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Development and validation of the brief questionnaire SuPr-10 for suicidality assessment among patients with depressive symptoms in primary care

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Abstract

Background: General practitioners (GPs) are the main care providers for approximately 50% of patients with a depression diagnosis. About 10% of primary care patients experience suicidal ideation. National and international depression guidelines recommend to screen for suicidality, but there are few screening tools feasible for the use in primary care. In addition, protective factors are often overlooked.

Objectives: The overall aim of the study was to develop and validate a brief questionnaire to assess suicidality, including protective factors, with the goal of optimizing it for use in primary care. In addition, the study aims to provide a detailed understanding of the socio-demographic and mental health differences, as well as differences in the perception of preventive factors, within the study population as a whole (1), as well as between different recruitment approaches (2) and treatment settings (3), in terms of sample representativeness. Finally, the questionnaire was analyzed for its factor structure (4), psychometric properties (5), and applicability (6).

Method: We included participants with a PHQ-9 score of 6 or higher. Six different subsamples with a total of 521 participants were used to validate the newly developed questionnaire. In addition to conventional recruitment methods, we employed online recruitment via social media campaigns. Initially, we conducted descriptive analyses to gain a comprehensive understanding of our study sample. To analyze the structure of the questionnaire, we conducted exploratory and confirmatory factor analysis, item analysis as well as an evaluation of psychometric properties. Furthermore, we assessed diagnostic accuracy using logistic regression and ROC analysis. In addition, we compared subgroups to analyze response patterns. We evaluated the instrument with regard to its acceptability and usability among patients and practitioners.

Results: Of the 521 participants, 67.8% were female, with a mean age of 40.89 years. Regarding marital status, 44.9% were in a relationship, and 53.7% were single. A total of 36.6% had at least one child. In terms of education, 53.9% had completed higher education, and 61% were employed. PHQ-9 scores indicated that 16.7% had mild depression, 32.9% moderate, 31.2% moderate-severe, and 19.2% severe depression, with a mean score of 14.8, indicating moderate severity. Suicidal ideation in the past two weeks was reported by 49.8%, and lifetime suicidal ideation by 74.4%. The severity of depression corresponded to a higher proportion of reported suicidal tendencies, with 21.5% having attempted suicide, 95% of whom expressed a moderate to strong desire to die. Six participants had attempted suicide in the previous two weeks. There were no substantial differences between traditional and online recruitment strategies. The acutely suicidal inpatient group (ASIP) showed significantly higher depression ($p<.001$-$.031$, $r=.138$-$.227$, small effect sizes) and suicidality scores ($p<.001$, $r=.332$-$.365$, moderate effect sizes), as well as lower protective scores ($p\leq.001$, $r=.181$-$.257$, small effect sizes), compared to all non-inpatient participants. Although the effect size was small ($r = .158$-$.186$), acutely suicidal patients were less likely to select internal aspects (e.g. confidence) as preventive reasons for not attempting suicide ($p < .001$) than non-inpatients.

A two-factor model was obtained from the analysis: I. Protective scale and II. Risk scale, with internal consistencies of $\omega = .817$ (I.) and $\omega = .928$ (II.). Both factors showed strong correlations with measures of suicidality ($r_{ac} = -.529$ for I.; $r_{ac} = -.854$ for II.) and depression ($rac = -.736$ for I.; $r_{ac} = .626$ for II.). The diagnostic accuracy of the tool for identifying individuals with a history of suicide attempts showed an AUC of .765, with a sensitivity of 83% and a specificity of 56% at a cut-off > 0. Finally, 88.8% (n = 388) of patients surveyed believed that the tool would

improve their treatment, and 96.5% (n = 442) indicated that they would be willing to complete the tool multiple times.

Discussion: Compared to the general population, our study population was slightly younger, more female, better educated, more likely to be single and childless, and more likely to be unemployed—characteristics comparable to those found in other studies of depressed patients. Social media proved effective in reaching a vulnerable, hard-to-reach population and in diversifying the sample, supporting the use of online strategies as a complementary approach. As expected, the severity of depression and suicidality was higher in inpatient treatment settings, particularly among acutely suicidal patients. The evaluation of the preventive reasons showed that self-efficacy and social support should be the focus of subsequent safety planning.

The SuPr-10 demonstrates good psychometric properties, content validity and patient acceptability. It can serve as reliable mean of assessing both risk and protective factors in primary care patients with depressive symptoms. When used in conjunction with the PHQ-9, the SuPr-10 provides a more comprehensive and additional understanding of suicidality, than the PHQ-9 alone. Therefore, it can assist general practitioners in decision making and communication with patients and promote a resource-oriented approach, although its predictive ability for suicidal behavior is limited. The questionnaire has been developed and validated in German and in a population with depressive symptoms so far, but further validation is needed for a broader use - in particular with regard to different (mental) disorders, languages and its use in under-age populations. Importantly, treatment decisions should not be based on the questionnaire alone, and patient responses should always be reviewed in a direct, face-to-face interaction.

Conclusion: The SuPr-10 is a valid, reliable and accepted tool for clinicians to guide the communication when dealing with patients with depressive symptoms. When used in addition to the PHQ-9, it provides a more comprehensive view of suicidal tendencies and preventive reasons. Although valuable for understanding suicidality, its predictive power for suicidal behavior is limited and it should be used to complement, rather than replace, direct interaction with patients. Further validation in different populations and settings is needed to expand its use. As recommended by guidelines, suicidality should always be addressed directly.

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List of abbreviations

Abbreviation	Full Form
95%-CI	95% Confidence Interval
ANOVA	Analysis of Variance
ASIP	Acutely Suicidal Inpatient Participants
AUC	Area Under the Curve
BDI-II	Becks Depression Inventory
BHAEV	Bavarian General Practitioners Association
BJPsych Open Open	British Journal of Psychiatry
BRFL	Brief Reasons For Living
BSS	Beck Scale for Suicide Ideation
BayPsychKHG	Bavarian Psychiatric Care Act
CCM	The Chronic Care Model
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CSE	Certificate of Secondary Education
DCP	Dayclinic Care Patients
DEGAM	German Society of General Practice and Family Medicine
DFG-GRK	Research Training Group of the German Research Foundation
DGPPN	German Association for Psychiatry, Psychotherapy and Psychosomatics
DGS	German Association of Suicide Prevention
EFA	Exploratory Factor Analysis
EKC	Empirical Kaiser Criterion
FA	Factor Analysis
GAD-7	Generalized Anxiety Disorder – 7 items
GCSE	General Certificate of Secondary Education
GP	General Practitioner
IASP	International Association for Suicide Prevention
ICD-10	International Classification of Diseases, 10th Revision
ICD-11	International Classification of Diseases, 11th Revision
JMIR	Journal of Medical Internet Research

K10	Kessler Psychological Distress Scale – 10 items
KMO	Kaiser-Meyer-Olkin Coefficient
LMU	Ludwig Maximilian University of Munich
M	Mean
Mean dif.	Mean difference
MO	Moral Objections (within BRFL scale)
MSA	Measure of Sampling Adequacy
MVZ	Medizinisches Versorgungszentrum
Mdn	Median
N	Number
NASIP	Not Acutely Suicidal Inpatient Participants
NCGP	Nordic Congress of General Practice
NICE	National Institute for Health and Care Excellence
NPV	Negative Predictive Value
PC-PTSD-5	Primary Care PTSD Screen
P4	Suicide Screener including Past, Plan, Probability, Preventive Factors
PHQ-15	Patient Health Questionnaire-15 (somatic disorder)
PHQ-8	Patient Health Questionnaire-8 (Depression scale without suicidal ideation item)
PHQ-9	Patient Health Questionnaire-9 (Depression scale)
PHQ-D	Patient Health Questionnaire – Mental Disorders
PMH	Positive Mental Health
PPV	Positive Predictive Value
PSY	Psychiatrist sample (Patients recruited by psychiatrists/ regarding psychiatrist as their main practitioner)
PT	Psychotherapist sample (Patients recruited by psychotherapists / regarding psychotherapist as their main practitioner)
PTSD	Post-Traumatic Stress Disorder
RF	Responsibility to Family (within BRFL scale)
RMSEA	Root-Mean-Square Error of Approximation
RMTS-S	Rapid Measurement Toolkit for Suicidality-Static Screener
ROC	Receiver Operating Characteristic
SBQ-R	Suicidal Behaviors Questionnaire - Revised
SC	Survival and Coping Beliefs (within BRFL scale)

SD	Standard Deviation
SD (BRFL)	Fear of Social Disapproval (within BRFL scale)
SEM	Structural Equation Modeling
SIDAS	Suicidal Ideation Attributes Scale
SIDAS-M	Suicidal Ideation Attributes Scale - Modified
SIS-Q	Suicidal Ideation Screening Questionnaire
SRMR	Standardised Root-Mean-Squared Residual
SSEV	Suicidal Ideation and Behaviour Scale
SuPr-10	Suicide prevention in Primary care, remaining 10 items of final version
SuPr-X	Suicide prevention in Primary care, preliminary version
TdA	Day of General Practice
WHO	World Health Organization
WLSMV	Weighted Least Squares Mean and Variance Adjusted

1. Introduction

Initially, we present a brief introduction to the subject of suicidality by providing information on the classification and epidemiology, followed by an exploration of psychological models of suicidality. We will also give an overview of risk and protective factors associated with suicidality and describe different approaches to suicide prevention. The role of general practice in suicide prevention is highlighted, along with a review of existing instruments used to assess suicidality. We discuss a research gap and propose the development of a new brief questionnaire, which provides the context for the following project aims and research questions.

Parts of the introduction overlap with text passages in articles submitted [1] or published [2] by the author.

1.1. Classification

There is no definition of suicidality that covers the entire spectrum of this mental and behavioral phenomenon [3]. The World Health Organization (WHO) defines suicide as “the act of deliberately killing oneself”, suicidal ideation as “thoughts, ideas, or ruminations about the possibility of ending one's life, ranging from thinking that one would be better off dead to formulation of elaborate plans.” (ICD-10: R45.851; ICD-11: MB26.A), whereas a suicide attempt is defined as “a specific episode of self-harming behavior undertaken with the conscious intention of ending one's life.” (ICD-10: T14.91; ICD-11: MB23.R) [4, 5].

1.2. Epidemiology

Each year more than 700,000 people die by suicide worldwide (plus a statistically unrecorded number of unreported cases), making suicide one of the leading causes of death: 1,3% of global deaths are due to suicide. While most countries worldwide are seeing decreasing suicide rates (global 2000-2019: -36%), they have been on the rise in (especially North) America [6].

In 2023, 10,304 people in Germany died by suicide, an 1.8% increase compared to 2022 [7]. With 10,119 suicides in 2022, there was another significant increase of 9.8% compared to the previous year (9,215 suicides). This 9.8% rise is the largest annual increase since 1980 [8, 9]. However, the overall number of suicides has significantly decreased over the years: In 1980, about twice as many people took their own lives. The suicide rate (number of suicides per 100,000 inhabitants) adjusts for population size variations across different years. Therefore, percentage changes in suicide numbers may not align with the change in the suicide rate: In 2022, the overall suicide rate increased by 9.1% from 11.1 the previous year to 12.1., which

positions Germany in the lower mid-range of the European context with Lithuania recording the highest suicide rate in Europe [8, 10]. The increasing suicide rate does currently not allow any causal statement to be made about links with the Covid pandemic [11].

Suicide methods vary by region and the availability of means. In Germany, the majority of suicides involve hanging, while in Asian countries, pesticides/chemicals/gas are common, and in the USA, firearms are prevalent [12-14].

It's estimated that there are about 10-20 suicide attempts for every completed suicide [6]. Statistically, most suicide attempts are made by younger women. Men, however, died by suicide significantly more often than women, with men accounting for around three quarters of all suicides. In 2023, there was a relatively constant distribution of suicides between men (73%) and women (27%). However, the overall increase in suicides observed in 2023 was mainly due to an increase among women (+8.0%), while there was a slight decrease among men (-0.3%) [7].

