideline formats [2]. The results remained consistent across professions in requiring more knowledge-related, attitude-related and external facilitators for guideline use in both print and living formats [2]. Appendix Tables 10 and 11 contain the complete test statistics.

6.3 Group comparisons – workplace: inpatient and outpatient setting

Mann-Whitney U-test for independent variables detected no significant results between inpatient and outpatient setting for barriers and facilitators to guideline implementation for both formats print and living. See Appendix Table 15 for full test statistics.

6.4 Group comparisons - years of professional experience

Kruskal-Wallis tests detected significant differences between healthcare professionals with different years of experience. Respondents with 15 to 29 years of working experience reported more attitude-related barriers to adherence to the concept of a living guideline than respondents with less experience (0 to 14 years), $p = 0.028$. Healthcare professionals with up to 14 years' experience showed higher agreement rates for knowledge, attitude and external facilitators than healthcare professionals with 15 to 29 years' experience, $p < 0.015$. See Appendix Tables 13 and 14 for full test statistics.

Figure 13 below provides an overview of Cabana's Knowledge-Attitude-Behavior framework [28] and the results of the comparisons investigated: The barriers and facilitators to the concept of a living guideline compared to the print version of the schizophrenia guideline, the differences in guideline adherence among the surveyed healthcare professionals, and the barriers and facilitators depending on years of professional experience.
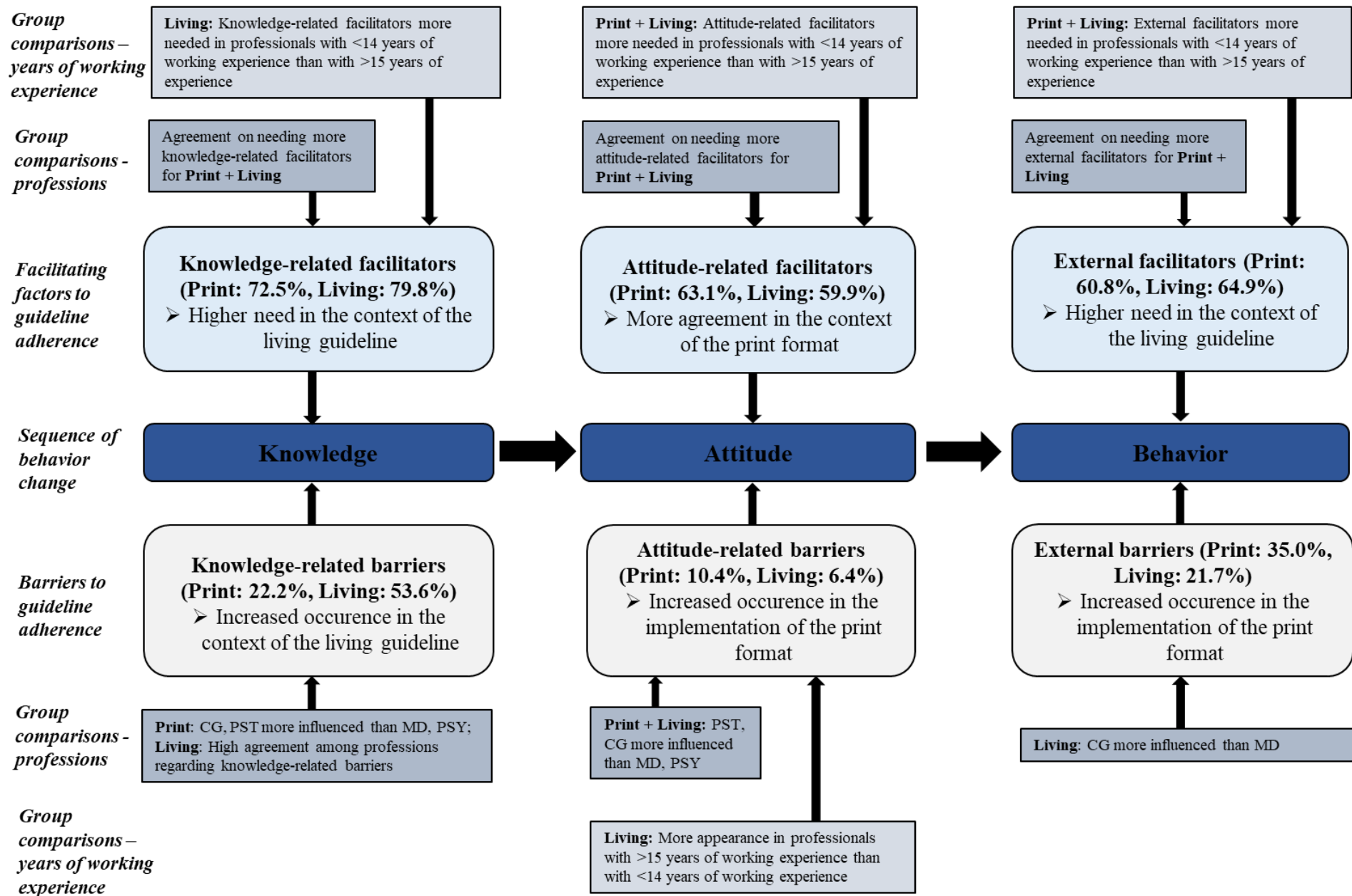
Figure 13. Overview of Cabana's Knowledge-Attitude-Behavior Framework [26] and the results of the investigated differences between the living guideline and the print format of the schizophrenia guideline, the professions and the years of working experience. Above the *Sequence of behavior change*, the facilitators to guideline adherence are presented. Below the *Sequence of behavior change*, the barriers to guideline adherence are shown (in each case knowledge-related, attitude-related and external barriers and facilitators as well as the differences among the surveyed healthcare professionals and differences depending on years of working experience.

7 Preferences in the use of living guidelines

Over half of the healthcare professionals surveyed (59%) deemed updating the living guideline yearly to be appropriate [2].

Moreover, approximately 78% of those surveyed considered the maximum update period of 12 months for a living guideline to be fitting. Only 4% regarded this update period as too brief (see Figure 14).
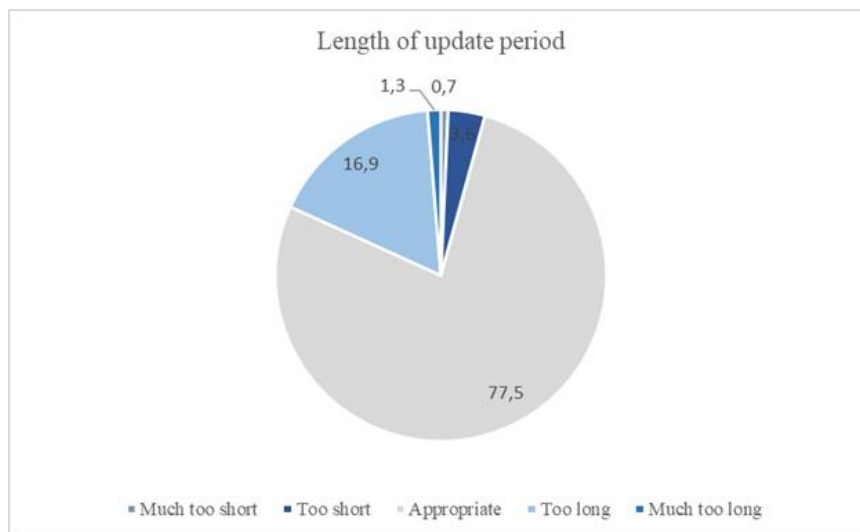
Figure 14. Length of update period.

38% of healthcare professionals stated a preference to receive immediate notification of new and relevant research, while 32% of respondents found biannual notification suitable [2].

Around 73% (those who *agreed* and *strongly agreed*) requested push notifications, such as those delivered via smartphones or email alerts on a regular basis [2]. Just 2% of mental health professionals surveyed opposed receiving notifications (Figure 15).
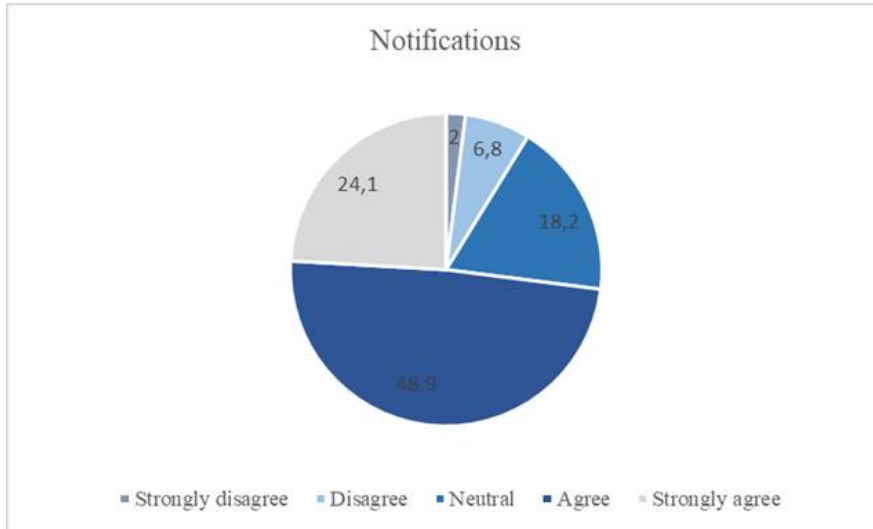
Figure 15. Notifications at regular intervals.

In addition, about 74% of healthcare professionals rated an annual update of recommendations or references to new research as beneficial in avoiding the oversight of the current state of knowledge (*agreed* and *strongly agreed)* [2] (see Figure 16).
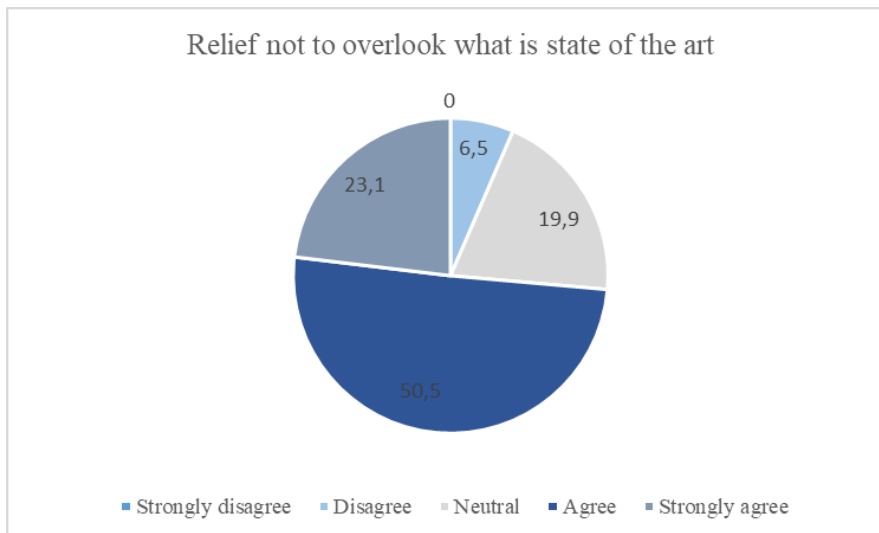
Figure 16. Relief not to overlook what is state of the art.

Less than 10% of respondents agreed or strongly agreed that an annual update would result in the need to constantly alter treatment (Figure 17).
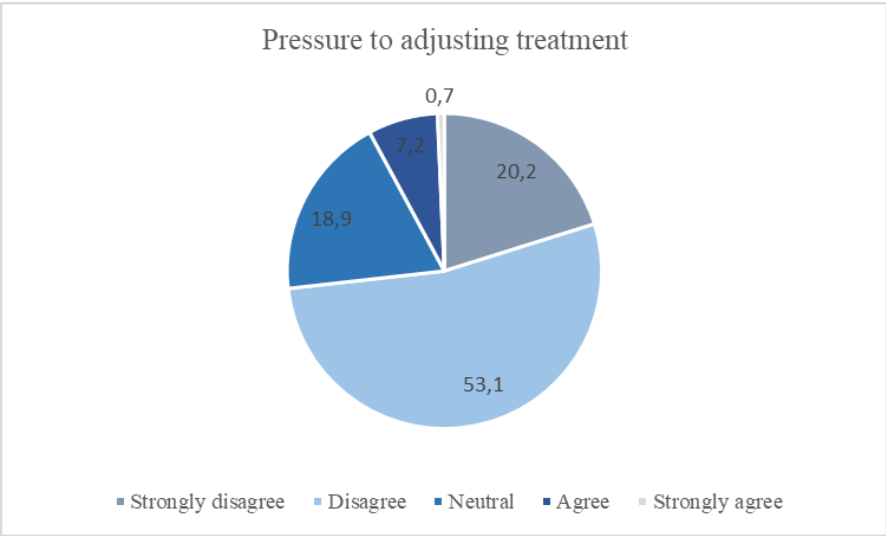
Figure 17. Pressure to adjusting treatment.

Only 15% of healthcare professionals referred to guidelines to learn about appropriate treatment options, while 34% favored textbooks and 23% opted for further education (see Figure 18) [2].
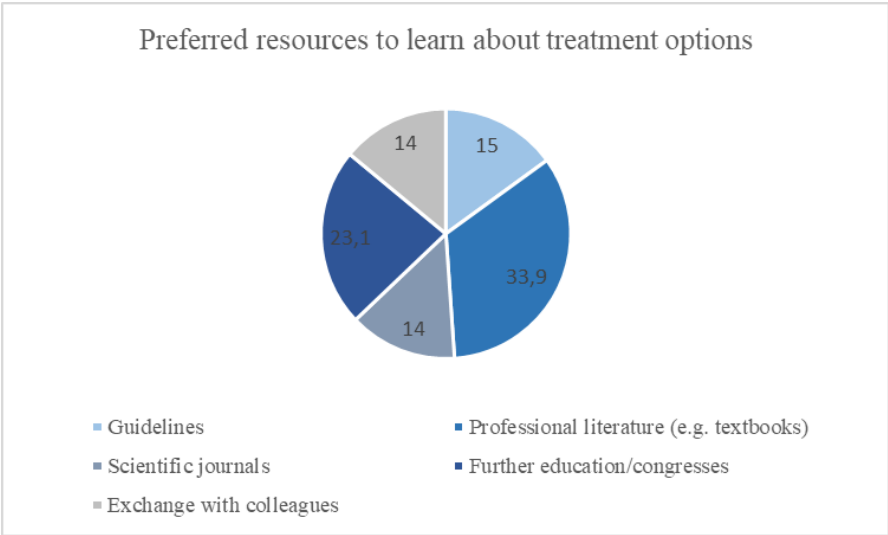
Figure 18. Preferred resources to learn about treatment options.