Suicide is the second leading cause of death among those aged 15 to 25. The suicide rate and risk of suicide increases with age ("Hungarian pattern"), with the rate for men being significantly higher than that for women across all age groups, particularly increasing sharply for men from age 70 onwards [12]. The average age at the time of suicide in 2022 was 60.3 years for men and 61.9 years for women [9].

1.3. Psychological explanation models of suicidality

The following theoretical models highlight important psychosocial determinants in the development of suicidality. Key factors include a sense of hopelessness, viewing stressful experiences as humiliating, feeling trapped, lacking a sense of belongingness and considering oneself a burden.

Due to the diverse nature of suicidal crises, no single model can provide a complete explanation of suicidality. Each model highlights important areas for further investigation in individual cases. Selection based on Teismann et al. ([15], p. 31 ff):

Cubic Model of Suicide [16]: The interaction of mental pain (psychache), external/internal stressors (press) and a state of arousal (pertubation).

Cry of Pain Model [17]: Feeling defeated due to a devastating experience with an impression of not being able to escape (entrapment).

Escape Theory [18]: Suicide driven by a desire to escape from a negative self-awareness - begins with significant failures that are internalized as personal inadequacy, leading to

negative emotions. To avoid these feelings, suicide becomes an extreme attempt to escape oneself and the world.

Fluid Vulnerability Theory [19]: Assumption of a suicidal mode being activated by stressors depending on individual vulnerabilities, including (1) cognitions related to hopelessness, self-hatred, shame; (2) emotions such as depression, guilt, anger and anxiety; (3) physiological difficulties such as disturbed sleep, pain, concentration problems; (4) behavioral issues like social withdrawal, self-harm, substance abuse.

Interpersonal-Psychological Theory of Suicidal Behavior [20]: The impression of being a burden to others (perceived burdensomeness) and not being part of a valued community (thwarted belongingness) leads to death wish. Fearlessness of death (acquired ability) enables the realization in suicidal behavior.

Integrated Motivational-Volitional Model of Suicidal Behavior [21]: Integrating (1) premotivational phase with background factors that create a context for potential suicide; (2) motivational phase with reasons for suicidal ideation and (3) volitional phase with factors involved in the transition from ideation to attempt.

Cognitive model of suicidal behavior [22]: Acute hopelessness arises from stress and the belief that it is unbearable. As a result of selective attention, the situation is focused on suicide as the only possible solution.

Stages of suicidal development [23]: Behavior regulation is divided into (1) consideration phase, (2) ambivalence phase and (3) decision phase.

1.4. Risk and protective factors of suicidality

The first step in preventing suicide is to identify risk factors and subsequently reduce them through appropriate interventions. Suicidal behavior is multifactorial and complex. It cannot be explained by a single cause or stressor alone. Often several risk factors co-occur and increase someone's vulnerability. However, being affected by risk factors does not automatically result in suicidal behavior [24].

The following list (Table 1) is based on the selection made by Teismann et al. ([25], p.13, Table 2) and Lewitzka et al. ([26], p.1488, Table 1). The factors mentioned serve as an overview and do not represent an exhaustive list:

Table 1. Risk and protective factors of suicidality

Category	Factors
Demographic factors	Older men (suicide)
	Younger women (suicide attempt)
	Unemployment
	Lower socioeconomic status
Diagnostic factors	Mental illness
	Affective disorder
	Schizophrenia
	Substance use disorder
	Personality disorder
	Physical illness
	Sleep disorders
Psychosocial factors	Social isolation/loneliness
	Hopelessness
	Negative affectivity
	Impulsivity/aggressiveness
	Suicidal thoughts
	Perfectionism
	Perception of being a burden to others
	Fear of pain, dying, and death
	History of abuse in childhood and adolescence
	History of other trauma like war / refugee
	Family suicides
	Suicide/suicide attempt in the immediate environment
Neurobiological vulnerability	Serotonergic deficit
	hypothalamic-pituitary-adrenal (HPA)-axis disturbances
History of suicidal behavior	Past suicide attempts
Proximal factors	Experience of loss (e.g., financial, interpersonal, identity-related)
	Acute and/or chronic health problems, especially pain syndromes
	Family/partner conflicts
	Discharge from inpatient treatment
	Seasonal variation (early summer)
Protective factors	Social integration/support
	Self-confidence
	Life satisfaction
	Presence of reasons to live
	Hope
	Active participation in therapy
	Problem-solving skills
	Partnership/marriage
	(Young) children to care for
	Pregnancy
	Active belonging to a religious community
	Meaningful activities / work

1.5. Suicide prevention

In medicine, prevention can be classified into primary, secondary and tertiary measures. Interventions of the primary category are aimed at reducing the incidence of a condition in the general population, e.g. by preventing an outbreak of the disease. Secondary measures focus on early detection of diseases and the prevention of further intensification. Tertiary interventions intend to prevent unfavorable progression or consequences and recurrence of an illness [27].

Other classifications divide prevention into universal, selective and indicated strategies. Universal interventions are implemented before a specific problem occurs in a population that is not at particular risk. Selective prevention addresses risk factors that have already been identified, and indicated prevention is directed at a target group exhibiting first signs of a problem [28].

Specified for suicide prevention, primary strategies refer to precaution, secondary prevention to the early detection of suicidality and tertiary prevention to aftercare following suicidal behavior [29]: Examples of effective primary interventions include restricting lethal means (limited access to weapons [30], pesticides [31], pharmaceuticals [32]; secured buildings [33]), training of gatekeepers [34], awareness campaigns and guidelines on media reports of suicide to avoid Werther effect (especially when a person of public interest is involved) [35].

Secondary suicide prevention strategies include the early detection of crises and the referral of people in crisis to appropriate support or treatment (selective or indicative prevention). Outlining alternatives is a key element in preventing suicidal impulses. In addition to practitioners, anonymous services such as Helplines also play an important role [26].

Tertiary suicide prevention not only involves the aftercare of people following a suicide attempt to prevent repeated suicidal behavior, but also the aftercare of bereaved relatives or professional groups confronted with completed suicides are part of postvention strategies [26].

There is an obvious overlap between primary, secondary and tertiary suicide prevention: For example, working with bereaved families can not only help them to cope with the experience of a loss by suicide, but can also help to prevent suicidal crises among relatives or detect them at an early stage [29, 36].

Historically, it has often been cited that at least six people are directly affected by a suicide [37]. More recent empirically derived data show that this is a severe underestimation and that up to 135 people, including those more distant from the deceased, may be directly affected. Helpers, such as emergency departments, crisis intervention teams, police or funeral services, must also be taken into account [38, 39].

Suicides also have a substantial economic impact. In countries of the European Union, the average financial loss for each completed suicide is approximately 2 million euros. Implementing a suicide prevention strategy that reduces suicides by just 1% would be highly cost-effective [40].

In view of the multifactorial nature of suicide and the many pathways leading to suicidal behavior, approaches towards suicide prevention need a wide-ranging, multi-faceted strategy that targets different populations (at risk), across the entire life span and in various contexts [24]. Figure 1 provides an exemplary overview of the linking of risk factors with interventions ([24], p.31, Figure 7).

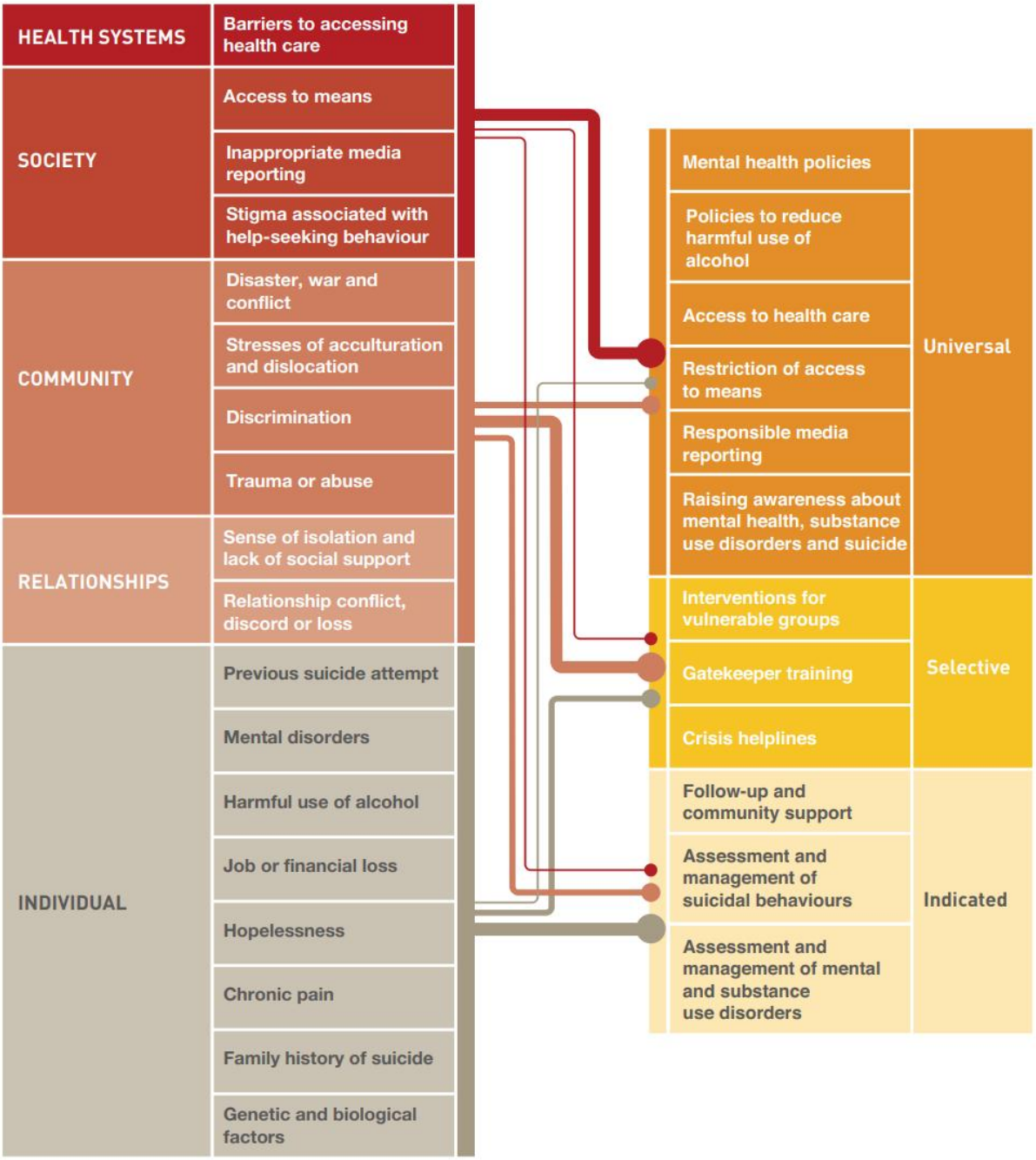

Figure 1. Key risk factors matched with interventions ([24], p.31, Figure 7).

1.6. Role of general practice in suicide prevention

The role of general practice is also mentioned in a previously published article by the author in the German Journal *Suizidprophylaxe* [2].

The cross-national lifetime prevalence of suicidal ideation in the general population is 9.2% [41]. In general practices of Germany, a cross-sectional study (1455 patients, 41 General practitioners (GP), 19 institutions) found a prevalence of 11.8% for suicidal ideation in the past two weeks [42].

The higher prevalence indicates that patients in the primary care setting might be a more vulnerable group in terms of suicidality than the general population and should therefore also be an explicit target group for suicide prevention. The patient population in primary care typically includes many older people with chronic conditions. Older and multimorbid people are at particularly high risk of developing suicidal ideation and behavior. More than half of all people who die by suicide in Germany are over 60 years old [8].

Multimorbidity is a significant risk factor for suicidal ideation, particularly in the presence of mental illness. Individuals with multimorbidity are three times more likely to experience suicidal ideation than those without multimorbidity [43]. Chronic diseases are also associated with increased suicidality [44]. General practitioners are often involved in the management of these patients, with approximately half of all people with depression being treated exclusively by GPs [45]. The identification, treatment and management of depression in primary care is even more challenging when patients suffer from multiple comorbidities [46]. Comorbid somatic conditions can mask symptoms of depression, making it difficult to choose and implement appropriate treatment. This can affect treatment effectiveness and safety [47].