Other sources besides guidelines were utilized by around 15% of the respondents for gaining knowledge on evidence-based treatments (Figure 19) [2].
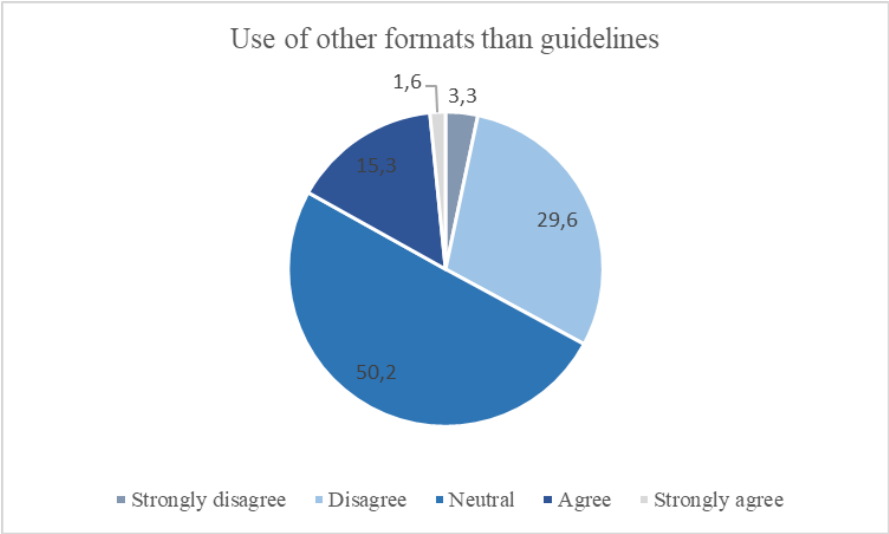
Figure 19. Use of other formats than guidelines.

With respect to digital tools/apps in everyday clinical practice, approximately 7% of respondents reported occasional usage, while 30% reported frequent usage and 7% stated that they always rely on such tools. On the other hand, 16% reported that they never use such digital tools (see Figure 20) [2]. Full test statistics can be found in Appendix Table 16.
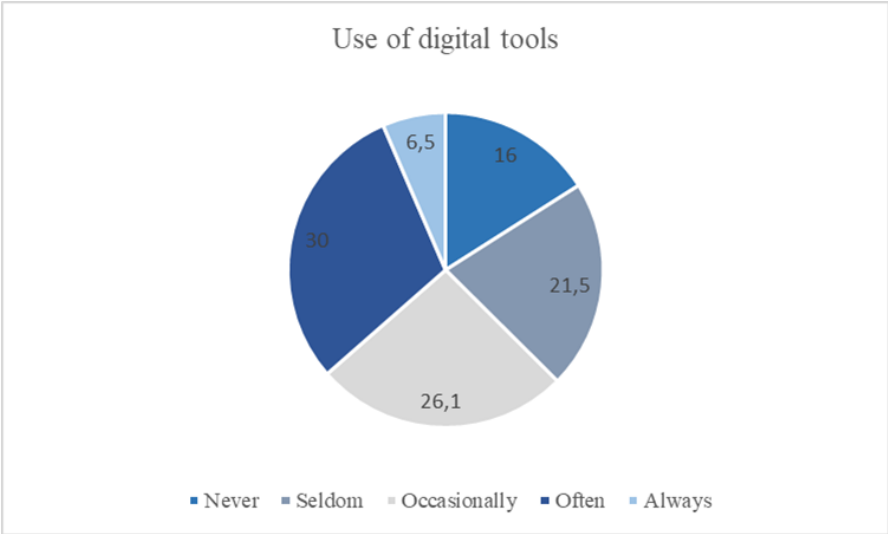
Figure 20. Use of digital tools.

7.1 Group comparisons – professions

Kruksal-Wallis tests for independent variables revealed noteworthy disparities among professions' inclinations towards the application of living guidelines. Medical doctors exhibited a greater inclination for receiving regular notifications than psychosocial therapists, $p = 0.042$. Additionally, nurses expressed higher levels of concern regarding the need to frequently modify treatment plans in response to annual recommendation updated when compared to medical doctors and psychologists ($p < 0.001$). Psychosocial therapists were also more worried about this issue than medical doctors ($p = 0.038$). Conversely, medical doctors and psychologists exhibited more positive attitudes towards the annual update, believing it prevented oversight of advancements in the field ($p < 0.001$). Medical doctors used digital tools more frequently than psychologists ($p < 0.001$) and psychosocial therapists ($p < 0.001$). However, nurses reported a higher usage of these tools in clinical practice than psychologists ($p = 0.001$). Full test statistics can be found in Appendix Tables 17 to 18.

7.2 Group comparisons – age groups

Kruskal-Wallis tests for independent variables revealed age-based variations only in relation to preferences concerning the frequency at which living guidelines should be updated. Older healthcare professionals were more inclined to agree with an annual update of the living guideline than younger healthcare professionals, who preferred a biannual ($p = 0.003$). There were no significant results between age groups for the other preferences surveyed. The complete test statistics are presented in Tables 19 and 20 in the Appendix.

Note. Apart from newly evaluated results, this dissertation combines results from two publications [2, 15], which is why overlaps are unavoidable.

8 Discussion

8.1 The SISYPHOS project – survey among healthcare professionals

First, the thesis presents the current implementation status of the schizophrenia guideline and four key recommendations, with investigating differences between professional groups and age groups. Second, attitudes towards the concept of a living guideline are presented. Third, as the implementation status is closely related to perceived barriers and facilitators to guideline adherence, these are also examined, including differences among professions, place of work and years of experience working in the field of psychiatry. Fourth, preferences in the use of living guidelines are identified. Finally, key issues with guidelines are presented, along with considerations for necessary changes in guideline development, implementation, and presentation.

8.2 Implementation status of the schizophrenia guideline and of four selected key recommendations

For the schizophrenia guideline as a whole, there was an awareness-, agreement-, and adoption-to adherence gap for all professions combined. Approximately two fifths reported being aware of, agreeing with, and adopting the guideline, with only 7% indicating adherence to it. These results are in line with previous studies in psychiatry [14] and somatic medicine, which point to a disconnect between awareness and adherence [15, 50-52]. Similarly, a discrepancy was identified between awareness and adherence, as well as between agreement and adherence for the four key recommendations [15]. Among the professions, recommendation 2 (relapse prevention) demonstrated the highest levels throughout the four categories [15]. This could be

attributed to the fact that the recommendation on antipsychotics for relapse prevention is not a detailed recommendation, but rather a general and relatively uncontroversial one, reflecting general medical knowledge. In contrast, recommendation 3 (metformin for weight gain) had the lowest implementation status of all four categories. Antipsychotic-induced weight gain is a frequent side-effect [53-55]. This has become more significant with the increased prescription of second-generation antipsychotics [56, 57]. Weight gain can impede medication compliance and, in the long term, lead to e.g., metabolic syndrome and increased cardiovascular and cerebrovascular morbidity and mortality [58, 59]. Despite this, weight-gain remains an often neglected side-effect of antipsychotic prescribing [60]. This may be because, in an inpatient setting, medical doctors may prioritize treatment of the core symptoms of schizophrenia, and subsequently discharging patients once these symptoms have abated, with less focus on weight gain. Additionally, there may be limited experience in prescribing metformin and concerns about side effects and drug interactions [15]. Lack of expectation of outcomes may also play a role, which is often associated with low patient compliance [61].

For all selected recommendations, the greatest discrepancy between awareness and adherence, as well as between agreement and adherence for all professions combined was identified for recommendation 4 (psychotherapy) [15]. This may be partly attributed to the high workload in an inpatient setting and the time-consuming nature of psychotherapy. However, one of the most commonly reported barriers to health professional adherence to guidelines is a lack of time [2, 23, 62-64]. Therefore, medications may take priority over psychotherapy since it is a less time-consuming treatment option. In addition, a lack of available psychotherapists may also be a reason for the observed gaps.

Furthermore, analyses revealed profession-specific differences in implementation status, with medical doctors exhibiting greater awareness and agreement than the three other professions surveyed for the guideline as a whole and for recommendation 1 (dose of antipsychotics), 2

(relapse prevention) and 3 (weight gain) [15]. Moreover, medical doctors perceived these recommendations as more feasible and appropriate than the other surveyed professions. This may be explained by the multi-professional inpatient environment, where medical doctors adopt managerial roles, making decisions and giving instructions [14]. Literature validates this by illustrating that health professionals who are more involved in therapeutic decisions have a higher implementation status [65]. In addition, the German schizophrenia guideline provides more specific treatment recommendations related to the area of responsibility for the medical doctors [6, 15]. As a result, medical doctors may feel more addressed by the recommendations and encouraged to implement the guideline in clinical practice.

For recommendation 4 (psychotherapy), psychotherapists exhibited greater awareness of and concurrence with the recommendation than psychosocial therapists and caregivers, and deemed it more feasible and appropriate than any other profession [15]. The different education of medical doctors and psychologists may be a contributing factor to these findings. Practical training in psychotherapy forms just one part of the specialist psychiatrists' broader training, and it's common for psychotherapy to be distinct from medication prescription in in-patient settings [15]. This separation might have implications for medical doctors' career trajectory, since the lower level of psychotherapeutic proficiency could result in reduced usage of this treatment option. In contrast, psychologists/psychotherapists undergo more extensive practical and theoretical training in the field of psychotherapy, resulting in greater experience conducting psychotherapeutic interventions [15].

Differences in implementation were noted across age groups. Senior healthcare professionals exhibited greater awareness of and concurrence with the schizophrenia guideline than their junior counterparts. Moreover, middle-aged healthcare professionals were more inclined to adhere to the schizophrenia guideline in clinical practice than younger healthcare professionals.

The acquisition of expertise and an overview of various treatment options gained with increasing professional experience could account for these discrepancies [15].

In summary, the implementation status of the four selected key recommendations within the schizophrenia guideline varied, indicating that different recommendations face different implementation barriers. Consequently, when implementing guidelines, it may be beneficial to customize implementation strategies to important key recommendations [14]. This is underlined by a survey involving general practitioners in which adherence to guidelines varied between 52% and 95% for different recommendations [66]. Furthermore, the reported profession-specific differences in guideline implementation are consistent with other studies in the field of health care [14, 15, 23, 25, 44], highlighting the importance of tailoring guideline implementation to specific professional groups.

8.3 Attitude towards the concept of a living guideline

The results indicate support for the concept of a living guideline, with approximately two-thirds of the respondents indicating their preference for the living guideline over the previous print version and more than half of the healthcare professionals surveyed considering the living guideline to be user-friendly and clinically relevant [15]. These results coincide with a recent study investigating physicians' attitudes towards a new multilayered guideline format presented in the evidence ecosystem MAGICapp compared to a conventional pdf guideline format, which found a clear preference for the new multilayered guideline format [67]. However, only about 40% of respondents considered the living guideline to be more informative compared to the print version [15]. This could also by explained by the fact that solely screenshots of the living guideline concept were displayed. The multi-layered digital system of a guideline application such as MAGICapp is difficult to convey through screenshots.

Differences were noted among professions in their attitudes towards the concept of a living guideline. Medical doctors considered the living guideline to be more user-friendly and expressed a more positive attitude towards the concept than caregivers and psychosocial therapists. In addition, psychologists assessed the living guideline to be more practical and relevant than caregivers and psychosocial therapists. These findings are congruent with the higher level of implementation of the schizophrenia guideline among medical doctors compared to caregivers and psychosocial therapists. This could also be explained by the fact that the schizophrenia guideline contains more recommendations on the clinical practice for physicians and relatively more recommendations on psychotherapeutic interventions compared to practical advice for psychosocial therapists and caregivers [6]. The increased representation reflected in the recommendations may ultimately result in a more favorable mindset, irrespective of the format of the guideline.

Differences across age groups were observed in all categories: younger healthcare professionals perceived the living guideline as more user-friendly and clinically relevant than older professionals, and expressed more favorable attitudes towards the concept compared to middle-aged and older professionals [15]. Although the use of technology is gaining more ground among elderly adults [68, 69], there is still a level of apprehension towards new technological advancements, as well as some uncertainty and lack of confidence in using it [15, 70, 71]. In addition, physicians tend to disapprove of new technology should it interfere with traditional practice patterns [72], particularly so amongst older medical doctors with long-established treatment patterns over many years. In contrast, younger adults possess greater familiarity and ease with technology, which may explain the differences between age groups in attitudes to the concept of a living guideline [15].

8.4 Barriers and facilitators to guideline adherence as well as preferences in the use of living guidelines

The most important reported barrier to guideline adherence regarding the print version of the schizophrenia guideline was a perceived lack of time, whereas barriers to the concept of a living guideline were mostly knowledge related: 'lack of awareness', 'lack of experience' and 'lack of knowledge about access' were the most frequently reported barriers [2]. These predominant knowledge-related obstacles in the context of a living guideline can be attributed to the novel and still unaccustomed format of living guidelines and the absence of a psychiatric living guideline [2, 40]. Factors identified as facilitators to guideline adherence comprised the provision of treatment checklists, update notifications, guideline inclusion in the curriculum, short and concise versions with essential treatment recommendations and tailored versions of the guideline [2]. However, implementing facilitators such as training for professionals is time-consuming. This is in contrast to the most commonly reported barrier to guideline adherence, which is lack of time [2]. Living guidelines could be a possible solution to address these facilitators while saving time if embedded in a flexible online environment such as MAGICapp, which enhances and facilitates digitalized learning [2]. This consideration is emphasized by a recent study on the dissemination of psychiatric practice guidelines, which discovered web-based courses on guideline knowledge to be equally effective and more satisfying than face-to-face courses [2, 73].

Frequently reported profession-specific differences in guideline implementation [14, 23, 74] highlight the importance of investigating profession-specific impediments and facilitators to guideline adherence. Regarding the print version of the schizophrenia guideline, caregivers and psychosocial therapists reported encountering more knowledge-, and attitude-related obstacles than medical doctors and psychologists, which aligns with the lower implementation rate of the schizophrenia guideline among these professional groups. Specifically, caregivers displayed

high numerical rates for lack of awareness and lack of experience, and had the highest percentage rate among the surveyed professions for the knowledge-related impediment of lack of training (see Appendix Table 12) [2]. As caregivers are usually the professionals who spend the most time with patients and therefore tend to develop a trusting relationship, they have a key role to play in repeatedly explaining important evidence-based treatments to patients. For instance, relapse prevention among individuals with schizophrenia is crucial, but the recommendation regarding antipsychotics for relapse prevention showed a greater implementation among medical doctors compared to caregivers. Our findings regarding the predominance of knowledge-related barriers are consistent with the literature, where lack of knowledge is the most commonly reported barrier among caregivers [75]. Psychosocial therapists were more constrained by attitudinal barriers than medical doctors. However, most psychosocial therapists deemed the guideline useful in their clinical work, potentially attributable to the interprofessional teamwork in an inpatient environment, which makes it essential to comprehend the roles and responsibilities of other professions [14, 76].