Several theoretical models for managing multimorbidity focus on a collaborative approach to treat patients with multiple chronic conditions, including mental illness [48]. The Chronic Care Model (CCM) is an evidence-based framework that provides a structured, coordinated, patient-centered, and proactive approach to care. It aims to improve access to evidence-based mental health treatments within primary care settings [49-51].

The model is based on the premise that better clinical outcomes are achieved through 'productive collaboration' between healthcare providers and patients. This collaboration is guided by four key principles: self-management, coordination, decision support, and the use of IT/data [50, 51].

Collaborative / Chronic care approaches have proven to be effective in treating depression [52, 53] and suicidality [54], particularly older patients with suicidal ideation [55]. Within the CCM-

guided POKAL framework, the development and validation of a suicidality questionnaire is related to the key principle of decision support [47].

Most suicide prevention programs in older people focus on identifying depression [56]. Depression and suicidality are clearly related, but screening for depression alone is not sufficient to adequately identify those at risk. Even if the last item ("Thoughts that you would rather be dead or want to hurt yourself") of the widely used PHQ-9 depression screener is negated, suicidality should be further investigated if risk factors are known [57].

As primary healthcare contact, GPs have a particular opportunity to identify suicidal ideation at an early stage and to initiate appropriate (internal or external) treatment in a collaborative way. From this perspective, low-barrier suicide prevention projects should focus particularly on this setting [58]. Current deficits in primary care suicide prevention are considered to be a low probability of detection, lack of time, and too little focus on psychosocial counselling or referral to existing support services [57, 59].

In addition to raising awareness of risk factors, the training of health care providers, usually includes the use of checklists or questionnaires for conversation guidance and exploration support [58, 59].

The literature presents mixed evidence on the effectiveness of GP training. Although the often-cited Gotland study [34], along with similar German [60] and global studies [61], found an association with reduced suicidality, a 2017 meta-analysis showed no such evidence [62].

Nevertheless, general practice plays a crucial role in depression care and suicide prevention due to the often trustful and well-established relationship between patients and GPs [47]. This unique relationship can be summed up anecdotally by a quote from the *German National Suicide Prevention Program* ([3], p.183):

„Nur der Hausarzt kennt seine älteren und alten, evtl. verwitweten, vereinsamten, alkoholmissbrauchenden, an Kniearthrose leidenden, im 4. Stock eines Hauses ohne Aufzug lebenden Männer, deren Kinder räumlich weit entfernt berufstätig sind.“

"Only the family doctor knows his elderly and old, possibly widowed, lonely, alcohol-abusing men suffering from knee osteoarthritis, living on the 4th floor of a house without a lift, whose children work far away." ([3], *p. 183, translated by CH)*

Research shows that people in suicidal crisis also seek contact with their GP [57, 63-65]. However, people seeking help are relatively unlikely to disclose suicidal ideation to their general practitioner unasked [66, 67]. Identification of people at risk can be greatly improved by regularly screening primary care patients for suicidal ideation using a brief self-report

measure [68]. Thus, early identification and an improvement in clinical decision making can be achieved.

1.7. Existing instruments for assessing suicidality

For a structured approach to the assessment of suicidality, the use of standardized screening tools is useful. The limited time available in general practice makes this a challenge. International test theory already offers a large number of English-language instruments for the assessment of suicidality. However, only a few have been validated in German and no gold standard has yet emerged [69, 70].

Furthermore, these tools have mainly been developed for use in psychiatric contexts. In primary care, different heuristics apply compared to mental health specialists, for whom the use of extensive questionnaires or diagnostic tests is part of their daily routine.

A systematic review evaluated brief screening tools (Table 2) that the authors considered suitable for use in general practice [71]: A total of 12,460 studies were identified, of which seven were eligible for inclusion on the basis of strict defined criteria by the authors.

With regard to the applicability in primary care, only studies that analyzed short screening instruments were included. An instrument with no more than 12 items was defined as brief enough. Information about diagnostic accuracy was required for inclusion, as sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were evaluated. Furthermore, only German and English instruments were considered for this study. This review also shows that a reference gold standard for validation still does not exist.

In the seven included studies, eleven screening tests were validated. Five short questionnaires and six single items were identified as potentially suitable screeners and subsequently discussed by the authors [71]:

Table 2. Brief suicidality screeners (according to [71], p. 12).

Questionnaires	Single-Items
1. Rapid Measurement Toolkit for Suicidality-Static Screener (RMTS-S) [72]	1. Gate question suicide attempt [76]
2. Suicidal Behaviors Questionnaire - Revised (SBQ-R) [72]	2. Gate question suicide ideation [76]
3. Kessler Psychological Distress Scale (K10) [73]	3. Feeling suicidal [77]
4. Suicidal Ideation Screening Questionnaire (SIS-Q) [74]	4. Wishing you were dead [77]
5. Suicidal Ideation Attributes Scale (SIDAS) [75]	5. Thoughts of death [77]
	6. Patient-Health-Questionaire-9 (PHQ-9) - Item 9 [78]

German versions of the selected instruments are available for K10 [79], SBQ-R [80], and PHQ-9 [81], item 9. Regarding the selection, the authors argued that although single items meet the criteria for a brief tool, they are not recommended for an appropriate exploration of suicidality [71] and are controversially discussed in the literature [76, 82, 83].

Furthermore, directly addressing suicidality is recommended according to national guidelines, and therefore, K10 [73] and SIS-Q [74] also seem unsuitable for an adequate suicidality assessment [71].

In addition to the specific aspects of suicidal tendencies (thoughts, plans, attempts) that are typically considered in an assessment, a moderating effect of 'Positive Mental Health' (PMH) has been identified between depression and suicidal ideation [84], as well as between suicidal ideation and attempts [85].

The one-dimensional construct of Positive Mental Health is associated with life satisfaction, a positive attitude, and confidence, and correlates negatively with suicidal experiences and behaviors [86]. These findings suggest a need to focus more on protective aspects of suicidality during suicidality assessment [84, 85].

1.8. Research gap and the need for a new short questionnaire

This chapter is also part of an earlier publication by the author [2].

The review of brief questionnaires for primary care shows that none of the mentioned screening tools consider protective factors [71]. The P4 questionnaire combines the requirement of a small number of items including a protective question about reasons that prevent suicide [87]. The questionnaire was not included in the above-mentioned review due to a lack of information on diagnostic accuracy [71].

In preliminary work by the authors, the questionnaire was translated into German and validated [88]: The questionnaire showed limitations in terms of psychometrics, applicability, and wording: In the German translation, suicidal behavior is indicated by the phrase 'sich etwas antun' (hurt yourself). We consider this expression too vague, as it may refer to self-harm / non-suicidal auto-aggression – a related but distinct behavioral phenomenon [89].

The unspecific construct definition of suicidality is a challenge for research [90]. The dichotomous and inconsistent response options do not allow the identification of mild changes in tendencies toward improvement or worsening.

Additionally, the phrasing of the P4 questions assesses suicidality in medical history without temporal limitations, focusing on lifetime prevalence ('Have you ever…'). However, the need

for intervention or further consultation depends on present suicidal tendencies [91], which should be considered for treatment decisions.

The internal consistency (Cronbach's α = 0.44) of the P4 scale is low [88].

1.9. Project goals

Project goals were also specified in previous publications (Suizidprophylaxe [2]) and current submissions (British Journal of Psychiatry [BJPsych Open Open] [1]) by the author.

Based on the concepts of the P4 and the PMH, the aim of this validation study was to develop a short questionnaire for the assessment of suicidality with a solid psychometric and factor analytic foundation and to compare it with established instruments for the assessment of mental disorders and suicidality. We aimed to generate a broad and diverse sample through a variation of recruitment strategies and settings.

Key innovations were the adaptation of the instrument for use in primary care settings and the inclusion of protective factors. In addition to mental health professionals, primary care physicians and patients were involved in the development of this tool to ensure high content validity and practical application in routine care.

1.10. Research questions

I. Descriptive analysis of the sample

What is the socio-demographic characteristic of the sample? What medical, especially mental health conditions are present and what were typical reasons for seeking counselling? How prevalent and severe are depressive and suicidal tendencies at the present time and in the past?

These fundamental questions serve as a baseline to gain a comprehensive understanding of the analyzed study sample. In line with the overall goal of the graduate program to improve primary care for patients with depression (and multi- and comorbidities), associations with other mental disorders or somatic symptoms were explored. We expected descriptively higher correlations with reference questionnaires asking for suicidality than for mental disorders or somatic symptoms.

II. Compare recruitment strategies

Does the recruited sample differ in terms of sociodemographic factors or symptom severity depending on the recruitment method?

It is important to assess whether there are potential biases or differences between traditionally or online recruited patients in order to determine the generalizability of the results. We expected the online recruitment strategy used to lead to a similar sample as the traditional approach.

III. Compare treatment settings

How do treatment settings differ in terms of demographics and symptom severity?

To gain insight into the response patterns of suicidal patients, group comparisons of different treatment settings were conducted. The instrument was tested among depressive / suicidal patients in different treatment settings (e.g. outpatient psychotherapy, day clinic, inpatient psychiatry, etc.), but adapted and optimized for outpatient (primary) care. In more intensive treatment settings, we expected higher symptom severity.

IV. Factor structure

What is the factor structure of the newly developed questionnaire and how well does the model fit the data?

These methodological questions are essential for the validation of the instrument. The integration of protective aspects means that one-dimensionality is not anticipated.

V. Psychometric criteria and diagnostic accuracy

How can the new questionnaire be evaluated from a psychometric point of view? How well does the questionnaire perform in terms of diagnostic accuracy, particularly regarding positive and negative predictive values?

These questions aim to provide an assessment of the reliability, validity and predictive value of the instruments used in this study. Cut-offs and recommendations for follow-up care were derived based on the questionnaire scores. The scale is intended to be used both as a complementary support for decision making and as a monitoring tool. The questionnaire design enables a psychometrically sound instrument.

VI. Acceptance and further development

How will the new tool be accepted in daily practice and what additional adjustments are needed to ensure its usability and acceptance by patients and practitioners?

This final question is intended to ensure that the solutions developed are practical and user-friendly. By including all relevant target groups, a high level of content validity can be assumed.

2. Methodology

In this chapter, we outline the methodology used in our study, beginning with the study design, which serves as the foundation for the research structure.
Next, we explain the development of the questionnaire design, detailing the processes of cognitive pretesting and adjustments based on feedback received. Subsequently, the preliminary version of the questionnaire intended for validation is presented, including the German version and the English translation. The validation of the questionnaire itself is described in detail, including inclusion and exclusion criteria, recruitment strategies, sample details, and data collected. Finally, we address the ethical considerations relevant to our research.

This study is part of the DFG-funded research training group POKAL (DFG-GRK 2621 POKAL „PrädiktOren und Klinische Ergebnisse bei depressiven ErkrAnkungen in der hausärztLichen Versorgung“ - Predictors and outcomes in primary depression care [49]) with the aim to improve the care of patients with depression in the primary care setting. Within the POKAL framework and its three main research areas, i.e. diagnosis, treatment and their implementation, this project contributes to the field of diagnostics.

2.1. Study design

Döring and Bortz (2016) have identified nine criteria that help to distinguish between different study designs: These criteria relate to the theoretical approach of the study, what it aims to find out, what the study is about, where the data come from, what the researchers are interested in, how groups are formed and managed in explanatory studies, where the study takes place, how often data are collected, and how many subjects are involved [92].

These criteria help us to categorize the research design of both project phases (questionnaire development and validation): We used a qualitative approach for questionnaire development applying cognitive pretests. In accordance with the definition, we addressed open research questions and an unstructured data collection method on a small number of subjects, which allowed us to gain a deeper insight into the subjects' perspectives and understanding of the questionnaire. This methodological study can also be considered as an applied science, aiming practical relevance to a pre-defined group. The independent, empirically based, original study approach could also be described as a primary analysis with an exploratory and explanatory research interest. We could not control for practice-related confounding variables such as delays due to emergencies, waiting times, time pressure, and noise. Furthermore, the sample of this validation study was not randomized [92].