Regarding the concept of a living guideline, respondents concurred on barriers related to knowledge, which might be attributed to the novel format of a living guideline and is substantiated by the high numerical values for lack of awareness and lack of experience (see Appendix Table 12) [2]. Caregivers reported more external barriers for adhering to a living guideline than did medical doctors, particularly mentioning shortage of time and rejection by patients (see Appendix Table 12). As caregivers play a significant role in interacting with patients, these findings emphasize the necessity of resolving these hindrances.

Facilitators were explored to identify possible solutions to improve guideline adherence. The results demonstrated consensus across professions regarding the requirement for more facilitators for both print and living formats [2]. The frequently expressed knowledge-related facilitators, notification of updates and firm implementation of guidelines in the curriculum,

could be well met with living guidelines if they are stored in a flexible, digital online environment such as MAGICapp [2]. These results are consistent with the expressed preferences of healthcare professionals to receive regular notifications with a living guideline. The most frequently reported attitudinal facilitator was a heightened focus on clinical conditions, since guidelines typically concentrate on a particular disease without providing recommendations for the intricate reality of multimorbid patients [2, 23, 63]. However, this is challenging to achieve in conventional guidelines, as the purpose of the often rather general recommendations is to be applicable in as many situations as possible. However, living guidelines may resolve this quandary, as links to other guidelines or appropriate recommendations can be included in a digital system, simplifying to deal with the complexities of clinical reality [2]. In addition, web-based tools may offer visual aids to facilitate shared decision-making, condensed versions and treatment checklists, which were considered external facilitators [2]. Our results propose that potential solutions to guideline adherence may be more easily and comprehensively addressed with living guidelines than with classic print versions [2]. As about two-thirds of the healthcare professionals surveyed reported using digital tools in their daily clinical practice, living guidelines could be characterized as a beneficial tool for improving guideline adherence [2].

There were variances in the barriers and facilitators to guideline adherence among respondents with differing years of professional experience. Professionals with more than 15 years of professional experience perceived more attitudinal barriers compared to their less experienced counterparts. The more positive attitude of younger health professionals towards the concept of a living guideline may explain this. Moreover, experienced professionals are likely to have traditional, well-established treatment patterns any may therefore experience more attitudinal barriers to living guidelines, such as restrictions on therapeutic freedom. In addition, professionals with less work experience, who tend to be younger, were more likely to agree

with facilitators for all three categories of living guidelines than their more experienced counterparts. With the increasing emergence of living guidelines [33, 74], younger healthcare professionals may be more motivated to improve implementation of living guidelines as they have more exposure to living guidelines throughout their professional lives, and younger professionals are generally more likely to use guidelines [2, 23, 77].

In summary, numerous obstacles impede guideline adherence. Achieving and maintaining behavior change is a long and complex endeavor [78, 79]. For a sustainable guideline implementation, all stages of behavioral change should be addressed, as behavior change is usually a multistep process [14, 45, 80]. However, altering behavior can present challenges even when knowledge and attitudes are not a barrier, due to inertia resulting from entrenched routines [61]. The existence of various obstacles, discrepancies between and within professions as a result of differences in training, skills and experience [61], highlights the importance of multi-faceted, structured implementation strategies, encompassing a combination of different tailored interventions [10, 14, 23, 44-46, 81, 82].

8.5 Key problems in guidelines and necessary changes in guideline development, dissemination and uptake

Numerous guidelines have been published in recent decades [37]. The Guideline International Library discovered 57 guidelines on hypertension published within ten years [83], whilst other studies found 27 guidelines regarding schizophrenia published in the same timeframe [84], and 61 national psychiatric guidelines originating from 14 countries [85]. Guidelines frequently present conflicting recommendations [86, 87], and a varying methodology of development [84], reducing their trustworthiness. Furthermore, different methods of assessing the evidence and grading the strength of recommendations are commonly used, leading to misunderstandings and misinterpretations [88]. It is thus a positive development that over 100 organizations

worldwide have already embraced the GRADE (Grading of Recommendations Assessment, Development and Evaluation) system and that its use in the development of guidelines is increasing, as it standardizes the assessment of evidence and provides transparency about what factors have been considered in the decision-making process [67, 88].

Producing all these guidelines worldwide is time and resource consuming and results in overlapping, sometimes contradictory and redundant guidelines [83, 89, 90]. In addition, even current methodologically sound guidelines are burdened by a convoluted development process, are often quickly outdated, have unclear presentation formats, and lack support for shared decision making [91]. Therefore, a change in the development, presentation and implementation of clinical practice guidelines is needed.

Different solution approaches can be considered. The idea of a European guideline project was mentioned in studies as early as 20 years ago, but at that time there were many obstacles regarding the technical infrastructure and the coordination of guidelines at an international level [85, 89]. With the emergence of evidence ecosystems and living guidelines, new opportunities have emerged to realize more joint guidelines. The evidence underlying guideline recommendations is often international in nature [85]. Thus, the evidence could be disseminated globally and implemented by national organizations based on their respective characteristics of the health care system [85] – promoting evidence globalization and decision localization [92]. The World Health Organization (WHO) serves as a prime illustration of how guideline developed for different countries can work. The WHO Mental Health Gap Action Programme (mhGAP) has been implemented in more than 100 countries and includes guidelines for mental, neurological and substance use disorders [93, 94]. An international Guideline Development Group (GDG) develops transparent recommendations using the GRADE process, taking into account the values and preferences of different countries [95]. Because this system works for so many countries, it should work even better to simply use a

common evidence base and then develop recommendations at the national level, taking into account, for example, different values and preferences and the resources of the respective health care system.

Improving quality and reducing duplication in health care could be achieved with evidence ecosystems, such as the digital evidence ecosystem MAGICapp, a platform for guideline development and publication according to the GRADE methodology [36]. It enables the creation of user-friendly digital guidelines with multiple layers, a continuous and rapid updating of guidelines (living guidelines), the creation of decision aids, thus facilitating shared decision making and minimizing the workload for guideline developers [67, 91].

It is important to adapt guidelines not only to national regularities but also to individual patients. Even in evidence-based medicine, clinical decisions should not be based solely on evidence as the values and preferences of the informed patient must also be taken into account [96, 97]. Furthermore, an essential end product of evidence-based medicine is not only the guidelines themselves, but also decision aids that help to understand the evidence and facilitate shared decision-making [83]. Only when patients have a complete understanding of the risks and benefits of an intervention, they can make a decision according to their preferences [96]. However, patient values and preferences may differ from those of the clinician or guideline panel [83, 96], and are increasingly reflected in guidelines through the increased use of the GRADE methodology [88]. Guidelines using GRADE may provide weak recommendations, indicating to healthcare professionals that discussion with patients and shared decision-making are particularly important [98, 99]. Nevertheless, guidelines that rely on population estimates cannot be applied in all circumstances to every patient and, for example, often neglect the clinical reality of multimorbidity [83, 100]. Therefore, decision aids fill this gap by focusing on individual values and preferences and encouraging shared decision making [101]. In clinical practice, decision aids are often outdated and unused [91, 99, 102], emphasizing the importance of linking them to regularly updated guidelines [101]. The evidence ecosystem MAGICapp

enables the creation of up-to-date decision aids, as these are automatically updated when the underlying evidence is updated. Furthermore, the decision aids are not intended to be used by patients on their own, but in a time-constrained clinical routine with the clinician, ensuring the nature of shared decision-making [91]. A study of real-life user testing of the MAGICapp decision aids among clinicians and patients indicates an overall positive sentiment towards the decision aids: They were deemed easy to understand, useful, helpful in conveying evidence, and supportive in encouraging discussion about topics of particular importance to the individual patient [102].

As medication non-adherence is common among patients living with schizophrenia, it is crucial to involve them in the decision-making process to develop an understanding of the need for interventions and, ultimately, increase compliance rates, at least among some patients. In the SISYPHOS project, we translated the schizophrenia guideline to MAGICapp and developed decision aids. Figure 21 below illustrates a MAGICapp decision aid taken from the German schizophrenia guideline on the relapse rate in patients with schizophrenia on maintenance therapy compared with dose reduction [103]. The 126 red figures depict the number of patients additionally experiencing relapse after dose reduction, as compared to maintenance therapy. It also shows that the certainty of the evidence is low according to GRADE, indicating that discussion between medical doctors and patients is particularly important.
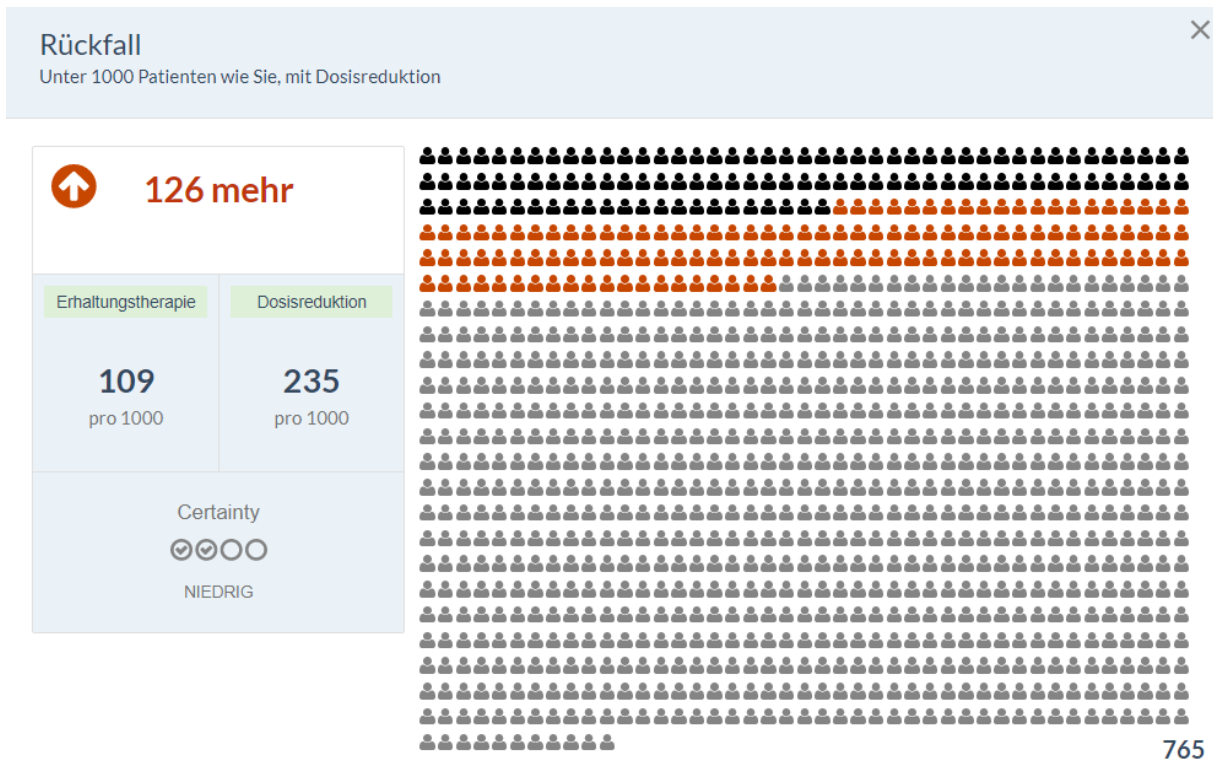
Figure 21. This figure shows a MAGICapp decision aid for the outcome relapse (3 months up to one year) for patients with schizophrenia. With dose reduction 235 patients out of 1000 experienced a relapse, whereas with maintenance therapy a relapse occurred in 109 patients out of 1000 [103]. The 126 red figures display the amount of patients additionally experiencing relapse with dose reduction compared to maintenance therapy.

The German guideline for schizophrenia will be transformed into a living guideline. By using the evidence ecosystem MAGICapp, problems with conventional guidelines will be overcome and a turnaround will be initiated: Towards improved implementation and presentation of guidelines, sharing of evidence-based knowledge, up-to-date and trustworthy guidelines and patient-centered care.

9 Abbreviations

GRADE	Grading of Recommendations Assessment, Development and Evaluation
MAGICapp	Making GRADE the irresistible choice
SISYPHOS	Structured implementation of digital, systematically updated guideline recommendations for enhanced therapeutic adherence in schizophrenia
WHO	World Health Organization
GIN	Guidelines International Network
mhGAP	Mental health Gap Action Programme
GDG	Guideline Development Group

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11 Appendix

11.1 Tables

11.1.1 Implementation status of the schizophrenia guideline and of four selected key recommendations

11.1.1.1 Group comparisons – professions

Appendix Table 1. *Subgroup analyses of mean response comparisons among professions regarding the implementation status of the schizophrenia guideline as well as of four key recommendations.*

| | Chi Square Test (*p*-values Bonferroni corrected) | | | | | | | | | | |
| | PSY [vs] PST | | PSY [vs] MED | | PSY [vs] CG | | PST [vs] MED | | PST [vs] CG | | MED [vs] CG | |
	X²	p	X²	p	X²	p	X²	p	X²	p	X²	p
Awareness												
Guideline for schizophrenia [Q13]	0.04	1.000	25.19	<0.001	1.95	0.978	23.98	<0.001	2.30	0.774	14.49	<0.001
Recommendation 1 [Q17]	3.55	0.354	37.52	<0.001	5.85	0.096	66.21	<0.001	17.49	<0.001	10.32	0.006
Recommendation 2 [Q21]	6.68	0.060	19.10	<0.001	0.35	1.000	54.85	<0.001	9.79	0.012	12.99	0.006
Recommendation 3 [Q25]	0.21	1.000	44.78	<0.001	5.64	0.108	30.75	<0.001	2.93	0.522	18.72	<0.001
Recommendation 4 [Q29]	19.25	<0.001	0.44	1.000	17.03	<0.001	23.78	<0.001	0.28	1.000	21.64	<0.001
Agreement												
Guideline for schizophrenia [Q14]	3.45	0.378	25.31	<0.001	0.52	1.000	43.30	<0.001	1.58	1.000	37.18	<0.001
Recommendation 1 [Q18]	10.58	0.006	7.32	0.042	1.49	1.000	46.72	<0.001	4.95	0.156	18.80	<0.001
Recommendation 2 [Q22]	20.15	<0.001	0.99	1.000	1.96	1.000	49.35	<0.001	11.12	0.006	7.90	0.030
Recommendation 3 [Q26]	0.10	1.000	22.47	<0.001	1.18	1.000	19.87	<0.001	1.63	1.000	12.76	0.006
Recommendation 4 [Q30]	20.05	<0.001	1.65	1.000	10.35	0.006	19.66	<0.001	2.28	0.786	7.70	0.036
Adoption												
Guideline for schizophrenia [Q15]	0.48	1.000	3.90	0.288	0.22	1.000	5.63	0.108	0.10	1.000	6.94	0.048
Recommendation 1 [Q19]	5.63	0.108	3.98	0.276	0.13	1.000	22.61	<0.001	4.41	0.216	6.32	0.072
Recommendation 2 [Q23]	5.42	0.120	14.07	0.001	0.12	1.000	40.86	<0.001	4.01	0.270	17.62	<0.001
Recommendation 3 [Q27]	2.91	0.528	11.18	0.006	0.12	1.000	20.73	<0.001	3.95	0.282	8.57	0.018
Recommendation 4 [Q31]	8.93	0.018	15.98	<0.001	12.19	0.006	0.06	1.000	0.06	1.000	0.004	1.000
Adherence												

Recommendation 1 [Q20]	1.07	1.000	0.01	1.000	1.76	1.000	1.58	1.000	0.00	1.000	2.94	0.516
Recommendation 2 [Q24]	4.80	0.174	3.25	0.426	0.08	1.000	13.92	0.001	3.92	0.288	4.57	0.198

Note. X^2 = Chi Square value. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. Total = all participants included; PSY = psychologists/psychotherapists; MED = medical doctors; PST = psychosocial therapists; CG = caregivers. Table from [15].

11.1.1.2 Group comparisons – age groups

Appendix Table 2. *Mean response comparisons among age groups regarding the implementation status of the schizophrenia guideline as well as of four key recommendations.*

	Young (20-34 years)		Middle-aged (35-49 years)		Older (50-66 years)		Chi Square Test		
	N	%Yes	N	%Yes	N	%Yes	X^2	df	p
Awareness									
Guideline for schizophrenia [Q13]	168	28.6%	146	41.1%	133	51.1%	16.09	2	<0.001
Recommendation 1 [Q17]	148	77.0%	136	74.3%	126	86.5%	6.47	2	0.039
Recommendation 2 [Q21]	141	78.7%	130	79.2%	120	85.8%	2.57	2	0.277
Recommendation 3 [Q25]	134	36.6%	125	44.0%	118	32.2%	3.71	2	0.157
Recommendation 4 [Q32]	133	75.2%	121	75.2%	117	76.9%	0.13	2	0.937
Agreement									
Guideline for schizophrenia [Q14]	168	29.2%	145	43.4%	133	56.4%	22.80	2	<0.001
Recommendation 1 [Q18]	148	88.5%	136	82.4%	126	87.3%	2.45	2	0.291
Recommendation 2 [Q22]	141	87.9%	130	84.6%	120	90.8%	2.25	2	0.325
Recommendation 3 [Q26]	134	38.1%	125	40.8%	118	28.8%	4.14	2	0.126
Recommendation 4 [Q30]	133	83.5%	121	81.0%	117	78.6%	0.95	2	0.622
Adoption									
Guideline for schizophrenia [Q15]	110	51.8%	98	62.2%	102	60.8%	2.78	2	0.250
Recommendation 1 [Q19]	148	74.3%	136	66.9%	126	69.0%	1.99	2	0.370
Recommendation 2 [Q23]	141	70.2%	130	73.1%	120	78.3%	2.24	2	0.327
Recommendation 3 [Q27]	134	37.3%	125	30.4%	117	29.9%	2.01	2	0.366
Recommendation 4 [Q31]	133	42.5%	121	52.1%	116	55.2%	2.45	2	0.288
Adherence									
Guideline for schizophrenia [Q16]	97	3.1%	99	13.1%	93	5.4%	8.05	2	0.018
Recommendation 1 [Q20]	117	22.2%	108	26.9%	102	22.5%	0.80	2	0.670
Recommendation 2 [Q24]	107	43.0%	101	44.6%	97	30.9%	4.60	2	0.100
Recommendation 3 [Q28]	74	8.1%	73	1.4%	71	4.2%	3.84	2	0.146
Recommendation 4 [Q32]	102	7.8%	92	8.7%	91	5.5%	0.74	2	0.691

Note. N = number of participants, *df* = degrees of freedom X^2 = Chi Square value. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. Recommendation 1 (dose of antipsychotics); Recommendation 2 (relapse prevention); Recommendation 3 (weight gain); Recommendation 4 (psychotherapy). For subgroup analyses see Appendix Table 3.

Appendix Table 3. *Subgroup comparisons between age groups: implementation status of the schizophrenia guideline as well as of four selected recommendations.*

	Chi Square Test *(p*-values Bonferroni corrected)*					
	Young (20 – 34 years) [vs] **Older (50 – 66 years)**		**Middle-aged (35 – 49 years)** [vs] **Older (50 – 66 years)**		**Young (20 – 34 years)** [vs] **Middle-aged (35 – 49 years)**	
	X^2	p	X^2	p	X^2	p
Awareness						
Guideline for schizophrenia [Q13]	15.95	0.003	2.82	0.279	5.43	0.060
Recommendation 1 [Q17]	4.04	0.132	6.16	0.039	0.29	1.76
Agreement						
Guideline for schizophrenia [Q14]	22.71	0.003	4.65	0.093	6.91	0.027
Adherence						
Guideline for schizophrenia [Q16]	0.61	1.000	3.39	0.195	6.59	0.030

Note. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). X^2 = Chi Square value. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2

11.1.2 Attitude towards the living guideline

11.1.2.1 Group comparisons – professions

Appendix Table 4. *Mean response comparisons between professions regarding the attitude towards the concept of a living guideline.*

	Total			PSY			MED			PST			CG			Kruskal-Wallis-Test		
	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	H	df	p
User-friendliness																		
I find the layout appealing and the content clearly presented. [Q33]	335	4.00	3.69 (0.83)	66	4.00	3.71 (0.86)	165	4.00	3.69 (0.89)	41	4.00	3.68 (0.69)	56	4.00	3.63 (0.70)	1.12	3	0.772
I can imagine getting along well with the Living Guideline. [Q34]	334	4.00	3.87 (0.75)	65	4.00	4.05 (0.67)	165	4.00	3.92 (0.78)	41	4.00	3.71 (0.68)	56	4.00	3.63 (0.73)	15.96	3	0.001
The Living Guideline seems clearer than the previous print version. [Q36]	335	4.00	3.61 (0.82)	66	3.50	3.62 (0.94)	165	4.00	3.76 (0.85)	41	3.00	3.29 (0.46)	56	3.00	3.36 (0.65)	21.11	3	<0.001
Clinical practicability/relevance																		
The Living Guideline seems to be more informative than the previous print version. [Q37]	334	3.00	3.40 (0.72)	65	3.00	3.48 (0.66)	165	3.00	3.44 (0.82)	41	3.00	3.20 (0.40)	56	3.00	3.34 (0.61)	6.77	3	0.079
The Living Guideline seems to be more practical than the previous print version. [Q38]	333	4.00	3.77 (0.80)	64	4.00	3.97 (0.82)	165	3.00	3.93 (0.81)	41	3.00	3.34 (0.62)	56	3.00	3.36 (0.62)	45.61	3	<0.001
I can imagine that a Living Guideline would be a valuable tool in my everyday clinical practice. [Q39]	333	4.00	3.98 (0.76)	64	4.00	4.20 (0.72)	165	3.00	4.05 (0.74)	41	4.00	3.63 (0.73)	56	4.00	3.79 (0.80)	19.94	3	<0.001
General attitude																		
The advantages of a Living Guideline over a print version are evident to me. [Q40]	333	4.00	3.92 (0.82)	64	4.00	4.03 (0.87)	165	4.00	4.01 (0.78)	41	4.00	3.68 (0.85)	56	4.00	3.70 (0.81)	13.78	3	0.003
I would prefer a Living Guideline to the previous print version. [Q41]	334	4.00	3.80 (0.89)	64	4.00	4.05 (0.80)	165	4.00	3.87 (0.89)	41	3.00	3.49 (0.93)	56	3.00	3.52 (0.87)	18.95	3	<0.001

Note. Print = guideline for schizophrenia in the print-format; *Living* = living guideline for schizophrenia. As no German living guideline for mental disorders existed at the time of the study, participants were asked to answer the questions based on the visual and written presentation of the concept of the living guidelines. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians; *KWT* = Kruskal-Wallis test; *H* = H-value; *df* = degrees of freedom. Number of question is displayed in square brackets. *Total* = all participants included; PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers. The complete questionnaire in shown below in the Appendix under 10.2. For subgroup analyses see Appendix Table 5.

Appendix Table 5. *Subgroup analyses of mean response comparisons between professions regarding the attitude towards the concept of a living guideline.*

	Subgroup analysis: Dunn-Bonferroni-Test (p-values Bonferroni corrected)											
	PSY [vs] PST		PSY[vs]MED		PSY [vs] CG		PST [vs] MED		PST [vs] CG		MED [vs] CG	
	Z	p	Z	p	Z	p	Z	p	Z	p	Z	p
User-friendliness												
I can imagine getting along well with the Living Guideline. [Q34]	2.41	0.097	0.82	1.000	3.33	0.005	2.06	0.237	0.53	1.000	3.15	0.010
The Living Guideline seems clearer than the previous print version. [Q36]	2.25	0.145	-1.37	1.000	1.86	0.381	3.71	0.001	0.54	1.000	3.47	0.003
Clinical Practicability/relevance												
The Living Guideline seems to be more practical than the previous print version. [Q38]	4.32	<0.001	0.11	1.000	4.39	<0.001	4.86	<0.001	0.29	1.000	5.09	<0.001
I can imagine that a Living Guideline would be a valuable tool in my everyday clinical practice. [Q39]	3.81	0.001	1.34	1.000	3.04	0.014	3.24	0.007	1.00	1.000	2.33	0.120
General attitude												
The advantages of a Living Guideline over a print version are evident to me. [Q40]	2.50	0.076	0.30	1.000	2.55	0.065	2.60	0.055	0.16	1.000	2.72	0.039
I would prefer a Living Guideline to the previous print version. [Q41]	3.29	0.006	1.11	1.000	3.30	0.006	2.83	0.028	0.27	1.000	2.84	0.027

Note. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Z = standard score. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers.

11.1.2.2 Group comparisons – age groups

Appendix Table 6. *Comparisons between age groups regarding the attitude towards the concept of a living guideline.*

	Young (20 – 34 years)			Middle-aged (35 – 49 years)			Older (50 – 66 years)			KWT		
	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	H	df	p
User-friendliness												
I find the layout appealing and the content clearly presented. [Q33]	124	4.00	3.83 (0.86)	108	4.00	3.69 (0.84)	103	4.00	3.52 (0.74)	9.53	2	<0.001
I can imagine getting along well with the Living Guideline. [Q34]	124	4.00	4.03 (0.78)	108	4.00	3.81 (0.76)	102	4.00	3.73 (0.68)	11.90	2	0.003
The Living Guideline seems clearer than the previous print version. [Q36]	124	4.00	3.81 (0.85)	108	3.00	3.54 (0.81)	103	3.00	3.43 (0.74)	10.20	2	0.006
Clinical practicability / relevance												
The Living Guideline seems to be more informative than the previous print version. [Q37]	124	4.00	3.61 (0.76)	108	3.00	3.33 (0.64)	103	3.00	3.23 (0.69)	14.17	2	0.001
The Living Guideline seems to be more practical than the previous print version. [Q38]	123	4.00	4.03 (0.87)	108	3.00	3.67 (0.70)	102	4.00	3.57 (0.75)	20.30	2	<0.001
I can imagine that a Living Guideline would be a valuable tool in my everyday clinical practice. [Q39]	123	4.00	4.19 (0.80)	108	4.00	4.00 (0.76)	102	4.00	3.73 (0.63)	26.72	2	<0.001
General attitude												
The advantages of a Living Guideline over a print version are evident to me. [Q40]	123	4.00	4.12 (0.83)	108	4.00	3.90 (0.84)	102	4.00	3.72 (0.75)	16.40	2	<0.001
I would prefer a Living Guideline to the previous print version. [Q41]	123	4.00	4.04 (0.86)	108	4.00	3.80 (0.88)	103	4.00	3.52 (0.85)	18.77	2	<0.001
Mean – positive attitude Living Guideline*												
	123	4.00	3.96 (0.60)	108	3.75	3.72 (0.54)	102	3.63	3.56 (0.51)	25.54	2	<0.001

Note. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians; *KWT* = Kruskal-Wallis test; *H* = H-value; *df* = degrees of freedom. Number of question is displayed in square brackets. *The variable represents the mean agreement rate of the above displayed items. The complete questionnaire appears below in the Appendix under 10.2. For subgroup analyses see Appendix Table 7. Table from [15].

Appendix Table 7. *Subgroup comparisons between age groups: Attitude towards the living guideline for schizophrenia.*

	Subgroup analyses: Dunn-Bonferroni-Test (p-values Bonferroni corrected)					
	Young (20 – 34 years) [vs] Older (50 – 66 years)		Middle-aged (35 – 49 years) [vs] Older (50 – 66 years)		Young (20 – 34 years) [vs] Middle-aged (35 – 49 years)	
	Z	**p**	**Z**	**p**	**Z**	**p**
User-friendliness						
I find the layout appealing and the content clearly presented. [Q33]	3.09	0.006	1.64	0.302	1.41	0.476
I can imagine getting along well with the Living Guideline. [Q34]	3.36	0.001	1.11	0.800	2.25	0.074
The Living Guideline seems clearer than the previous print version. [Q36]	2.98	0.003	0.60	1.000	2.39	0.051
Clinical practicability / relevance						
The Living Guideline seems to be more informative than the previous print version. [Q37]	3.50	0.001	0.67	1.000	2.85	0.013
The Living Guideline seems to be more practical than the previous print version. [Q38]	4.12	<0.001	0.64	1.000	3.51	0.001
I can imagine that a Living Guideline would be a valuable tool in my everyday clinical practice. [Q39]	5.16	<0.001	3.03	0.007	2.06	0.118
General attitude						
The advantages of a Living Guideline over a print version are evident to me. [Q40]	4.04	<0.001	1.84	0.195	2.17	0.091
I would prefer a Living Guideline to the previous print version. [Q41]	4.33	<0.001	2.16	0.093	2.13	0.099
Mean – positive attitude Living Guideline*						
	4.93	<0.001	1.66	0.291	3.27	0.003

Note. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Z = standard score. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. *The variable represents the mean agreement rate of the above displayed items. Table from [15].