2.2. Development of questionnaire design

The questionnaire development and composition were previously published in the German Journal *Suizidprophylaxe*. [2].

The newly designed instrument for **Su**icide prevention in **Pr**imary care “SuPr-X” is divided into two parts (I. Risk factors across the lifespan, II. Risk and protective factors in the past two weeks) and three subsections within part II. (1. Suicidal ideation, 2. Suicidal behavior, 3. Protective factors (Figure 2), which were developed based on the literature and current theoretical considerations, and which the author believes are well suited to the needs of primary care.

We first presented the initial version in November 2021 to the entire POKAL consortium (www.pokal-kolleg.de) and subsequently developed it taking psychological, psychiatric and general medical expertise into account [49].

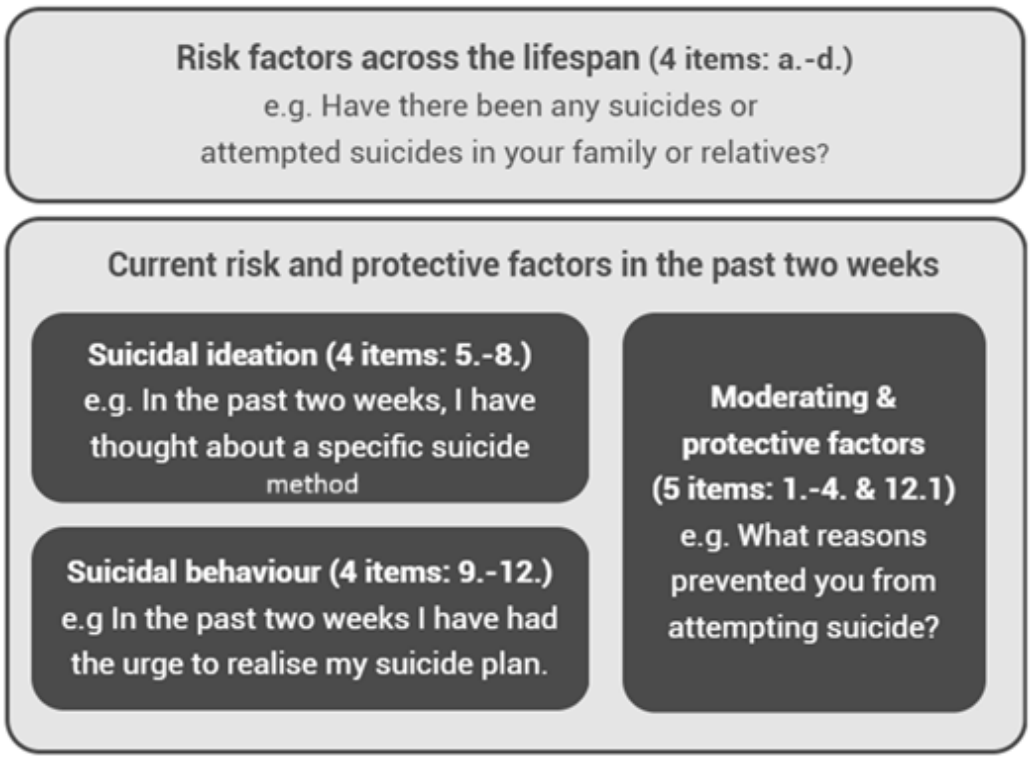

Figure 2. Structure and included aspects of the new SuPr-X questionnaire [2]

Part 1 - Four items on basic risk factors and lifetime suicidality: 90% of those who died by suicide had a mental illness, especially from the affective spectrum [93]. However, it is not only mental illnesses that cause suicide; specific life circumstances, physical illnesses, biographical aspects, and personality traits also contribute to mental stress and suicide [94]. Previous suicide attempts are crucial in assessing the risk of further attempts: 28% will attempt again within ten years [95]. It is known that suicide risk is passed on in families, with relatives at risk up to five times more than the general population [25, 96].

However, these questions on lifetime prevalence do not provide general practitioners with information for decision support whether and how to treat someone who is potentially suicidal.

The second part of the questionnaire is designed to collect indicators of current suicidality: risk and protective factors of the past two weeks (Figure 2).
During the study, participants completed both parts of the questionnaire once, but in clinical or outpatient care the second part could be used regularly to monitor progress or trends. Patients rate each item on a scale from 0 "strongly disagree" to 3 "strongly agree".

The literature recommends a clear distinction between suicidal ideation and suicidal behavior, underlining the importance of making a graded assessment of thoughts, plans, intentions, self-harm with or without the intent to die, and suicide attempts [15, 97, 98]. Additionally, there are various degrees of escalation in suicide risk: actions typically follow thoughts [98]. Other diagnostic tools have also shown this classification in several factor analyses [99, 100].

Four items in the new questionnaire deal with a mental stage of suicidal ideation, beginning with a passive wish to die and proceeding to concrete consideration of a suicide plan (subsection 1). Four additional items deal with suicidal behaviors that include realization intentions and concrete preparations, self-harming activities and suicide attempts (subsection 2).

In addition, five items address protective aspects (subsection 3). These items correspond to the statements of the "Positive Mental Health" scale [86], the factor structure of "Reasons for Living" [101] and the German short version BRFL "Brief Reasons For Living" [102]. These instruments focus on reasons that prevent a person from attempting suicide. Factor analyses repeatedly identified six major reasons: survival and coping beliefs; responsibility to family; child-related concerns; fear of suicide; fear of social disapproval; moral objections [101-103] [101-103]. Similar reasons were found in an analysis of the P4 with the corresponding "4 F's": Family, Future Hope, Faith, Fear of Failure in the Suicide Attempt" [87, 88].

In summary, the newly designed questionnaire has the following structure: Assessment of lifetime / basic risk and current suicidality - including suicidal ideation (passive/active thoughts,

plans), suicidal behavior (preparations, self-harm and attempts), and protective reasons (aspects of BRFL & PMH) [2].

2.2.1. Cognitive pretesting

We tested the comprehensibility and usability of the preliminary questionnaire version by cognitive pretests. These tests also provided insight into the question's difficulty and potential burdens of answering [104].

Therefore, we recruited ten general practitioners from Munich or the surrounding area via telephone and e-mail and subsequently conducted cognitive interviews with ten patients who had currently or previously experienced depressive symptoms or suicidal ideation. We tested the questionnaire on a sample of 20 participants (10 GPs, 10 patients) with sufficient language skills in German and the ability to give voluntary and informed consent to participate. We arranged cognitive pretest interviews in the practices.

After obtaining consent for audio recording, we instructed participants to read the questionnaire and "think aloud," encouraging them to verbalize all thoughts, even those that might seem trivial [2]. If necessary, the interviewer would follow up on the participant's responses. Participants could also give open feedback and suggest modifications.

Patients did not discuss their own experiences with suicidality (i.e., they did not answer the actual items of the questionnaire), but commented on about unclear items, desired changes in wording or order of items, font size, suggestions for additional content, and simplifying language.

Immediately after each interview, we conducted an analogous transcription to evaluate the questionnaire. The transcribed interviews did not contain personal information. We removed any personal statements and comments made during the interviews that could have compromised anonymity and deleted the audio files after transcription.

The comments from each interview were subsequently reviewed with the principal investigators and possible adjustments to the questionnaire were debated. This iterative process of item selection and adaptation over multiple interviews ensured high content validity.

2.2.2. Adaptation of questionnaire design via cognitive pretesting

Our key findings from interviews with GPs, patients and a patient's representative resulted in the following implications for the developed questionnaire:

A essential requirement from GPs was that the questionnaire should take as little time as possible. Therefore, the questionnaire should contain as few items as possible and as many as necessary, based on the psychometric sub criterion of usability.

In the original evaluated version, skipping rules were included to shorten the questionnaire for time efficiency reasons. The skipping rules would have been applied if patients denied any form of dead wish or suicide attempt in their lifetime medical history. However, at the request of the general practitioners (and at the cost of time efficiency), these skipping rules were removed, meaning that all patients must complete all questions. GPs were concerned about missing a vulnerable person.

It was also important for them to receive guidance on how to start the interview without being too harsh. The order of questions was adjusted to start with positive mental health questions (e.g., self-confidence, life goals, etc.), followed by history and current risk factors, and concluding with a protective assessment. In this way, the more 'hard to manage' questions were placed in the middle.

The layout had to be adjusted several times to ensure that the instructions were not overlooked and did not distract from the main content of the interview. Some doctors preferred to conduct the assessment as an interview, so that they could tell when a patient was not being straightforward, other GPs preferred to hand over the questionnaire to the patient and discuss given answers afterwards due to time constraints.

It was also important for doctors to use plain language, for example, to have an alternative to the word 'suicide' which is a Latin loanword. Therefore, the instructions included an explanation and an alternative German word (“Selbsttötung”) in plain language [2].

From the patient's perspective, subtle distinctions were often not intuitively understood, for example the difference between "a desire to be dead" and "a wish to die", or "thinking about suicide" and "seriously considering suicide". On the other hand, a stronger distinction was needed for reasons that prevent a suicide attempt, e.g. family. In the example of the category "family" this means (1) "responsibility for..." and (2) "support from...".

Redundancies or unspecific wording (e.g. the question "do you feel balanced?") were linguistically adjusted or removed. In addition, the questionnaire was improved so that the wording and order of the questions were not too overwhelming from the patient's perspective. For example, the first item on suicidal ideation was changed from active language ("Have you

ever wished you were dead?") to more passive language ("Have you ever wished you were not alive?"). The challenge was to create smooth transitions in the wording without circumlocution. From the patient's point of view, plain language was also usually preferred, with straightforward, specific questions.

Over time and after several evaluation cycles, the need for iterative adjustments decreased, as major improvements were identified after the first few interviews. At this point the cognitive pretests were finalized and the preliminary version of the questionnaire for the subsequent validation study was set [2].

2.3. Preliminary version for questionnaire validation

The German version of the questionnaire is presented below (see chapter 2.3.1), subsequently followed by an English translation (see chapter 2.3.2), which is as literal as possible.

Although an English translation has been added for a better understanding, it must be noted that the questionnaire validation was carried out exclusively on the basis of the German version. In order to be able to use the questionnaire in English, it would be necessary to carry out another validation study and to re-test the psychometric quality criteria.

2.3.1. German preliminary SuPr-X questionnaire

SuPr-X Fragebogen

Bitte lesen Sie die Fragen sorgfältig durch. Für die Studie ist es wichtig, die Fragen möglichst vollständig zu bearbeiten. Es gibt keine richtigen oder falschen Antworten. Es ist auch in Ordnung, wenn Sie keine Antwort geben können oder wollen. Notieren Sie in diesem Fall bitte „k.A" daneben.

Teil I: Wie stark treffen folgende Aussagen auf Sie zu?	Trifft gar nicht zu	Trifft eher nicht zu	Trifft eher zu	Trifft völlig zu
1. In den letzten zwei Wochen war ich im Allgemeinen zuversichtlich.	**0**	**1**	**2**	**3**
2. In den letzten zwei Wochen hatte ich Ziele im Leben.	**0**	**1**	**2**	**3**
3. In den letzten zwei Wochen fühlte ich mich dem Leben und seinen Schwierigkeiten gewachsen.	**0**	**1**	**2**	**3**
4. In den letzten zwei Wochen war ich alles in allem zufrieden mit meinem Leben.	**0**	**1**	**2**	**3**

Teil II:

a. Haben Sie schon mal wegen psychischer Beschwerden eine/n Arzt/Ärztin oder andere/n Behandler/in aufgesucht, z.B. Psychologe/in, Therapeut/in, Heilpraktiker/in, o.Ä.?

☐ Nein

☐ Ja wenn ja, welche Beschwerden? _____

b. Manchmal sind Menschen so sehr niedergeschlagen, dass sie den Wunsch haben, nicht am Leben zu sein. Haben Sie sich jemals gewünscht, lieber nicht am Leben zu sein?

☐ Nein

☐ Ja wenn ja, wann? _____ wie oft? _____

c. Haben Sie jemals versucht sich das Leben zu nehmen?

☐ Nein

☐ Ja wenn ja, wann? _____ wie oft? _____ wie? _____

d. Kamen in ihrer Familie oder Verwandtschaft Suizid -oder Suizidversuche vor?
*(*Suizid ist ein anderes Wort für Selbsttötung)*

☐ Nein

☐ Ja wenn ja, bei wem? _____ wann? _____

Teil III: Wie stark trafen folgende Aussagen auf Sie zu?

	Trifft gar nicht zu	Trifft eher nicht zu	Trifft eher zu	Trifft völlig zu
5. In den letzten zwei Wochen hatte ich den Wunsch zu sterben.	**0**	**1**	**2**	**3**
6. In den letzten zwei Wochen habe ich darüber nachgedacht mir das Leben zu nehmen.	**0**	**1**	**2**	**3**
7. In den letzten zwei Wochen habe ich mir Gedanken zu einer bestimmten Suizidmethode gemacht.	**0**	**1**	**2**	**3**
8. In den letzten zwei Wochen habe ich über einen konkreten Suizidplan nachgedacht.	**0**	**1**	**2**	**3**
9. In den letzten zwei Wochen hatte ich den Drang meinen Suizidplan umzusetzen.	**0**	**1**	**2**	**3**
10. In den letzten zwei Wochen habe ich Vorkehrungen für die Zeit nach meinem Suizid getroffen.	**0**	**1**	**2**	**3**
11. In den letzten zwei Wochen habe ich mich absichtlich verletzt und / oder in Gefahr gebracht und dabei den Tod in Kauf genommen.	**0**	**1**	**2**	**3**

12. Haben Sie in den letzten zwei Wochen einen Suizidversuch unternommen?

□ Ja

□ Nein

12.1 Welche Gründe schützten Sie vor einem Suizidversuch? *(Mehrfachauswahl möglich)*

- □ Das Vertrauen in die eigene Stärke, die Schwierigkeiten schon irgendwie bewältigen zu können
- □ Die Zuversicht oder Hoffnung auf Besserung
- □ Die Verantwortung für andere
- □ Die Unterstützung durch Familie, Freunde oder andere soziale Kontakte
- □ Die Angst vor dem Tod oder der Selbsttötung
- □ Moralische oder religiöse Bedenken
- □ Die Sorge vor Missbilligung oder der Reaktion des Umfelds
- □ Sonstige Gründe: _____

2.3.2. English translation of preliminary SuPr-X questionnaire

SuPr-X questionnaire

Please read the questions carefully. It is important for the study that you answer the questions as completely as possible. There are no right or wrong answers. It is also okay if you cannot or do not want to give an answer. In this case, please write "n/a" next to it.

Part I: How strongly do the following statements apply to you?	Strongly disagree	Rather disagree	Rather agree	Strongly agree
1. In the last two weeks, I was generally confident.	**0**	**1**	**2**	**3**
2. In the last two weeks, I have had goals in life.	**0**	**1**	**2**	**3**
3. In the last two weeks, I felt able to cope with life and its difficulties.	**0**	**1**	**2**	**3**
4. In the last two weeks, I was satisfied with my life.	**0**	**1**	**2**	**3**

Part II:

a. Have you ever consulted a doctor or other practitioner, e.g. psychologist, therapist, alternative practitioner, etc., about mental health problems?

☐ No

☐ Yes if yes, about which complaints? _____

b. Sometimes people are feeling so depressed that they wish they were not alive. Have you ever wished you were not alive?

☐ No

☐ Yes if yes, when? _____ how often? _____

c. Have you ever tried to take your own life?

☐ No

☐ Yes if yes, when? _____ how often? _____ how? _____

d. Have there been suicides or attempted suicides in your family or relatives?
(explanation and alternative German word in plain language)*

☐ No

☐ Yes if yes, with whom? _____when ? _____

Part III: How strongly did the following statements apply to you?

		Strongly disagree	Rather disagree	Rather agree	Strongly agree
5.	In the last two weeks, I have wished to be dead.	**0**	**1**	**2**	**3**
6.	In the last two weeks, I have thought about taking my own life.	**0**	**1**	**2**	**3**
7.	In the last two weeks, I have thought about a specific method of suicide.	**0**	**1**	**2**	**3**
8.	In the last two weeks, I have thought about a specific suicide plan.	**0**	**1**	**2**	**3**
9.	In the last two weeks, I have had the urge to realize my suicide plan.	**0**	**1**	**2**	**3**
10.	In the last two weeks, I have made preparations for the time after my suicide.	**0**	**1**	**2**	**3**
11.	In the last two weeks, I have intentionally injured myself and / or put myself in danger, risking my own death.	**0**	**1**	**2**	**3**

12. Have you attempted suicide in the last two weeks?

☐ Yes

☐ No

12.1 What reasons prevented you from a suicide attempt? *(multiple choice possible)*

☐ Confidence in your own strength to be able to overcome the difficulties somehow

☐ Faith or hope for improvement

☐ Responsibility for others

☐ Support from family, friends or other social contacts

☐ The fear of death or suicide

☐ Moral or religious concerns

☐ Concern about disapproval or the reaction of others

☐ Other reasons: _____

2.3. Questionnaire validation

Inclusion and Exclusion Criteria are also described in submitted papers by the author (currently under review BJPsych Open [1], Journal of Medical Internet Research (JMIR) Mental Health [105]).

2.3.1. Inclusion criteria

From discussions with general practitioners, for which the instrument is primarily being developed, we were able to conclude that a questionnaire would be particularly used in cases of presumed depression and for a subsequent detailed assessment.
Although universal screening is approved in a few guidelines (e.g. recommendation of the US Joint Commission [106] or implementation in a Safety-Net Hospital System [107]), it is currently not recommended by German national guidelines [108].

Moreover, suicidality occurs not exclusively, but predominantly with affective disorders, especially outside of the inpatient settings [109]. We therefore aimed to have at least a bare minimum of depressive symptoms as an inclusion criterion. A score of 10 on the PHQ-9 is often suggested as a cut-off for diagnosing depression. However, we did not only want to validate the questionnaire for people with a diagnosis of major depression (ICD 10: F32/33 [110]). We also wanted to validate its use in a population with only mild (comorbid) symptoms of depression - regardless the actual diagnostic certainty of depression, since suicidality can occur with several disorders [109].

In a validation study of the PHQ-9, the total score for patients with all depressive disorders was M = 11.7 (SD = 5.0) [111]. Subtracting the standard deviation and round-down to whole numbers, the cut-off would be 6 points.

A POKAL study [112], in which the PHQ-9 was assessed in all GP patients (not only with presumed depression), showed an average score of m=5.06 (95%-CI: 4.5 - 5.7). Based on the upper confidence interval rounded up to whole numbers, this also resulted in a cut-off score of 6 points.

Based on these considerations, we set the inclusion criterion for our study at a PHQ-9 sum score ≥ 6 in order to also include people with mild depressive symptoms. In addition, the cut-off for inclusion was no longer necessary once a respondent scored >0 on PHQ-9 item 9 regarding suicidal ideation.

2.3.2. Exclusion criteria

In research studies, patients with schizophrenia (ICD-10: F2 [110]) are often excluded. As schizophrenia often involves suicidality [109], these patients were not explicitly excluded from this study. However, all participants had to be cognitively and verbally capable of giving informed consent and completing the German questionnaire set which required approximately 30 minutes.

Accordingly, we refrained from giving the questionnaire to cognitively impaired individuals or patients with severe positive symptoms of psychosis (e.g. hallucinations, disorganized thinking).

In addition, underaged participants were excluded from participating in the study.

2.3.3. Recruitment strategies

The recruitment strategies have been presented in a previous paper, submitted by the author in 2024 to the Journal JMIR Mental Health, currently under review [105].

Patients were recruited between July 2022 and February 2024 (20 months). We applied a combination of traditional and online recruitment strategies: Traditional methods included direct outreach to physicians and therapists and handing out leaflets. From September 2023 to February 2024, we expanded our efforts to include social media and online advertising through platforms such as Facebook, Instagram, TikTok, and Google Ads.

Traditional recruitment was conducted in 20 general and 12 psychotherapy practices in Germany (mostly Bavaria) and Austria. Of the outpatient doctors and therapists (71,8% female, 28,1% male), eleven worked in individual practices, 13 in group practices and eight in medical care centers (“Medizinisches Versorgungszentrum” - MVZ). Additionally, we recruited in five inpatient psychiatric wards and two daycare clinics.

The 39 recruitment sites are distributed across nine practices / clinics in metropolises (Munich) (>1 million inhabitants), three practices / clinics in large cities (>100,000 inhabitants), eight practices / clinics in medium-sized towns (>20,000 inhabitants), 14 practices / clinics in small towns (>5000 inhabitants) and four practices / clinics in rural regions (<5000 inhabitants) (Figure 3).

Figure 3. Collaborating recruitment sites throughout Germany and Austria

We contacted practitioners at events (e.g. TdA “Day of General Practice” LMU training series; BHAEV “Bavarian General Practitioners Association “) and conferences (e.g. DEGAM “German Society of General Practice and Family Medicine”, DGPPN “German Association for Psychiatry, Psychotherapy and Psychosomatics”, DGS “German Association of Suicide Prevention”), by telephone and by e-mail to inform them about the study.

Interested clinicians subsequently received all necessary materials to enroll patients in the study. Considering the inclusion criteria, practitioners were expected to identify and recruit suitable patients with depressive symptoms.

Patients who learned about the study from online campaigns and met the inclusion criteria, as assessed by an online pre-screening with the PHQ-8 (short form of PHQ-9 without the item related to suicidality [113]), could make an appointment at the Institute for General Practice

and Family Medicine in Munich, Germany. Appointments could be made either through a shared calendar or through a telephone patient service.

During these appointments, study psychologists or physicians conducted an informational interview, reviewed the inclusion criteria, and provided the questionnaire for participants to complete on site. The results were then discussed with the participants, with particular attention to questions about current suicidal tendencies. In appreciation of their participation, all participants received a €25 shopping voucher [105].

2.3.4. Sample

The analysis and composition of the sample have been presented in a previous paper, submitted by the author in 2024 to the Journal JMIR Mental Health, currently under review [105].

Between July 2022 and February 2024, 521 patients with depressive symptoms were recruited for the study (Figure 4).

Of these, 282 were recruited using traditional methods, representing 54% of the total participants. This group included patients recruited by general practitioners (GP cohort, n=105), psychotherapists (PT cohort, n=50), a psychosomatic day clinic (n=74) and a psychiatric inpatient unit (n=53).

Among the inpatients, there were also 23 subjects who were acutely suicidal: these patients attempted suicide in the previous two weeks; were hospitalized under the Bavarian Psychiatric Care Act (BayPsychKHG) because they were at risk of harming themselves in a sense of suicidal behavior; or were prohibited from leaving the secure wards alone for a certain period of time because they were at risk of self-harm.

239 Patients (46% of the total study population) were recruited online and via social media and were subsequently invited to the Institute of General Practice and Family Medicine, LMU Munich. We collected data on the type and provider of treatment and who the patients identified as their primary care provider.

Of these, 230 (96.2%) had a general practitioner (GP), with 106 (46.1%) reporting that their GP was their main healthcare provider. In addition, 131 (54.5%) were linked to psychiatric services (PSY), with 51 (38.9%) considering the psychiatrist to be their main healthcare provider. Furthermore, 118 (49.4%) were involved in psychotherapy (PT), with 66 (55.9%) considering their psychotherapist as their mostly involved practitioner. Finally, 51 (21.3%) regularly consulted other doctors or therapists (such as neurologists or pain specialists), with 17 (33.3%) considering these professionals as their main medical contact. [105].