11.1.3 Barriers and facilitators

11.1.3.1 Group comparisons – print versus living

Appendix Table 8. *Barriers regarding guideline adherence for the print and living guideline for schizophrenia.*

		% Yes	Mdn	M	SD	Wilcoxon test Z	p
Knowledge-related barriers							
Lack of awareness[a] [Q42] (*n* = 326)	**Print**	11.7%	2.00	1.96	1.15	12.66	<0.001
	Living	63.5%	4.00	3.67	1.20		
Lack of experience[a] [Q43] (*n* = 326)	**Print**	23.9%	2.00	2.49	1.25	12.91	<0.001
	Living	80.4%	4.00	4.23	0.82		
Lack of competence [Q45] (*n* = 324)	**Print**	3.1%	2.00	1.85	0.81	3.36	<0.001
	Living	5.9%	2.00	1.96	0.88		
Lack of knowledge about access [Q52] (*n* = 320)	**Print**	19.7%	2.00	2.28	1.12	11.15	<0.001
	Living	64.1%	4.00	3.64	1.03		
Lack of trainings [Q46] (*n* = 324)	**Print**	52.5%	4.00	3.43	1.05	2.28	0.023
	Living	54.0%	4.00	3.52	1.07		
Mean – Knowledge-related barriers[b] (*n* = 320)	**Print**	22.2%	2.20	2.40	0.76	-13.76	<0.001
	Living	53.6%	3.40	3.41	0.53		
Attitude-related barriers							
Lack of motivation [Q48] (*n* = 323)	**Print**	27.2%	2.00	2.67	1.07	-5.56	<0.001
	Living	14.9%	2.00	2.40	0.97		
Lack of confidence [Q44] (*n* = 324)	**Print**	3.4%	2.00	1.89	0.80	-1.05	0.296
	Living	2.8%	2.00	1.82	0.77		
Lack of benefits for clinical work [Q47] (*n* = 323)	**Print**	6.5%	2.00	2.25	0.81	-5.12	<0.001
	Living	4.0%	2.00	2.06	0.77		
Limitation of therapeutical freedom [Q49] (*n* = 323)	**Print**	4.6%	2.00	2.02	0.82	-2.32	0.020
	Living	3.7%	2.00	1.98	0.80		
Mean – Attitude-related barriers[b] (*n* = 323)	**Print**	10.4%	2.25	2.20	0.57	-6.09	<0.001
	Living	6.4%	2.00	2.06	0.59		
External barriers							
Confusing layout / structure [Q50] (*n* = 320)	**Print**	34.1%	3.00	3.13	0.83	-3.64	<0.001
	Living	31.9%	3.00	2.89	0.98		
Too long / complex [Q51] (*n* = 320)	**Print**	48.4%	3.00	3.44	0.90	-10.45	<0.001
	Living	7.8%	3.00	2.71	0.68		
Lack of clinical testing [Q53] (*n* = 320)	**Print**	20.9%	3.00	2.66	0.97	6.05	<0.001
	Living	24.1%	3.00	3.02	0.84		
Lack of time ressources [Q54] (*n* = 320)	**Print**	62.8%	4.00	3.58	0.94	-7.26	<0.001
	Living	39.1%	3.00	3.23	0.90		
Rejection by patients [Q55] (*n* = 320)	**Print**	8.8%	3.00	2.51	0.84	0.42	0.674
	Living	5.6%	3.00	2.52	0.79		
Mean – External barriers[b] (*n* = 320)	**Print**	35.0%	3.00	3.07	0.47	-6.45	<0.001
	Living	21.7%	2.80	2.88	0.46		

Note. Print = guideline for schizophrenia in the print format; *Living* = living guideline for schizophrenia (visualized with screenshots and based on written description, as no living guideline for mental disorders existed at the time of the study). Agreement on barriers was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). *% Yes* represents the percentage of participants, who *agreed* or *strongly agreed* to the statement. *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians; *Z* = standard score. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. [a]The items referred to any living guideline (e.g., somatic living guidelines). [b]The variables represent the mean agreement rate on items of the corresponding categories of the "Knowledge-Attitude-Behavior Framework". Table from [2].

Appendix Table 9. *Facilitating factors regarding guideline adherence for the print and living guideline for schizophrenia.*

		% Yes	Mdn	M	SD	Wilcoxon test Z	p
Knowledge-related facilitating factors							
Firm implementation of guidelines in the curriculum [Q61] ($n = 310$)	**Print**	82.9%	4.00	4.12	0.73	1.93	0.054
	Living	84.5%	4.00	4.15	0.71		
Notifications in case of updates [Q68] ($n = 309$)	**Print**	83.2%	4.00	4.15	0.77	3.07	0.002
	Living	85.1%	4.00	4.21	0.75		
Trainings for professionals [Q56] ($n = 314$)	**Print**	51.3%	4.00	3.34	1.05	7.51	<0.001
	Living	69.7%	4.00	3.69	0.99		
Mean – Kowledge-related facilitators* ($n = 309$)	**Print**	72.5%	4.00	3.87	0.56	-7.32	<0.001
	Living	79.8%	4.00	4.02	0.58		
Attitude-related facilitating factors							
Increased consideration of clinical conditions [Q62] ($n = 310$)	**Print**	74.2%	4.00	3.98	0.77	2.76	0.006
	Living	77.7%	4.00	4.05	0.75		
Involvement of clinicians in guideline Development [Q60] ($n = 310$)	**Print**	50.3%	4.00	3.52	0.81	1.95	0.051
	Living	52.9%	4.00	3.56	0.80		
Promotion of guideline benefits (e.g., advertisement) [Q69] ($n = 309$)	**Print**	55.3%	4.00	3.58	0.92	3.00	0.003
	Living	58.6%	4.00	3.63	0.91		
Mean – Attitude-related facilitators* ($n = 309$)	**Print**	63.1%	3.67	3.69	0.56	-3.81	<0.001
	Living	59.9%	3.67	3.75	0.57		
External facilitating factors							
Feedback from patients (e.g., on drug tolerability) [Q57] ($n = 314$)	**Print**	71.7%	4.00	3.85	0.82	3.32	<0.001
	Living	76.4%	4.00	3.93	0.77		
Trainings for patients and relatives [Q58] ($n = 314$)	**Print**	61.1%	4.00	3.69	0.88	31.63	0.018
	Living	65.0%	4.00	3.73	0.87		
Possiblity to use the guideline for shared-decision-making [Q59] ($n = 310$)	**Print**	60.3%	4.00	3.66	0.85	5.48	<0.001
	Living	70.3%	4.00	3.86	0.79		
Quality management [Q63] ($n = 309$)	**Print**	31.0%	3.00	3.17	0.87	2.77	0.006
	Living	33.5%	3.00	3.22	0.90		
Provision of electronic devices (tablets, smartphones) [Q64] ($n = 309$)	**Print**	61.6%	4.00	3.72	1.05	6.23	<0.001
	Living	73.9%	4.00	3.98	0.94		
Simpler language [Q65] ($n = 309$)	**Print**	39.2%	3.00	3.18	1.02	-1.48	0.139
	Living	36.6%	3.00	3.15	1.00		
Short and concise versions with essential treatment recommendations [Q66] ($n = 309$)	**Print**	69.9%	4.00	3.87	1.00	0.87	0.387
	Living	71.8%	4.00	3.90	0.99		
Treatment checklists [Q67] ($n = 309$)	**Print**	88.3%	4.00	4.30	0.75	1.19	0.234
	Living	89.6%	4.00	4.32	0.72		
Tailored guideline versions (profession, specification) [Q70] ($n = 309$)	**Print**	64.4%	4.00	3.76	0.97	3.22	0.001
	Living	67.3%	4.00	3.81	0.96		

Mean – External facilitators*	**Print**	60.8%	3.78	3.69	0.49	-6.31	<0.001
(n = 309)	**Living**	64.9%	3.78	3.77	0.49		

Note. Print = guideline for schizophrenia in the print format; *Living* = living guideline for schizophrenia (visualized with screenshots and based on written description, as no living guideline for mental disorders existed at the time of the study). Agreement on barriers was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). *% Yes* represents the percentage of participants, who *agreed* or *strongly agreed* to the statement. *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians; *Z* = standard score. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. *The variables represent the mean agreement rate on items of the corresponding categories "Knowledge-Attitude-Behavior Framework". Table from [2].

11.1.3.2 Group comparisons – professions

Appendix Table 10. *Mean response comparisons between professions regarding the barriers and facilitators to guideline adherence for both formats print and living of the guideline for schizophrenia.*

	Total			PSY			MED			PST			CG			Kruskal-Wallis-Test		
	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	H	df	p
Barriers																		
Knowledge-related [Q42, Q43, Q45, Q52, Q46]																		
Print	329	2.40	2.41 (0.75)	63	2.20	2.31 (0.69)	163	2.00	2.10 (0.61)	39	3.20	3.14 (0.60)	54	3.00	2.94 (0.70)	87.43	3	<0.001
Living	329	3.40	2.41 (0.75)	63	3.40	3.46 (0.49)	163	3.40	3.36 (0.54)	39	3.50	3.55 (0.51)	54	3.60	3.43 (0.60)	3.86	3	0.227
Attitude-related [Q44, Q47, Q48, Q49]																		
Print	327	2.25	2.21 (0.59)	63	2.00	2.14 (0.49)	163	2.00	2.11 (0.55)	38	2.50	2.53 (0.63)	53	2.25	2.37 (0.53)	19.18	3	<0.001
Living	327	2.00	2.08 (0.62)	63	2.00	1.92 (0.55)	163	2.00	1.96 (0.58)	38	2.25	2.36 (0.61)	53	2.25	2.38 (0.57)	31.78	3	<0.001
External [Q50, Q51, Q53, Q54, Q55]																		
Print	323	3.00	3.07 (0.47)	63	3.00	3.06 (0.54)	162	3.00	3.06 (0.48)	36	3.00	3.12 (0.40)	52	3.00	3.09 (0.40)	0.27	3	0.965
Living	323	2.80	2.88 (0.46)	63	2.80	2.87 (0.44)	162	2.80	2.81 (0.48)	36	3.00	2.91 (0.42)	52	3.00	3.08 (0.41)	13.50	3	0.004
Facilitating factors																		
Knowledge-related [Q56, Q61, Q68]																		
Print	316	4.00	3.86 (0.58)	62	3.67	3.82 (0.58)	161	4.00	3.88 (0.55)	35	4.00	3.92 (0.61)	49	4.00	3.86 (0.62)	1.73	3	0.631
Living	316	4.00	4.00 (0.60)	62	4.00	4.00 (0.58)	161	4.00	4.06 (0.57)	35	4.00	3.97 (0.62)	49	4.00	3.94 (0.63)	2.66	3	0.447
Attitude-related [Q60, Q62, Q69]																		
Print	312	3.67	3.69 (0.56)	61	3.67	3.67 (0.58)	160	3.67	3.70 (0.56)	35	3.67	3.69 (0.58)	48	3.67	3.74 (0.50)	0.47	3	0.926
Living	312	3.67	3.75 (0.57)	61	3.67	3.75 (0.60)	160	3.67	3.77 (0.58)	35	3.67	3.71 (0.57)	48	3.67	3.75 (0.51)	0.51	3	0.917

External [Q57, Q58, Q59, Q63, Q64, Q65, Q66, Q67, Q70]

	N	M	Mdn (SD)	N	M	Mdn (SD)	N	M	Mdn (SD)	N	M	Mdn (SD)	N	M	Mdn (SD)	H	df	p
Print	316	3.72	3.69 (0.50)	62	3.67	3.67 (0.52)	161	3.67	3.65 (0.52)	35	3.78	3.74 (0.44)	49	3.89	3.79 (0.39)	4.27	3	0.234
Living	316	3.78	3.77 (0.49)	62	3.78	3.78 (0.50)	161	3.78	3.75 (0.51)	35	3.78	3.77 (0.45)	49	3.89	3.84 (0.43)	1.383	3	0.709

Note. Print = guideline for schizophrenia in the pdf-format*; Living* = living guideline for schizophrenia (visualized with screenshots and based on written description, as no living guideline for mental disorders existed at the time of the study). Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). *N* = number of participants, *M* = means, *SD* = standard deviations, *Mdn* = medians, *KWT* = Kruskal-Wallis test, *H* = H-value, *df* = degrees of freedom. Number of question is displayed in square brackets. Total = all participants included, PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers. The complete questionnaire appears below in the Appendix under 10.2. For subgroup analyses see Appendix Table 11. Table from [2].

Appendix Table 11. *Subgroup analyses of mean response comparisons between professions regarding barriers and facilitators to guideline adherence.*

	Subgroup analysis: Dunn-Bonferroni-Test (p-values Bonferroni corrected)											
	PSY [vs] PST		**PSY [vs] MED**		**PSY [vs] CG**		**PST [vs] MED**		**PST [vs] CG**		**MED [vs] CG**	
	Z	**p**	**Z**	**p**	**Z**	**p**	**Z**	**p**	**Z**	**p**	**Z**	**p**
Barriers												
Knowledge-related [Q42, Q43, Q45, Q52, Q46]												
Print	-5.13	<0.001	2.03	0.256	-4.36	<0.001	-7.45	<0.001	-1.17	1.000	-7.02	<0.001
Attitude-related [Q44, Q47, Q48, Q49]												
Print	-2.99	0.002	0.26	1.000	-2.28	0.134	-3.61	0.002	-0.91	1.000	-2.93	0.020
Living	-3.41	0.004	-0.53	1.000	-4.22	<0.001	-3.46	0.003	0.37	1.000	-4.49	<0.001
External [Q50, Q51, Q53, Q54, Q55]												
Living	-0.25	1.000	0.83	1.000	-2.46	0.083	-0.96	1.000	1.88	0.359	-3.67	0.001

Note. Agreement was assessed by a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). *Z* = standard score. Numbers of questions are displayed in square brackets. The complete questionnaire is shown in the Appendix below under 10.2. PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers. Table from [2].