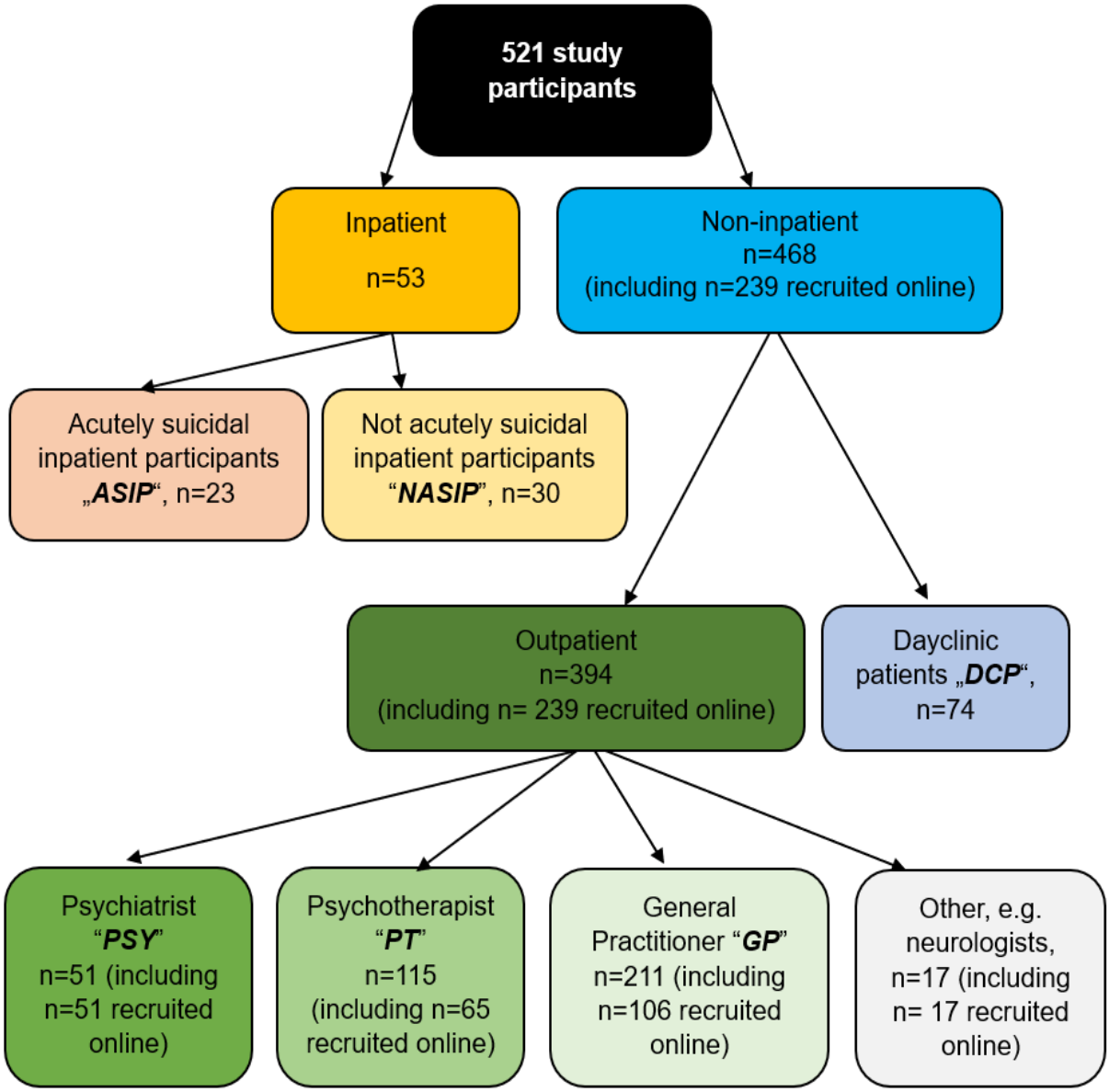

Figure 4. Sample and settings

2.3.5. Data collection

The presentation of used measures in this study is part of the supplemental material of a submitted paper (currently under Review BJPsych Open) by the author [1].

After being informed and giving their consent, patients received a set of questionnaires to complete, either from their practitioners or from a member of the study team. The questionnaire set contained the newly developed questionnaire on suicide prevention SuPr-X, two reference questionnaires to assess suicidality (Beck Scale for Suicide Ideation (BSS) [114] & Brief Reasons for Living (BRFL) [102]), as well as questions on socio-demographics, co/multimorbidity (e.g. depression, anxiety, post-traumatic stress disorder, somatic symptoms) and medication:

2.3.5.1. PHQ-9

The Patient Health Questionnaire-9 (PHQ-9) is part of the larger PHQ-D Mental Health Questionnaire [115]. The PHQ-9 focuses on assessing depression over the past two weeks using nine items (on a scale from 0 "not at all" to 3 " nearly every day"), with a total score ranging from 0 to 27. The PHQ-8 is an abbreviated form that does not include the death wish / suicidal ideation items of the PHQ-9 [113].

The severity of depression is categorized based on the total score: Minimal depression (0-4), mild depression (5-9), moderate depression (10-14), moderate depression (15-19), severe depression (20-27) [116].

It has been validated in German and is widely used in primary care. The PHQ-9 has good psychometric properties, making it a reliable and valid instrument [81].

2.3.5.2. BSS

The Beck Scale for Suicide Ideation (BSS) is based on a self-report of the past week using 21 items on a three-point scale (0-2). Items 1-5 are used as a screening assessment. All subsequent items are answered if there is a suicidal wish (item 4) or a refusal to save oneself in a life-threatening situation (item 5).

Items 1-19 measure the presence and intensity of suicidal ideation and the extent to which the individual wants to live or die. Items 20-21 focus on the individual's history of suicide attempts, but those items are not included in the total score.

The total score ranges from 0 to 38, with a higher score indicating more severe suicidal ideation. The authors do not report a severity classification using cut-offs [117], and the German version appears to be valid and reliable [114].

The BSS is not a gold standard for assessing suicidality, but it is one of the most frequently used questionnaires [70].

2.3.5.3. BRFL

The Brief Reasons for Living (BRFL) [118] was derived by factor analysis from the "Reasons for Living" [101] and validated in German [102]. It is a short, 12-item self-report instrument designed to evaluate positive beliefs and attitudes that support the desire to live.

This inventory includes six distinct subscales: fear of suicide, responsibility to family, survival and coping beliefs, children-related concerns, moral objections, and fear of social disapproval. Each of the 12 items is rated on a 6-point scale, with (1) representing "not at all important" and (6) representing "extremely important".

Higher scores on both the overall BRFL and its individual subscales indicate stronger reasons for choosing to live. The reasons listed in item SuPr-X 12.1 are based on this factor structure.

2.3.5.4. GAD-7

The GAD-7 is a commonly used screening instrument for the severity of generalized anxiety disorder (GAD) [119]. it includes 7 questions about anxiety symptoms over the past two weeks. Answers are rated on a 4-point scale from 0 'not at all' to 3 'almost every day'.

The total score is used to measure the severity: Minimal or no anxiety (0-4), mild anxiety (5-9), moderate anxiety (10-14) and severe anxiety (15-21).

The GAD-7 is an established tool for clinical and research use. It has been validated in German primary care settings and has demonstrated valid and reliable results [120].

2.3.5.5. PHQ-15

Like the PHQ-9, the Patient Health Questionnaire-15 (PHQ-15) is part of PHQ-D [111]. The PHQ-15 assesses somatic symptoms over the past four weeks and consists of 15 items, each scoring from 0 ('not bothered at all') to 2 ('bothered a lot'), with a total score that ranges from 0 to 30.

The somatic symptoms is classified on the total score: minimal (0-4), low (5-9), moderate (10-14) and high (15-30) severity [121]. The PHQ-15 is validated in German [122, 123] with good psychometric properties for use in primary care [124].

2.3.5.6. PC-PTSD-5

The Primary Care PTSD Screen is a screening tool developed to detect patients with posttraumatic stress disorder according to the DSM-5 criteria [125]. It has 5 items asking about PTSD symptoms over the last four weeks on a dichotomous scale (yes/no).

A score of 3 or more affirmed responses are considered an indicator of PTSD that should follow a more detailed assessment. The PC-PTSD-5 is used in primary care for screening and it has been validated in German [126].

2.3.5.7. Acceptability Questionnaire

We also used an adapted acceptability questionnaire, based on the one used by Gräfe et al. to evaluate the PHQ-9 in 2004 [111], to evaluate the new SuPr-X instrument.

The acceptance questionnaire focuses on the assessment of patients' feedback on their experience of completing a health questionnaire. Five key items are included in the questionnaire: Patient satisfaction, difficulty level, time consumption, perceived usefulness for medical treatment, willingness to complete similar questionnaires in the future.

2.3.6. Statistical analyses

The reported statistical analyses is also part of a submitted paper by the author - currently under Review BJPsych Open [1].

We used R 4.3.3. [127] and SPSS version 29 [128] for all calculations. The "factoextra" package was used to visualize and interpret the results of the factor analysis [129]. The "psych" package served for psychometric analyses, Bartlett's tests, KMO measures, eigenvalues and scree plots [130]. The "nFactors" package provided eigenvalue analysis and additional criteria for determining the number of factors [131]. The "corrplot" package was employed for the visualization of correlation matrices [132]. The "lattice" package has been applied to generate scree plots [133]. The lavaan package was implemented to perform exploratory and confirmatory factor analyses (CFA) using the WLSMV estimation method [134]. The package "semPlot" was used to plot the results of factor analyses and structural equation models [135].

2.3.6.1. Group differences among recruitment strategies or treatment settings

Statistical Analyses of group differences among recruitment strategies was also reported in a submitted paper (currently under review JMIR Mental Health) by the author [105].

A chi-square test was used to compare nominally scaled gender distribution and different group settings. Since only two non-binary patients participated in total, 1-6 cells have an expected frequency of less than 5.

For age comparison we conducted different tests depending on violations of assumptions. Within recruitment strategies (traditional vs. online), we conducted a t-test. Data was not normally distributed for each online recruitment channel (Shapiro-Wilk test, $p < .05$); therefore, we chose a non-parametric test.

Kruskal-Wallis test was conducted to analyze whether age differences exist depending on the online recruitment channel (Facebook vs. Instagram vs. TikTok vs. Google, etc.). Pairwise post-hoc tests were corrected according to Bonferroni. Data was not also normally distributed in every treatment group (GP vs. PT vs. PSY, etc.) and homogeneity of variance could not be assumed (Levene’s test, p =.028). Therefore, we conducted a robust Welch's ANOVA for treatment group comparison of age.

A non-parametric Mann-Whitney-U-Test for ordinally scaled items was calculated to determine if there were (sub)group differences depending on the recruitment strategy or channels, regarding depression symptoms measured by PHQ-9.

We also conducted a Mann-Whitney-U test to determine possible differences in reported suicidality between recruitment methods measured by the SuPr-X risk scale (sum score of items 5–11) and BSS screening (sum score of items 1–5).

We conducted a non-parametric Kruskal-Wallis test to determine treatment group differences in symptom severity using non-metric-scaled questionnaires for depression (PHQ-9), suicidality (SuPr-X, BSS), anxiety (GAD-7), somatoform disorder (PHQ-15), PTSD (PC-PTSD-5), as well as preventive reasons using BRFL - with subsequent Dunn-Bonferroni post-hoc comparisons.

Any p-value less than 0.05 indicated statistical significance. For the calculation of the effect sizes, r according to Cohen was calculated to match the non-parametric tests and to compare the medians, in which the amount of Z is divided by the square root of the sample size with divisions into small (0.1–0.3), medium (0.3–0.5), and large (>0.5) effects [136].

2.3.6.2. Factor analyses

The reported statistical analyses of the following chapters is part of a submitted paper by the author - currently under Review BJPsych Open [1].

For the exploratory (EFA) and confirmatory (CFA) factor analysis, we only considered the ordinal and Likert-scaled items of the SuPr-X questionnaire (items 1-11), which provide information about protective factors and suicidal tendencies in the last two weeks.

For this purpose, the dataset was randomly divided into two independent sub-sets. An exploratory factor analysis (EFA) was conducted to analyze the underlying structure of the variables. A subsequent confirmatory factor analysis was conducted in order to retest the structure and model fit of the questionnaire. Missing values were excluded listwise. The adjusted EFA dataset contained n=256 and the adjusted CFA dataset contained n=259 complete cases.

There are favorable conditions for carrying out factor analysis. Essentially, the question is whether the correlations between the items can be explained by a common cause in the sense of an underlying latent variable. The items should have substantial correlations with each other. This can be tested using the Bartlett test, which detects whether the correlations in the correlation matrix are not equal to zero and whether there are underlying factorial relationships in the correlation matrix.

The Kaiser-Meyer-Olkin (KMO) coefficient is another useful indicator. Critical items can be found using the individual Measure of Sampling Adequacy (MSA) coefficients. If the KMO and MSA coefficients are below 0.50, the content validity of the item should be critically reviewed.

However, the removal of items from an analysis should be based primarily on content considerations.

The results of the Bartlett's test were significant $\chi^2(55) = 1512$, $p < 0.001$, indicating that the correlation matrix deviates significantly from a unit matrix. Kaiser-Meyer-Olkin (KMO) test calculations resulted in a value of 0.865, indicating a good suitability of the data for factor analysis.

In addition to the global KMO value, we calculated individual Measure of Sampling Adequacy (MSA) values for each variable. The MSA values for the individual variables ranged from 0.825 to 0.919, indicating that all variables were well suited for factor analysis.

There are different methods to determine the number of factors. However, no method is reliable for determining the true number of factors in a population. Some historical methods include the "eigenvalue greater than one" criterion or the Scree test. Parallel analysis or information criteria are commonly used today. The Maximum-Likelihood-hypothesis-test (ML-test) and the minimum average partial (MAP) test are used less frequently. The empirical Kaiser criterion (EKC) is a good way to estimate the number of factors in the population. Usually, several criteria are used, and the best-interpretable factor solution is used. The parallel analysis and the Empirical Kaiser Criterion should be standard for factor extraction. If a model is unclear and equally interpretable, information criteria can help decide on the number of factors. However, the best criterium for factor extraction is the interpretability of the solution [137].

The Weighted Least Squares Mean and Variance adjusted (WLSMV) estimation method is a robust method for estimating structural equation modeling (SEM) models that is suitable for categorical or ordinal data. It takes the variance and the mean values of the observations into account to provide reliable results. The initial solutions are usually not easy to interpret. For this reason, researchers try to achieve an easily interpretable structure in which there are high significant loadings on one factor and at the same time only low loadings on the other factors.

The intention of a suitable orthogonal or oblique rotation is to find factors that have a simple structure. Varimax rotation which is the most common orthogonal rotation method leads to uncorrelated factors, while promax or oblimin rotation which are the most common obliqe rotation methods lead to correlated factors [137]. In situations where factors are expected to be highly correlated and a simple structure of loadings is desired, geomin can be a very useful rotation method [138].

A series of fit indices have been developed, which assess the quality of the fit of the data with a model regardless of the sample size. They can be understood in a similar way to effect sizes in the context of mean value comparisons [137]. Root-Mean-Square-Error of Approximation - the RMSEA represents the typical deviation of the data from the model per degree of freedom.

The Standardised Root-Mean-Squared Residual (SRMR) indicates the standardized typical deviation between estimated values of the implicit correlation matrix and the sample correlation matrix. Comparative Fit Index (CFI) checks the deviation from a zero or independence model [139]. RMSEA, SRMR and CFI are reported as global model fit indices.

2.3.6.3. Item analyses

Item difficulty values below 20% are considered too difficult, and those above 80% are considered too easy. However, the average deviation is what matters. Item discrimination shows how well an item measures a targeted construct or latent variable. It is specified using a Pearson correlation with the mean or sum of the remaining items on the latent variable.

The item discriminatory power is considered as sufficient >.30 and good >.40 [140], but very high discrimination can be an indicator of redundant items.

Communality explains how well the extracted factors explain the item variance. The communality of an item can be used to estimate its reliability. Values above .50 are considered good and above .70 very good [141].

Internal consistency (according to McDonald's omega ω [142]) takes the correlation between the items as well as the test length into account. Each individual item is regarded as an independent part of a test and correlated with the remaining test items. It stands for the measurement accuracy of the test.

Convergent validity refers to how well a test relates to other tests that measure the same (or similar) constructs, whereas discriminant / divergent validity should show no correlation with unrelated constructs.

Spearman's inter-item correlations as well as attenuation-corrected correlations with similar constructs are reported. Correlations are considered as weak $|\rho/r_{ac}|>.10$, moderate $|\rho/r_{ac}|>.30$ and strong $|\rho/r_{ac}|>.50$ [136].

2.3.6.4. Diagnostic accuracy

A binomial logistic regression model was conducted to see whether the SuPr-X contributes significantly to the prediction of previous suicide attempts as a major indicator for further attempts [143]. Goodness of fit was assessed by Hosmer-Lemeshow test with p>.05 indicating a good model fit. Nagelkerke's R^2 shows an acceptable (>.2), moderate (>.4) or good (>.5) amount of explained variance [144].

To assess the diagnostic accuracy of the SuPr-X risk factor scale, we furthermore performed a Receiver Operating Characteristic (ROC) analysis, which provides an assessment of

sensitivity (true positive rate) and specificity (true negative rate) across several thresholds. The SuPr-X risk scale was used as a test variable to predict the state variable lifetime suicide attempts ("c. Have you ever tried to take your own life?" - yes=1, no=0).

An area under the curve AUC of 1.0 indicates perfect separation between positive (affirmed suicide attempt in medical history) and negative cases (denied suicide attempt in medical history), whereas an AUC of 0.5 corresponds to a random classification [145].

Youden index (sensitivity + specificity - 1) was considered to determine cut-off values [146].

The positive predictive value (PPV) and the negative predictive value (NPV) are metrics for assessing the validity of diagnostic tests.
In our case, the PPV indicated the proportion of people who were actually classified as attempters according to the SuPr-X risk scale, who actually attempted suicide in the past and are therefore at higher risk of suicidal behavior.
The NPV shows how many people who were not identified as previous attempters by the SuPr-X risk scale, actually have not attempted suicide in the past and therefore have a lower suicide risk.
To calculate the PPV and NPV, the a-priori test probability, sensitivity and specificity are required. To define a-priori-probability, prevalence and individual risk factors have to be considered.

2.4. Ethical considerations

Patients identified as suicidal during the study were referred for outpatient or, if necessary, inpatient psychiatric or psychotherapeutic care. If an acute suicide risk could not be excluded, immediate transfer to a secure psychiatric ward was required. The Department of Psychiatry and Psychotherapy at the University Hospital of the LMU Munich, headed by Prof. Dr. Peter Falkai, acted as a psychiatric back-up clinic during the patient recruiting phase.

Participation in the study was voluntary for all patients and practices and could be terminated at any time without giving a reason. Withdrawal from the study had no negative consequences for the participant. The decision to participate voluntarily had to be informed and documented in writing by both patients and practice teams.

The explanation of the study, including the risk-benefit assessment, was provided by the treating or study physician / psychologist, who confirmed compliance with the duty to inform by signing the patient consent form. An additional consent forms covered the re-use of the collected data for various medical research purposes, the linking of the collected data with other research partners, permission to collect data from the treating physician, and contact by the research teams after the study was completed. Participation in the study was possible without agreeing to the optional consent forms, and consent could be withdrawn at any time.

The study complied with medical and psychological confidentiality and data protection laws. Personal survey data and findings about study participants were collected, stored, and pseudonymized, meaning that neither names nor initials nor exact dates of birth appeared in the encryption code. The encryption code was a combination of letters and numbers. Access to the original data and the encryption code was restricted to authorized personnel bound by confidentiality, and the decryption list had to be stored securely in a locked or password-protected location.

If patients agreed in the optional consent forms to be contacted again by the study team, their names and contact details were given to the study staff when they were collected by the treating practitioners. Otherwise, the Institute of Family Medicine and General Practice, LMU Munich received only pseudonymized questionnaire data.

Payment of the patient compensation (25€ shopping voucher per participation) was funded by the German Research Foundation and could not legally be made to 'unknown' participants in the event of an audit. However, patients had the right to remain anonymous to the study team and could participate without agreeing to the transfer of personal data. Compensation could only be processed if the relevant information was available.

If consent was withdrawn, the pseudonymized data were destroyed. Personal data will be deleted after achievement of the study objective/end of the research project, but at the latest after 15 years, unless legal regulations required a longer retention period.

The study provided an opportunity to bring the sensitive topic of suicidality into discussions between patient and provider, potentially allowing a more detailed exploration. Ideally, this could have led to better care or counselling for the individual patient. The long-term benefit would be improved recognition of suicidality or suicidal ideation in at-risk patients in Germany and the initiation of preventive measures.

Actively asking about possible suicidal ideation/plans has been proven not to increase the risk of suicide. Study participants were informed in the patient information leaflet that if they had any acute suicidal ideation, they should immediately contact their health care provider or the psychiatric crisis service of Upper Bavaria on 0180 / 655 3000.

Study participants had the right to access the personal data collected about them. The interests of the study participants were always prioritized. Participation could be terminated if there was a change in the risk situation.

For the use of the reference questionnaires, the applicants had the rights of use by e-mail: BRFL & PMH, 23.11.2021, Dr. Teismann, Ruhr-Universität Bochum; acceptance questionnaires PHQ-D, 24.11. & 25.11.2021, Prof. Löwe, University of Heidelberg; BSS, purchased for research purposes from Pearson Verlag on 22.12.2021.

The personal survey data collected with the consent of the participant in this research project were subject to confidentiality and data protection regulations. The participant's personal data could only be attributed to the treating physician without the patient's separate consent, unless the data were collected directly by the study staff. Data were analyzed and used only in pseudonymized form, and study results were published only in anonymized for

The study was ethically approved by the Medical Ethics Committee of the LMU Munich on 9 May 2022 (project no. 22-0028) and was conducted in accordance with the relevant guidelines and regulations. The most recent amendment for additional online recruitment was approved on 8 August 2023.

3. Results

In the following, we present the results of our study, beginning with descriptive analyses of the sample that present sociodemographics, followed by an examination of symptom severity, including reasons for seeking counseling, severity of depression and suicidality, methods of suicide, and family history of suicidality. We then compare the traditional recruitment method with online recruitment and look at differences between treatment settings in both demographics and symptom severity, particularly for depression and suicidality.

The subsequent sections describe the exploratory and confirmatory factor analyses (EFA and CFA) used to specify the questionnaire. The psychometric criteria of the instrument are presented and the diagnostic accuracy is assessed, focusing on positive and negative predictive values and cut-off values. Finally, we report on the acceptability of the new instrument, show further adaptations, and provide an overview of the final version of the questionnaire, SuPr-10.

This thesis presents findings from previous papers (published in *Suizidprophylaxe* [2] or submitted 2024, currently under review in JMIR Mental Health [105] and BJPsych Open [1]) by the author. Main contributions from co-authors are not included to clearly identify own research work.

3.1. Descriptive analyses of the sample

Parts of the reported descriptive analyses overlap with results of two submitted papers by the author (currently under Review BJPsych Open [1] and JMIR Mental Health [105]).

3.1.1. Sociodemographics

Gender

Of the total of 521 participants, 67.8% were female (n=353), 31.7% were male (n=165), and there were two non-binary individuals.

Age

The average age of the participants was 40.89 years (range 18-83 years, SD=14.32).

Marital status

Regarding the social environment and marital status, 44.9% (n=234) of the participants were married or in a stable relationship and 53.7% (n=280) considered themselves single (including

divorced and widowed participants with no current relationship), 3 entitled their relationship status as “on/off” and another 3 answers were missing.

Children

Of the enrolled sample, 36.6% (n=190; women 38.5%; men 32.7%) reported to have at least one child (range 1-7, mean 1.89, SD =.947).