Appendix Table 12. *Barriers in guideline utilization for the print and living format of the guideline for schizophrenia across different professions.*

		PSY		Med		PST		CG	
		N	% Yes	N	% Yes	N	% Yes	N	% Yes
Knowledge-related barriers									
Lack of awareness[a] * [Q42]	**Print**	63	7.9%	163	4.2%	39	38.5%	54	18.5%
	Living	63	74.6%	163	59.5%	39	71.8%	54	38.9%
Lack of experience[a] * [Q43]	**Print**	63	30.2%	163	8.0%	39	66.7%	54	35.2%
	Living	63	85.7%	163	85.3%	39	76.9%	54	64.8%
Lack of competence* [Q45]	**Print**	63	0%	163	0.6%	38	13.2%	53	7.5%
	Living	63	1.6%	163	4.3%	38	13.1%	53	11.3%
Lack of knowledge about access* [Q52]	**Print**	63	15.9%	162	12.3%	36	41.7%	52	32.7%
	Living	63	71.4%	162	63.0%	36	66.73%	52	50.0%
Lack of trainings [Q46]	**Print**	63	54.0%	163	52.1%	38	47.4%	53	58.5%
	Living	63	60.3%	163	54.6%	38	39.5%	53	56.6%
Attitude-related barriers									
Lack of motivation [Q48]	**Print**	63	34.9%	163	28.8%	37	10.8%	53	20.8%
	Living	63	12.7%	163	15.3%	37	5.4%	53	22.6%
Lack of confidence* [Q44]	**Print**	63	3.2%	163	1.2%	38	13.1%	53	3.8%
	Living	63	0%	163	1.2%	38	10.5%	53	5.7%
Lack of benefits for clinical work* [Q47]	**Print**	63	9.5%	163	6.1%	37	13.5%	53	0%
	Living	63	3.1%	163	3.7%	37	10.8%	53	1.9%
Limitation of therapeutical freedom [Q49]	**Print**	63	1.6%	163	4.9%	37	5.4%	53	5.7%
	Living	63	3.2%	163	3.1%	37	5.4%	53	3.8%
External barriers									
Confusing layout / structure [Q50]	**Print**	63	33.3%	162	39.5%	36	25.0%	52	26.9%
	Living	63	30.2%	162	29.0%	36	36.1%	52	38.5%
Too long / complex [Q51]	**Print**	63	49.2%	162	63.0%	36	27.8%	52	19.2%
	Living	63	7.9%	162	8.6%	36	8.3%	52	5.8%
Lack of clinical testing [Q53]	**Print**	63	17.5%	162	21.6%	36	8.3%	52	28.8%
	Living	63	22.2%	162	25.3%	36	11.1%	52	30.8%
Lack of time resources [Q54]	**Print**	63	69.8%	162	67.3%	36	50.0%	52	53.8%
	Living	63	54.0%	162	29.6%	36	38.9%	52	53.8%
Rejection by patients [Q55]	**Print**	63	7.9%	162	7.4%	36	5.6%	52	13.5%
	Living	63	4.7%	162	4.3%	36	2.8%	52	11.5%

Note. Print = guideline for schizophrenia in the print format; *Living* = living guideline for schizophrenia. *% Yes* represents the percentage of participants, who *agreed* or *strongly agreed* to the statement. *N* = number of participants. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. [a]The items referred to any living guideline (e.g., somatic living guidelines). PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers. Questions with * were inverted for the analysis on barriers. Table from [2].

11.1.3.3 Group comparisons – years of professional experience

Appendix Table 13. *Comparisons between groups with varying years of work experience: Barriers and facilitating factors in guideline utilization for the print and living format of the guideline for schizophrenia.*

	Working experience 0-14 years			Working experience 15-29 years			Working experience 30-45 years			KWT		
	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	H	df	p
Barriers												
Knowledge-related [Q42, Q43, Q45, Q52, Q46]												
Print	198	2.20	2.38 (0.75)	98	2.40	2.45 (0.78)	30	2.40	2.46 (0.74)	0.83	2	0.660
Living	198	3.40	3.39 (0.50)	98	3.40	3.45 (0.58)	30	3.20	3.35 (0.63)	1.32	2	0.516
Attitude-related [Q44, Q47, Q48, Q49]												
Print	198	2.25	2.19 (0.58)	96	2.25	2.25 (0.65)	30	2.13	2.15 (0.47)	0.38	2	0.827
Living	198	2.00	1.99 (0.60)	96	2.00	2.22 (0.64)	30	2.00	2.17 (0.51)	7.72	2	0.021
External [Q50, Q51, Q53, Q54, Q55]												
Print	197	3.00	3.07 (0.46)	95	3.00	3.05 (0.53)	28	3.00	3.07 (0.40)	0.203	2	0.903
Living	197	2.80	2.84 (0.48)	95	3.00	2.93 (0.46)	28	2.80	2.92 (0.36)	1.51	2	0.471
Facilitating factors												
Knowledge-related [Q56, Q61, Q68]												
Print	193	4.00	3.92 (0.58)	94	3.67	3.76 (0.60)	27	4.00	3.81 (0.47)	4.81	2	0.090
Living	193	4.00	4.08 (0.58)	94	4.00	3.85 (0.63)	27	4.00	3.96 (0.54)	8.98	2	0.011
Attitude-related [Q60, Q62, Q69]												
Print	190	3.67	3.76 (0.60)	93	3.67	3.56 (0.52)	27	3.67	3.65 (0.39)	7.97	2	0.019
Living	190	3.67	3.84 (0.59)	93	3.67	3.58 (0.54)	27	3.67	3.68 (0.42)	12.73	2	0.002
External [Q57, Q58, Q59, Q63, Q64, Q65, Q66, Q67, Q70]												
Print	193	3.78	3.76 (0.47)	94	3.61	3.55 (0.55)	27	3.67	3.66 (0.35)	8.86	2	0.012
Living	193	3.89	3.86 (0.44)	94	3.67	3.59 (0.56)	27	3.78	3.77 (0.38)	16.83	2	<0.001

Note. *Print* = guideline for schizophrenia in the pdf-format; *Living* = living guideline for schizophrenia. As no German living guideline for mental disorders existed at the time of the study, participants were asked to answer the questions based on the visual and written description / presentation of the concept of living guidelines. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians; *KWT* = Kruskal-Wallis test; *H* = H-value; *df* = degrees of freedom. Number of question is displayed in square brackets. The complete questionnaire appears below in the Appendix under 10.2. For subgroup analyses see Appendix Table 14.

Appendix Table 14. *Comparisons of subgroups with varying years of work experience: Barriers and facilitating factors in guideline utilization for the print and living format of the schizophrenia guideline.*

	Subgroup analyses: Dunn-Bonferroni-Test (*p* -values Bonferroni corrected)						
	Working experience 0-14 years [vs] **Working experience 30-45 years**			**Working experience 15-29 years** [vs] **Working experience 30-45 years**		**Working experience 0-14 years** [vs] **Working experience 15-29 years**	
	Z	**p**		**Z**	**p**	**Z**	**p**
Barriers							
Attitude-related [Q44, Q47, Q48, Q49]							
Living	-1.49	0.406		0.15	1.000	-2.60	0.028
Facilitating factors							
Knowledge-related [Q56, Q61, Q68]							
Living	1.07	0.852		-0.70	1.000	2.96	0.009
Attitude-related [Q60, Q62, Q69]							
Print	0.88	1.000		-0.80	1.000	2.81	0.015
Living	1.36	0.520		-0.75	1.000	3.51	0.001
External [Q57, Q58, Q59, Q63, Q64, Q65, Q66, Q67, Q70]							
Print	1.19	0.708		-0.56	1.000	2.91	0.011
Living	1.23	0.657		-1.19	0.697	4.08	<0.001

Note. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Z = standard score. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2.

11.1.3.4 Group comparisons – workplace: inpatient and outpatient setting

Appendix Table 15. *Group comparisons between inpatient and outpatient setting: Barriers and facilitating factors in guideline utilization for the print and living format.*

	Inpatient setting				**Outpatient setting**				**Mann-Whitney U-test**		
	N	Mdn	M	SD	N	Mdn	M	SD	U	Z	p
Barriers											
Knowledge-related [Q42, Q43, Q45, Q52, Q46]											
Print	297	2.40	2.43	0.75	20	2.20	2.20	0.78	2408.50	-1.42	0.156
Living	297	3.40	3.42	0.54	20	3.30	3.35	0.42	2667.00	-0.77	0.442
Attitude-related[Q44, Q47, Q48, Q49]											
Print	295	2.25	2.22	0.60	20	2.12	2.08	0.54	2585.50	-0.93	0.350
Living	295	2.00	2.09	0.62	20	2.00	1.97	0.54	2666.00	-0.73	0.467
External [Q50, Q51, Q53, Q54, Q55]											
Print	291	3.00	3.06	0.47	20	3.20	3.17	0.40	2410.00	-1.23	0.194
Living	291	2.80	2.89	0.46	20	3.17	2.79	0.38	2537.50	-0.97	0.333
Facilitating factors											
Knowledge-related [Q56, Q61, Q68]											
Print	285	4.00	3.86	0.58	20	3.83	3.82	0.60	2748.50	-0.27	0.787
Living	285	4.00	4.00	0.61	20	4.00	3.98	0.58	2812.00	-0.10	0.919
Attitude-related[Q60, Q62, Q69]											
Print	281	3.67	3.69	0.57	20	3.67	3.67	0.61	2677.50	-0.36	0.720
Living	281	3.67	3.75	0.57	20	3.67	3.77	0.66	2785.50	-0.07	0.947
External [Q57, Q58, Q59, Q63, Q64, Q65, Q66, Q67, Q70]											
Print	285	3.67	3.68	0.50	20	3.67	3.76	0.40	2725.00	-0.33	0.524
Living	285	3.78	3.76	0.50	20	3.78	3.66	0.39	2608.00	-0.64	0.724

Note. Print = guideline for schizophrenia in the print-/pdf-format; *Living* = living guideline for schizophrenia. Agreement was assessed by a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians; *Z* = standard score. Number of questions are displayed in square brackets. The complete questionnaire appears below in the Appendix under 10.2.

11.1.4 Preferences in the use of a living guideline

Appendix Table 16. *Descriptive characteristics of participants' preferences using the living guideline.*

	N	%Yes	Mdn	M (SD)
Length of update period of living guidelines				
The recommendation of the Living Guideline should ideally be updated at the following intervals [Q71]				
A1: Quarterly	27	8.8%		
A2: Semiannually	92	30.0%		
A3: Annually	180	58.6%		
A4: Less frequently than once a year	8	2.6%		
Total	307		3.00	2.55 (0.69)
How would you rate the maximum update period of 12 months for Living Guidelines? [Q74]				
A1: Much too short	2	0.7%		
A2: Too short	11	3.6%		
A3: Appropriate	238	77.5%		
A4: Too long	52	16.9%		
A5: Much too long	4	1.3%		
Total	307		3.00	3.15 (0.51)
Notifications				
The Living Guideline should inform me about new and relevant research results at regular intervals (push notification e.g. to my smartphone, email notification. [Q72]*	307	73%	4.00	3.86 (0.93)
If there were notifications about new and relevant research findings: What would be an appropriate time interval for you? [Q73]				
A1: Immediately when guideline content is updated	116	37.8%		
A2: Quarterly	55	17.9%		
A3: Semiannually	98	31.9%		
A4: Quarterly	17	5.5%		
A5: Less frequently than once a year	13	4.2%		
A6: I do not wish to receive notification	8	2.6%		
Total	307		2.00	2.28 (1.28)
Impact of an annual update on healthcare professionals				
An annual update of recommendations or references to new research findings would put pressure on me to constantly adjust my treatment. [Q75]*	307	7.9%	2.00	2.15 (0.85)
An annual update of recommendations or reference to new research would be a relief as I could be sure not to overlook what is "state of the art." [Q76]*	307	73.6%	4.00	3.90 (0.83)
Use of digital tools				
How often do you use digital tools / apps in your everyday clinical practice (e.g., to look up medication dosages)? [Q79]				
A1: Never	49	16.0%		
A2: Seldom	66	21.5%		
A3: Occasionally	80	26.1%		

A4: Often	92	30.0%		
A5: Always	20	6.5%		
Total	307		3.00	2.90 (1.19)

<table>
<tr><td colspan="5">Formats/resources used to learn about treatment options/evidence-based treatments</td></tr>
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Which resource do you use most likely to learn about appropriate treatment options? [Q78]				
A1: Guidelines	46	15.0%		
A2: Professional literature (e.g., textbooks)	104	33.9%		
A3: Scientific journals (e.g., Ärzteblatt)	43	14.0%		
A4: Further education / congresses	71	23.1%		
A5: Exchange with colleagues	43	14.0%		
Total	307		3.00	2.90 (1.19)
I prefer to use other formats / resources than guidelines to learn about evidence-based treatments (e.g. textbooks). [Q77]*	307	16.9%	3.00	2.82 (0.79)

Note. *N* = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. Table adapted from [2].

11.1.4.1 Group comparisons – professions

Appendix Table 17. *Group comparisons between professions regarding preferences using the living guideline.*

	Total			PSY			MED			PST			CG			Test-statistics Kruskal-Wallis-Test		
	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	N	Mdn	M (SD)	H	df	p
Length of update period of living guideline																		
The recommendation of the Living Guideline should ideally be updated at the following intervals [Q71]																		
	309	3.00	2.56 (0.70)	62	3.00	2.58 (0.56)	158	3.00	2.57 (0.69)	35	3.00	2.49 (0.82)	48	3.00	2.52 (0.74)	0.61	3	0.895
How would you rate the maximum update period of 12 months for Living Guidelines? [Q74]																		
	309	3.00	3.15 (0.51)	62	3.00	3.06 (0.48)	158	3.00	3.19 (0.44)	35	3.00	2.17 (0.66)	48	3.00	3.08 (0.65)	3.48	3	0.323
Notifications																		
The Living Guideline should inform me about new and relevant research results at regular intervals (push notification e.g. to my smartphone, email notification. [Q72]*																		
	309	4.00	3.87 (0.93)	62	4.00	3.77 (0.97)	158	4.00	4.01 (0.90)	35	4.00	3.54 (1.04)	48	4.00	3.79 (0.80)	9.96	3	0.019
If there were notifications about new and relevant research findings: What would be an appropriate time interval for you? [Q73]																		
	309	2.00	2.30 (1.29)	62	3.00	2.48 (1.30)	158	2.00	2.14 (1.18)	35	2.00	2.40 (1.59)	48	2.00	2.50 (1.35)	4.35	3	0.226
Impact of an annual update on healthcare professionals																		
An annual update of recommendations or references to new research findings would put pressure on me to constantly adjust my treatment. [Q75]*																		
	309	2.00	2.16 (0.85)	62	2.00	1.95 (0.76)	158	2.00	2.00 (0.81)	35	2.00	2.40 (0.85)	48	3.00	2.73 (0.84)	36.36	3	<0.001
An annual update of recommendations or reference to new research would be a relief as I could be sure not to overlook what is "state of the art." [Q76]*																		
	309	4.00	3.89 (0.83)	62	4.00	4.13 (0.70)	158	4.00	4.03 (0.81)	35	3.00	3.43 (0.92)	48	4.00	3.54 (0.74)	29.33	3	<0.001
Use of digital tools																		
How often do you use digital tools / apps in your everyday clinical practice (e.g., to look up medication dosages)? [Q79]																		
	309	3.00	2.89 (1.19)	62	2.00	2.02 (0.97)	158	4.00	3.38 (1.09)	35	2.00	2.29 (1.10)	48	3.00	2.90 (1.02)	70.46	3	<0.001
Formats/ressources used to learn about treatment options																		
I prefer to use other formats / resources than guidelines to learn about evidence-based treatments (e.g. textbooks). [Q77]*																		

| 309 | 3.00 | 2.82 (0.78) | 62 | 3.00 | 3.03 (0.92) | 158 | 3.00 | 2.73 (0.79) | 35 | 3.00 | 2.77 (0.69) | 48 | 3.00 | 2.92 (0.58) | 5.68 | 3 | 0.128 |

Note. N = number of participants; *M* = means; *SD* = standard deviations; *Mdn* = medians; KWT = Kruskal-Wallis test; *df* = degrees of freedom. Numbers of questions are displayed in square brackets. *Total* = all participants included, PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers. The complete questionnaire is shown below in the Appendix under 10.2. For subgroup analysis, see Appendix Table 18.

Appendix Table 18. *Subgroup analyses of mean response comparisons between professions regarding preferences using the living guideline.*

	Subgroup analysis: Dunn-Bonferroni-Test (p-values Bonferroni corrected)										
PSY [vs] PST		PSY [vs] MED		PSY [vs] CG		PST [vs] MED		PST [vs] CG		MED [vs] CG	
Z	p	Z	p	Z	p	Z	p	Z	p	Z	p

Notifications

The Living Guideline should inform me about new and relevant research results at regular intervals (push notification e.g. to my smartphone, email notification. [Q72]*

Z	p	Z	p	Z	p	Z	p	Z	p	Z	p
21.11	1.000	-19.79	0.620	6.64	1.000	49.91	0.042	14.47	1.000	26.43	0.288

Impact of an annual update on healthcare professionals

An annual update of recommendations or references to new research findings would put pressure on me to constantly adjust my treatment. [Q75]*

Z	p	Z	p	Z	p	Z	p	Z	p	Z	p
-44.34	0.053	-3.46	1.000	-75.03	<0.001	-40.88	0.038	30.69	0.510	-71.57	<0.001

An annual update of recommendations or reference to new research would be a relieve as I could be sure not to overlook what is "state of the art." [Q76]*

Z	p	Z	p	Z	p	Z	p	Z	p	Z	p
62.79	0.001	5.64	1.000	58.14	0.001	57.15	0.001	4.65	1.000	52.51	<0.001

Use of digital tools

How often do you use digital tools / apps in your everyday clinical practice (e.g., to look up medication dosages)? [Q79]

Z	p	Z	p	Z	p	Z	p	Z	p	Z	p
-19.00	1.000	98.15	<0.001	-62.04	0.001	79.15	<0.001	43.03	0.136	36.11	0.060

Note. Z = standard score. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers.

11.1.4.2 Group comparisons – age groups

Appendix Table 19. *Group comparisons between age groups: Preferences using the living guideline.*

										KWT		
	Young (20 – 34 years)			**Middle-aged (35 – 49 years)**			**Older (50 – 66 years)**					
	N	**Mdn**	**M (SD)**	**N**	**Mdn**	**M (SD)**	**N**	**Mdn**	**M (SD)**	**H**	**df**	**p**
Length of update period of living guideline												
The recommendation of the Living Guideline should ideally be updated at the following intervals [Q71]												
	117	3.00	2.41 (0.72)	99	3.00	2.55 (0.72)	91	3.00	2.74 (0.57)	10.81	2	0.005
How would you rate the maximum update period of 12 months for Living Guidelines? [Q74]												
	117	3.00	3.17 (0.50)	99	3.00	3.13 (0.53)	91	3.00	3.13 (0.52)	0.18	2	0.914
Notifications												
The Living Guideline should inform me about new and relevant research results at regular intervals (push notification e.g. to my smartphone, email notification. [Q72]*												
	117	4.00	3.97 (0.93)	99	4.00	3.86 (0.98)	91	4.00	3.74 (0.85)	4.70	2	0.095
If there were notifications about new and relevant research findings: What would be an appropriate time interval for you? [Q73]												
	117	2.00	2.20 (1.20)	99	2.00	2.33 (1.33)	91	2.00	2.34 (1.34)	0.40	2	0.777
Impact of an annual update on healthcare professionals												
An annual update of recommendations or references to new research findings would put pressure on me to constantly adjust my treatment. [Q75]*												
	117	2.00	2.13 (0.89)	99	2.00	2.15 (0.84)	91	2.00	2.18 (0.81)	0.45	2	0.799
An annual update of recommendations or reference to new research would be a relieve as I could be sure not to overlook what is "state of the art." [Q76]*												
	117	4.00	4.02 (0.84)	99	4.00	3.85 (0.84)	91	4.00	3.81 (0.79)	4.05	2	0.132
Use of digital tools												
How often do you use digital tools / apps in your everyday clinical practice (e.g., to look up medication dosages)? [Q79]												
	117	3.00	3.03 (1.28)	99	3.00	2.91 (1.14)	91	3.00	2.71 (1.09)	3.43	2	0.180
Formats/ressources used to learn about treatment options												
I prefer to use other formats / resources than guidelines to learn about evidence-based treatments (e.g. textbooks). [Q77]*												
	117	3.00	2.89 (0.87)	99	3.00	2.81 (0.78)	91	3.00	2.76 (0.67))	1.15	2	0.563

Appendix Table 20. *Subgroup analyses between age groups: Preferences using the living guideline.*

	Subgroup analyses: Dunn-Bonferroni-Test (*p*-values Bonferroni corrected)					
	Young (20 – 34 years) [vs] Older (50 – 66 years)		Middle-aged (35 – 49 years) [vs] Older (50 – 66 years)		Young (20 – 34 years) [vs] Middle-aged (35 – 49 years)	
	Z	**p**	**Z**	**p**	**Z**	**p**
Length of update period of living guideline						
The recommendation of the Living Guideline should ideally be updated at the following intervals [Q71]						
	-3.28	0.003	-1.60	0.327	-1.65	0.294

Note. Z = standard score. Numbers of questions are displayed in square brackets. The complete questionnaire is shown below in the Appendix under 10.2. PSY = psychologists/psychotherapists, MED = medical doctors, PST = psychosocial therapists, CG = caregivers.

11.2 Questionnaire

Q	A	
		Demographic Information/Experience
1		**How old are you?**
		Only an integer value may be entered in this field.
		Please enter your answer here:
2		**Which gender do you have?**
		Please select only one of the following answers:
	A1	o Female
	A2	o Male
	A3	o diverse
3		**In which government district of Bavaria do you work?**
		Please select only one of the following answers:
	A1	o Upper Bavaria
	A2	o Lower Bavaria
	A3	o Upper Palatinate
	A4	o Upper Franconia
	A5	o Middle Franconia
	A6	o Lower Franconia
	A7	o Swabia
4		**What is your profession?**
		If more than one answer is correct, please select your primary profession.
		Please select only one of the following answers:
	A1	o Psychotherapist
	A2	o Psychotherapy trainee
	A3	o Psychologist
	A4	o Social pedagogue
	A5	o Specialist in psychiatry and psychotherapy
	A6	o Assistant doctor in psychiatry and psychotherapy
	A7	o Specialist in psychosomatic medicine and psychotherapy
	A8	o Assistant doctor in psychosomatic medicine and psychotherapy
	A9	o Specialist in neurology
	A10	o Assistant doctor in neurology
	A11	o Specialist in general medicine with qualification for psychosomatic primary care
	A12	o Specialist in general medicine without qualification for psychosomatic primary care
	A13	o Assistant doctor in general medicine
	A14	o (Medical) specialist in another discipline
	A15	o Assistant doctor in another discipline
	A16	o Specialist nurse for psychiatric care
	A17	o Qualified nurse

A18	o	Occupational therapist
A19	o	Sociotherapist
A20	o	Social worker
A21	o	Sportstherapist
A22	o	Art therapist
A23	o	Curative education nurse
A24	o	Peer-/Recovery attendant
A25	o	Other profession

5   **How many years of working experience do you have?**

Please select your primarily practiced profession.

Please enter your answer here:

6   **In which psychotherapeutic discipline do you train or are you training?**

If more answers are correct, please choose the specialisation you primarily apply.

Please select one of the following answers:

A1	o	(Cognitive) behavioral therapy
A2	o	Psychoanalytical psychotherapy
A3	o	Depth psychology oriented psychotherapy
A4	o	Conversational psychotherapy
A5	o	Gestalt therapy
A6	o	Systemic therapy
A7	o	Suggestive and autosuggestive therapy forms
A8	o	Body oriented therapies
A9	o	Other
A10	o	Not applicable

7   **What is your current workplace?**

Please select all applicable answers:

A1	o	Other
A2	o	University hospital
A3	o	Research
A4	o	Public hospital
A5	o	Non-profit hospital
A6	o	Private hospital
A7	o	Practice (public)
A8	o	Practice (private)
A9	o	Practice (training)

8   **Does your professional work involve or has it ever involved treating and supporting people with mental illness?**

Please choose one of the following answers:

A1	o	Yes
A2	o	No

9		**How would you assess your experience regarding the treatment of people with mental illness?**
		Please choose only one of the following answers:
	A1	o No experience
	A2	o Little experience
	A3	o Average experience
	A4	o Lots of experience
	A5	o Very much experience

10		**Which patient group do you treat primarily?**
		Please choose all applicable answers:
	A1	o Patients with main diagnosis ICD-10: F2.xx - Schizophrenia, schizotypal and delusional disorders
	A2	o Patients with somatic diagnoses
	A3	o Patients with other FX.xx diagnoses
	A4	o Patients with main diagnosis ICD-10:F4.xx – neurotic, stress and somatoform disorders
	A5	o Patients with main diagnosis ICD-10: F3.xx - Mood [affective] disorders
	A6	o Patients with main diagnosis ICD-10: F1.xx - Mental and behavioural disorders due to psychoactive substance use
	A7	o Patients with main diagnosis ICD-10: F0.xx - Organic, including symptomatic mental disorders

11		**Do you treat or have you ever treated people with a schizophrenic disorder?**
		Please choose one of the following answers:
	A1	o Yes
	A2	o No

12		**How do you assess your experience with regard to the treatment of people with a schizophrenic disorder?**
		Please choose only one of the following answers:
	A1	o No experience
	A2	o Little experience
	A3	o Average experience
	A4	o Lots of experience
	A5	o Very much experience

Attitude towards the guideline for schizophrenia (total)

In the following you will be asked questions about the guideline for schizophrenia. These all refer to the current evidence- and consensus-based AWMF S3 Guideline for Schizophrenia. For better readability, the term "schizophrenia guideline" is used.

13		**How familiar are you with the schizophrenia guideline?**
		Please choose only one of the following answers:
	A1	o Not at all familiar
	A2	o Not familiar
	A3	o Neither familiar nor unfamiliar

A4	o	Familiar
A5	o	Very familiar

14   **Do you generally agree with the recommendations of the schizophrenia guideline?**

Please choose only one of the following answers:

A1	o	Yes
A2	o	No
A3	o	Undecided – I do have enough information, but I have not decided yet
A4	o	Undecided – I need more information in order to make up my mind

15   **The recommendations of the guideline for schizophrenia are on the whole appropriate and feasible.**

Please choose only one of the following answers.

A1	o	Strongly disagree
A2	o	Disagree
A3	o	Neutral
A4	o	Agree
A5	o	Strongly agree
A6	o	No statement because of no knowledge of the schizophrenia guideline

16   **How high do you estimate the percentage of your patients (without contraindications) who receive treatment according to the recommendations of the schizophrenia guideline?**

Please select only one of the following answers:

A1	o	Not applicable
A2	o	Please indicate your answer as percentage (0-100):

Now you will be asked questions about specific recommendations of the schizophrenia guideline. The recommendations are described as follows:

Recommendation 1

Antipsychotics should be offered as low as possible and as high as necessary (lowest possible dosage) within the by international consensus recommended dosage range. Particularly in first-episode patients a low dose should be chosen as they are more sensitive to side effects and respond better to a lower dose.

17   **How familiar are you with the recommendation mentioned above?**

Please choose only one of the following answers:

A1	o	Not at all familiar
A2	o	Not Familiar
A3	o	Neither familiar nor unfamiliar
A4	o	Familiar
A5	o	Very familiar

18   **Do you agree with the recommendation mentioned above?**

Please choose only one of the following answers:

	A1	o Yes
	A2	o No
	A3	o Undecided – I do have enough information, but I have not decided yet
	A4	o Undecided – I need more information in order to make up my mind

19 **The recommendation above is appropriate and feasible.**
Please choose only one of the following answers:

	A1	o Strongly disagree
	A2	o Disagree
	A3	o Neutral
	A4	o Agree
	A5	o Strongly agree

20 **How high do you estimate the percentage of your patients (without contraindications) who receive treatment according to the recommendation mentioned above?**
Please select only one of the following answers:

| | A1 | o Not applicable |
| | A2 | o Please indicate your answer as percentage (0-100): |

Now you will be asked questions about specific recommendations of the schizophrenia guideline. The recommendations are described as follows:

Recommendation 2
People with schizophrenia (first-onset and multiple-onset) should be offered treatment with antipsychotics for relapse prevention after evaluating individual risk-benefit.

21 **How familiar are you with the recommendation mentioned above?**
Please choose only one of the following answers:

	A1	o Not at all familiar
	A2	o Not Familiar
	A3	o Neither familiar nor unfamiliar
	A4	o Familiar
	A5	o Very familiar

22 **Do you agree with the recommendation mentioned above?**
Please choose only one of the following answers:

	A1	o Yes
	A2	o No
	A3	o Undecided – I do have enough information, but I have not decided yet
	A4	o Undecided – I need more information in order to make up my mind

23 **The recommendation above is appropriate and feasible.**
Please choose only one of the following answers:

| | A1 | o Strongly disagree |

A2	o	Disagree
A3	o	Neutral
A4	o	Agree
A5	o	Strongly agree

24   **How high do you estimate the percentage of your patients (without contraindications) who receive treatment according to the recommendation mentioned above?**
Please select only one of the following answers:

A1	o	Not applicable
A2	o	Please indicate your answer as percentage (0-100):

Now you will be asked questions about specific recommendations of the schizophrenia guideline. The recommendations are described as follows:

Recommendation 3
In cases of severe weight gain and the need to continue current antipsychotic medication, after implementation of psychotherapeutic and psychosocial interventions, treatment for weight loss should be offered by trying metformin (first choice) or topiramate (second choice) and by taking into account the risks for additional drug treatment.

25   **How familiar are you with the recommendation mentioned above?**
Please choose only one of the following answers:

A1	o	Not at all familiar
A2	o	Not Familiar
A3	o	Neither familiar nor unfamiliar
A4	o	Familiar
A5	o	Very familiar

26   **Do you agree with the recommendation mentioned above?**
Please choose only one of the following answers:

A1	o	Yes
A2	o	No
A3	o	Undecided – I do have enough information, but I have not decided yet
A4	o	Undecided – I need more information in order to make up my mind

27   **The recommendation above is appropriate and feasible.**
Please choose only one of the following answers:

A1	o	Strongly disagree
A2	o	Disagree
A3	o	Neutral
A4	o	Agree
A5	o	Strongly agree

28		**How high do you estimate the percentage of your patients (without contraindications) who receive treatment according to the recommendation mentioned above?**
		Please select only one of the following answers:
	A1	o Not applicable
	A2	o Please indicate your answer as percentage (0-100):

Now you will be asked questions about specific recommendations of the schizophrenia guideline. The recommendations are described as follows:

<u>Recommendation 4</u>
People with schizophrenia should be offered cognitive behavioral therapy.

29		**How familiar are you with the recommendation mentioned above?**
		Please choose only one of the following answers:
	A1	o Not at all familiar
	A2	o Not Familiar
	A3	o Neither familiar nor unfamiliar
	A4	o Familiar
	A5	o Very familiar

30		**Do you agree with the recommendation mentioned above?**
		Please choose only one of the following answers:
	A1	o Yes
	A2	o No
	A3	o Undecided – I do have enough information, but I have not decided yet
	A4	o Undecided – I need more information in order to make up my mind

31		**The recommendation above is appropriate and feasible.**
		Please choose only one of the following answers:
	A1	o Strongly disagree
	A2	o Disagree
	A3	o Neutral
	A4	o Agree
	A5	o Strongly agree

32		**How high do you estimate the percentage of your patients (without contraindications) who receive treatment according to the recommendation mentioned above?**
		Please select only one of the following answers:
	A1	o Not applicable
	A2	o Please indicate your answer as percentage (0-100):

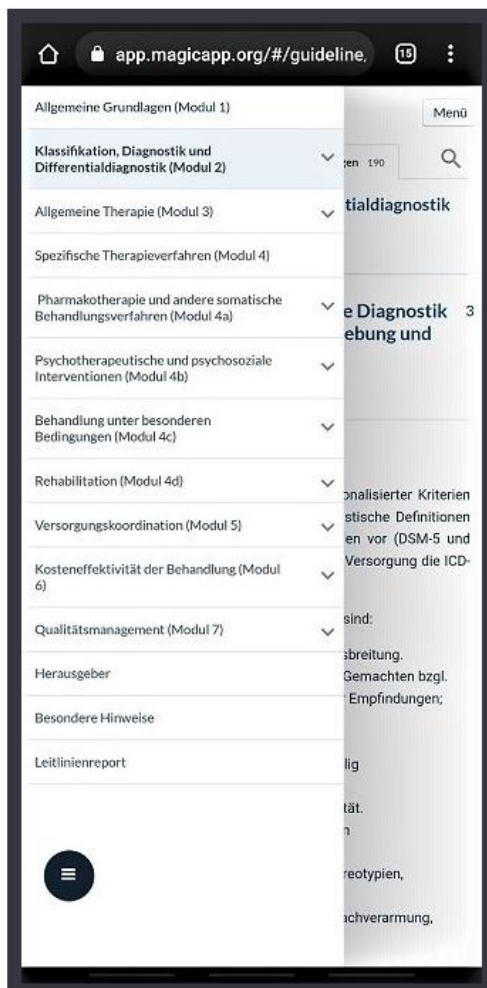**<u>Explanation - Living Guideline</u>**

Please read the following paragraph about Living Guidelines carefully. The information presented is important for answering the following questions.

A Living Guideline can be understood as an optimized process of guideline development by continuously updating recommendations. In contrast to updating non-living guidelines, with a living guideline individual recommendations are updated rather than the whole guideline. The aim is to facilitate decision making through a timely adaptation of recommendations based on current evidence. Furthermore, a living guideline enables the involvement of users, patients and relatives in the guideline development process at any time.
*Digital, internet-based systems, such as the "MAGICapp" platform used for the SISYPHOS project make the development of a living guideline possible. Living guidelines are usually updated once a year.*
In the following, screenshots of the "MAGICapp" are presented to illustrate a Living Guideline. We would like to ask you to look at them carefully, in order to answer questions about the format of Living Guidelines afterwards (e.g. with regard to clarity and comprehensibility).

Screenshot of the MAGICapp as an example of a Living Guideline – in the picture you see the table of contents. We would like to ask you to look at the illustration carefully in order to answer questions about the Living Guideline format afterwards.


Screenshot of the MAGICapp as an example of a Living Guideline – in the picture you see the guideline recommendation about social skills training and cognitive remediation.
We would like to ask you to look at the illustration carefully in order to answer questions about the Living Guideline format afterwards.
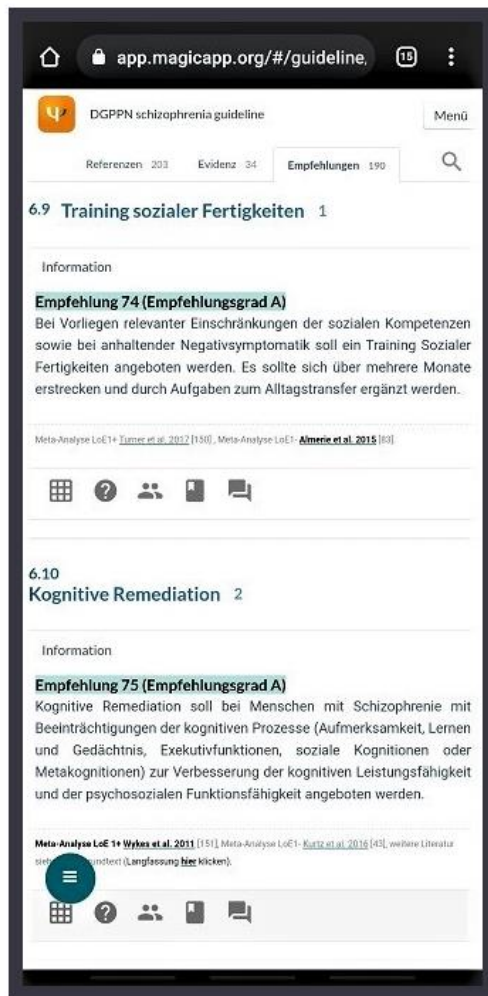
Screenshot of the MAGICapp as an example of a Living Guideline – in the picture you see the comparison of two treatment options (treatment as usual vs. social skills training). This graphical depiction can be used to support shared decision making.

We would like to ask you to look at the illustration carefully in order to answer questions about the Living Guideline format afterwards.
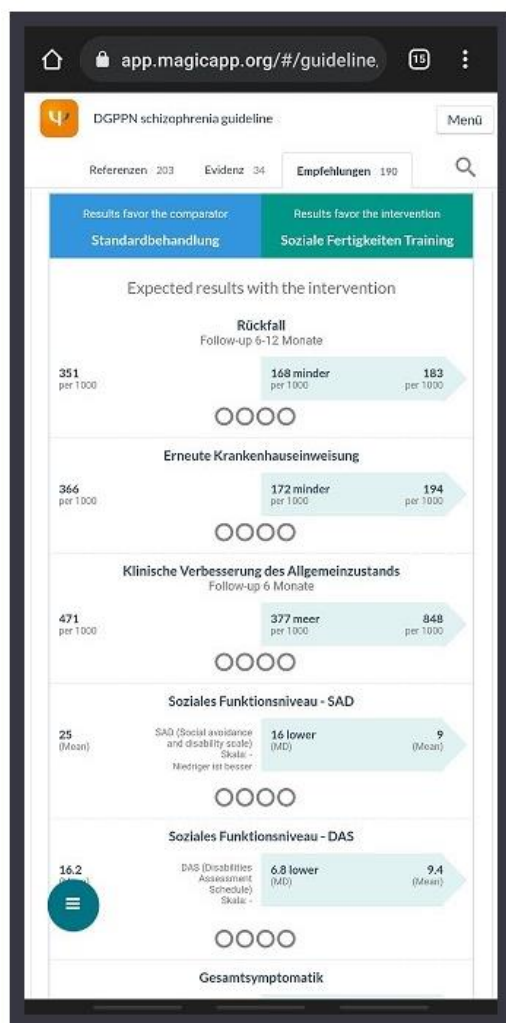
Attitude – Living Guideline

In the following we want to investigate the attitude towards Living Guidelines.

In case you do not have any immediate experience with the Living Guideline format, please refer to the impression you received from the shown screenshots.

Please rate the extent to which you agree with the following statements:

Please choose the correct answer for each item:

A1	o	Strongly disagree
A2	o	Disagree
A3	o	Neutral
A4	o	Agree
A5	o	Strongly agree

33	I find the layout appealing and the content clearly presented.
34	I can imagine getting along well with the Living Guideline.
35	I would need a training in order to be able to use the Living Guideline.

36		The Living Guideline seems clearer to me than the previous print version.
37		The Living Guideline seems to be more informative than the previous print version.
38		The Living Guideline seems to be more practical than the previous print version.
39		I can imagine that a Living Guideline would be a valuable tool in my everyday clinical practice
40		The advantages of a Living Guideline over a print version are evident to me.
41		I would prefer a Living Guideline to the previous print version.

Barriers

The following questions are referred to individual barriers using the Schizophrenia Guideline - both in terms of the familiar print format and in terms of the Living Guideline format.
Please rate the extent to which you agree with the following statements. In case you do not have any immediate experience with the living guideline format, please refer to the impression you received from the shown screenshots.

Please select the applicable answer for each item - both for the print version and the Living Guideline format:

A1	o Strongly disagree
A2	o Disagree
A3	o Neutral
A4	o Agree
A5	o Strongly agree

42		I have heard of the corresponding guideline format before.*
43		I have experience using the guideline format.*
44		I am confident to use the guideline format or to learn how to use it.*
45		I have sufficient skills to use the guideline format.*
46		There is not enough training/education on how to use guidelines.
47		The use of the format leads or would lead to an increase in the quality of my clinical work.*
48		I lack motivation to deal with the guideline format.
49		The use of the corresponding guideline format leads or would lead to a restriction of my freedom of therapy.
50		The presentation / structure of the corresponding format is / seems confusing.
51		The guideline in the corresponding format is / seems too long and extensive.
52		I know where I can / could find the guideline in the corresponding format.*
53		Working with the corresponding format does not seem to me to be sufficiently proven in clinical setting.
54		Due to lack of time resources (e.g. due to a high workload) the use of the guideline format seems to be difficult.
55		Patients are critical of the guideline format.

Items were inverted for the related analyses on barriers.

Facilitating Factors

The following questions refer to facilitating factors using the Schizophrenia Guideline - both with regard to the familiar print format and with regard to the Living Guideline format.

Please rate the extent to which you agree with the following statements. In case you do not have any immediate experience with the living guideline format, please refer to the impression you received from the shown screenshots.

		Please select the correct answer for each item - both for the print version and the Living Guideline format:
	A1	o Strongly disagree
	A2	o Disagree
	A3	o Neutral
	A4	o Agree
	A5	o Strongly agree

56		I would like to have (more) training/education on working with the guideline format.
57		I would like to see the feedback from the patient's perspective timely worked in, e.g. regarding the tolerability of medications.
58		I would like to have (more) training for patients and their relatives regarding the use of the guideline.
59		I would like to have the possibility to use the guideline for shared decision making (joint and equal decision making regarding treatment, e.g. with the help of information material, graphics, etc.).
60		I would like to have the practitioners to be more involved in the development of the guideline (e.g. with regard to content or formal design).
61		I would like to have a firm implementation of the guideline in the training / further education.
62		I would like to have clinical conditions more considered (e.g., comorbidities, complex courses) in the content of the guideline.
63		I would like to be supported by quality management.
64		I would like to have a provision of tablets / smartphones for the use of the guidelines in everyday clinical practice.
65		I would like to have simpler and easier understandable language.
66		I would like to have a short and concise version with the essential treatment recommendations (e.g. without the elaboration of underlying evidence).
67		I would like to have short, clear treatment checklists
68		I would like to be notified in case there are changes
69		I would like to have increased awareness of the benefits of the guideline (e.g., in the form of promotional activities).
70		I would like a version tailored to my treatment services or professional group.

Other questions

Finally, we would like to explore your preferences using the Living Guideline and similar formats.

71		**The recommendations of the Living Guideline should ideally be updated at the following intervals:**
		Please select only one of the following answers:
	A1	o Quarterly
	A2	o Semiannually
	A3	o Annually
	A4	o Less frequently than once a year

72		**The Living Guideline should inform me about new and relevant research results at regular intervals (push notification e.g. to my smartphone, email notification).**

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		Please select only one of the following answers:
	A1	o Strongly disagree
	A2	o Disagree
	A3	o Neutral
	A4	o Agree
	A5	o Strongly agree

73 **If there were notifications about new and relevant research findings: What would be an appropriate time interval for you?**
Please select only one of the following answers:

	A1	o Immediately when guideline content is updated
	A2	o Quarterly
	A3	o Semiannually
	A4	o Quarterly
	A5	o Less frequently than once a year
	A6	o I do not wish to receive notification

74 **How would you rate the maximum update period of 12 months for Living Guidelines?**
Please select only one of the following answers:

	A1	o Much too short
	A2	o Too short
	A3	o Appropriate
	A4	o Too long
	A5	o Much too long

75 **An annual update of recommendations or references to new research findings would put pressure on me to constantly adjust my treatment.**
Please choose only one of the following answers:

	A1	o Strongly disagree
	A2	o Disagree
	A3	o Neutral
	A4	o Agree
	A5	o Strongly agree

76 **An annual update of recommendations or reference to new research would be a relieve as I could be sure not to overlook what is "state of the art."**
Please choose only one of the following answers:

	A1	o Strongly disagree
	A2	o Disagree
	A3	o Neutral
	A4	o Agree
	A5	o Strongly agree

77 **I prefer to use other formats / resources than guidelines to learn about evidence-based treatments (e.g. textbooks).**

		Please select only one of the following answers:
	A1	o Strongly disagree
	A2	o Disagree
	A3	o Neutral
	A4	o Agree
	A5	o Strongly agree

78		**Which resource do you use most likely to learn about appropriate treatment options?**
		Please select only one of the following answers:
	A1	o Guidelines
	A2	o Professional literature (e.g., textbooks)
	A3	o Scientific journals (e.g., Ärzteblatt)
	A4	o Further education / congresses
	A5	o Exchange with colleagues

79		**How often do you use digital tools / apps in your everyday clinical practice (e.g., to look up medication dosages)?**
		Please select only one of the following answers:
	A1	o Never
	A2	o Seldom
	A3	o Occasionally
	A4	o Often
	A5	o Always

80		**If your relative/person of trust developed a schizophrenic disorder: Which three interventions would you recommend?**
		Please select all applicable answers:
	A1	o Outreach treatment (e.g., outpatient psychiatric care, sociotherapy).
	A2	o Treatment in a "Soteria"
	A3	o Antipsychotic pharmacotherapy
	A4	o Electroconvulsive therapy
	A5	o Psychoeducation
	A6	o Cognitive behavioral therapy
	A7	o Training-based interventions from cognitive behavioral therapy / metacognitive training
	A8	o Family interventions and collaboration with family members / persons of trust
	A9	o Social skills training
	A10	o Cognitive Remediation
	A11	o Psychodynamic or psychoanalytic therapy
	A12	o Conversational psychotherapy and supportive psychotherapy
	A13	o Occupational therapy
	A14	o Art therapies
	A15	o Exercise therapies
	A16	o Peer-led interventions (exchange between persons affected and experts from own experience)
	A17	o Vocational rehabilitation

The questionnaire was developed as part of the SISYPHOS project. Published in [2, 15].

Danksagung