School qualification

In terms of school qualifications, 16.5% (n=86) had a Certificate of Secondary Education (CSE, German “Mittelschulabschluss”), 26.7% (n=139) had a General Certificate of Secondary Education (GCSE, German: “Mittlere Reife”) and 53.9% (n=281) had a general qualification for university entrance (German: “Abitur”).

Degree and employment

Of all participants, 90.5% went on to complete an academic degree or vocational training and 61% (n=318) of all participants were employed at the time of the survey.

Among the unemployed, 2.1% (n=11) were housewives/husbands, 7.1% (n=37) were retired, 9.2% (n=48) were job seekers, 6.3% (n=33) were students and 4.2% (n=22) were permanently incapacitated.

3.1.2. Symptom severity

In this section, we examine reported symptoms, including reasons for help-seeking in our sample, severity of depression, and suicidality - including methods of suicide in previous attempts and family history of suicide.

3.1.2.1. Reasons for consultation

According to our data, depression or some of the core symptoms of depression, such as a low mood or lack of energy, were mentioned most frequently and applied to around half of all patients as their primary reason for consulting their therapist or practitioner *('Have you ever consulted a doctor or other practitioner, e.g. psychologist, therapist, alternative practitioner, etc., because of mental health problems?'*). Other symptoms typical of depression were also reasons why people were seeking medical advice: Concentration problems, feelings of worthlessness, hopelessness, feeling overburdened, burnout, rumination and suicidal tendencies. In addition, anxiety disorders, sleep disorders, eating disorders, emotional instability and borderline, PTSD, adjustment disorders and (psycho)somatic symptoms or pain were reported very frequently.

Since the question (SuPr-X item a) has no practical value in primary outpatient care or in decision-making regarding further treatment when implementing the questionnaire after this study, it will be removed as part of the item reduction process.

3.1.2.2. Depression and suicidality

According to the PHQ-9 severity classification 16.7% (n=90) suffered from mild (≥5), 32.9% (n=170) from moderate (≥10), 31.2% (n=161) from moderately severe (≥15) and 19.2% (n=99) from severe (≥20) depression symptoms.

The mean PHQ-9 score was 14.8 (range 5-27, SD=4.97, n=4 with PHQ-9 < 6, but suicidal ideation), reflecting a moderate level of depression severity and 81.6% (n=425) stated that they had already been diagnosed with at least one depressive episode.

The PHQ-9 also includes an item about suicidal ideations *("Thoughts that you would be better off dead or of hurting yourself in some way"*), that was affirmed by half of all participants (49.8%, n=258) and 43.6% (n=92) of GP patients for the past two weeks (PHQ-9 item 9 > 0).

Regarding lifetime suicidal ideation (SuPr-X item b), 74.4% of all patients (n=390) and 72% of GP patients (n=152) reported that they had wanted to die at least once in their lives with 51.9% (n=268) reporting current ideation (GP: 46.9%, n=98; SuPr-X 5.-11. > 0).

The proportion of people with suicidal tendencies increased with higher levels of depressive symptoms (mild: 17.9%, moderate: 36.5%, moderate-severe: 64.8% and severe: 87.9%).

Of all patients, 21.5% (n=110) and 16.2% of GP patients reported suicide attempts, of which 51 (GP: n=15) had two or more attempts (BSS item 20). According to BSS item 21, the desire to die in suicide attempts was 5% low, 28% moderate and 67% high. For six of the patients, the last suicide attempt had been less than two weeks before participating in this study (SuPr-X item 12).

3.1.2.3. Suicide methods

The patients who attempted suicide once or several times reported the following suicide methods, which can be classified as follows according to ICD-10 [147], chapter Intentional self-harm (X60-X84):

- X60-X69: Intentional self-poisoning by and exposure to chemicals and noxious substances: 55.26%
- X70: Intentional self-harm by hanging, strangulation and suffocation: 13.16%
- X71: Intentional self-harm by drowning and submersion: 1.75%
- X78: Intentional self-harm by sharp object: 16.67%
- X80: Intentional self-harm by jumping from a high place: 4.39%
- X81: Intentional self-harm by jumping or lying before moving object: 0.88%
- X82: Intentional self-harm by crashing of motor vehicle: 4.39%
- X83: Intentional self-harm by other specified means (electricity): 1.75%
- X84: Intentional self-harm by unspecified means (refusal to eat): 1.75%

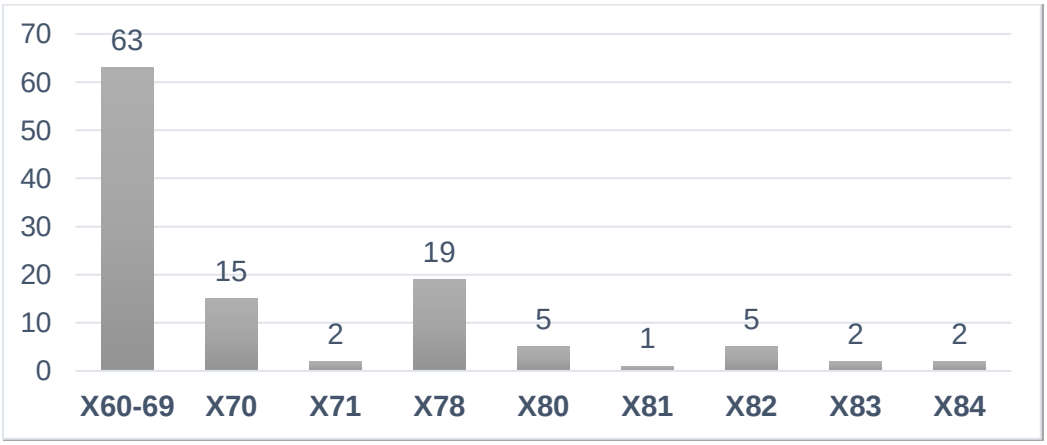

Figure 5. Suicide attempts classified by self-harm category according to ICD-10, chapter X60-84

3.1.2.4. Family history of suicidality

Suicide (attempts) in the family history were reported 106 times. We categorized them according to 1st and 2nd degree relatives. All more distant relatives (e.g. cousins, great-aunts/uncles, great-grandparents, brothers-in-law/sister-in-law, etc.) were classified as 3rd degree relatives.

Table 3. Suicide (attempts) in the family history

1st degree	**29 (27.4%)**
• Significant other	5
• Parents	13
• Siblings	8
• Children	3
2nd degree	**47 (44.3%)**
• Grandparents	15
• Aunt / Uncle	28
• Nephews / nieces	4
3rd degree or more	**29 (27.4%)**

The proportion of individuals with a family history of suicide (or attempted suicide) was consistently around one-third. There were no significant differences in the proportion of individuals with a family history of suicide (or attempted suicide) between those who had previously attempted suicide (35.6%) and those who had not (32.8%), or between those who had experienced suicidal tendencies in the past two weeks (35.6%) and those who had not (31.7%).

The correlation between suicide attempts in the family and either suicide attempts or suicidal tendencies among the participants was close to zero.

Since the question (SuPr-X item d) has no practical value in primary outpatient care or in decision-making regarding further treatment when implementing the questionnaire after this study, it will be removed as part of the item reduction process.

3.1.3. Preventive reasons for not attempting suicide

Figure 6 shows which reasons prevented patients from attempting suicide. Overall, the social network played the most important role, with 59.2% stating responsibility *for* others and 54.1% stating social support *from* others as a protective aspect.

Internal reasons, such as the belief that one can overcome the crisis as well as inner confidence and hope were also a major factor. About a third also mentioned fear of death or suicide as a protective reason, while moral concerns or worries about disapproval played a minor role.

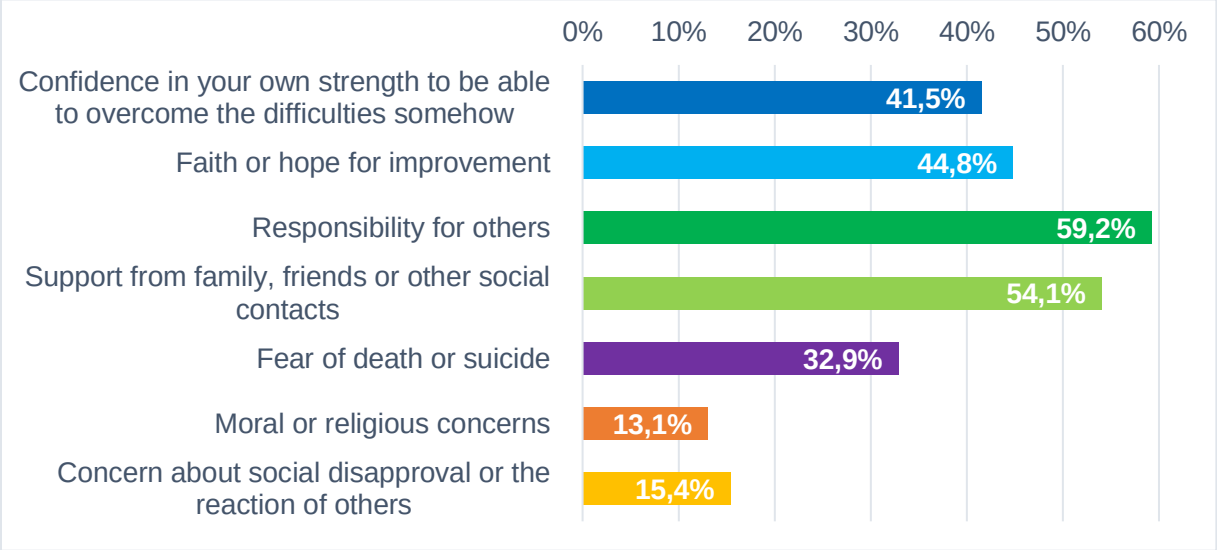

Figure 6. Reasons preventing suicide attempt

3.2. Comparison: Recruited traditional vs. online

The analysis and comparison of patients recruited traditionally or by various online / social media channels has been presented in a previous paper, submitted by the author in 2024 to the Journal JMIR Mental Health, currently under review [105].

Participants were recruited using both traditional methods (n=282) and online / social media platforms (n=239). Online recruitment channels were categorized as (1) Facebook, (2) Instagram, (3) TikTok, (4) Google, (5) 'Internet', and (6) 'Other'.

The 'Internet' category included all responses from participants that could not be associated with a specific platform or search engine. The 'Other' category included participants who heard about the study through personal networks and saw the study advertised online.

There was no significant difference in gender distribution between the two recruitment methods “traditional vs. online” (χ^2 (2) = 1.228, p = .541), nor were there notable age differences (t(512) = -1.065, p = .287).

Depression scores were similar across both groups (U = 30685.500, Z = -.918, p = .359). However, an increased risk of suicide was identified in the online recruitment group (SuPr-X: U = 24532.500, Z = -4.971, p < .001, r = .219; BSS screening (U = 25979.000, Z = -3.806, p < .001, r = .169): The results indicated a significant difference between the two groups, with a small effect size according to Cohen.

There was no significant correlation between online recruitment platforms (Facebook, Instagram, etc.) and gender distribution (χ^2 (5) = 7.164, p = .209).

Participants recruited via TikTok (Mdn = 23, SD = 9.238) were significantly younger than those recruited via Facebook (Mdn = 47, SD = 11.479, z = 5.410, p < .001, r = .489), Google (Mdn = 46, SD = 15.005, z = -4.670, p < .001, r = .704) and other internet sources (Mdn = 52, SD = 14.614, z = -5.308, p < .001, r = .766). Age differences were not significant compared to Instagram (Mdn = 29.5, SD = 16.796, z = 2.038, p = .623). Overall age differences (H(5) = 40.594, p < .001) with medium to strong effect sizes suggest that TikTok may appeal to a younger demographic for online study recruitment.

Severity of depression symptoms did not vary significantly across online recruitment platforms (H(5) = 8.773, p = .118).

3.3. Comparison: Treatment settings

Group comparison of treatment settings is also part of a submitted paper by the author - currently under Review BJPsych Open [1].

For further comparison of treatment group settings, we divided the sample into six subgroups, including all traditionally and online recruited patients, as there were only very small differences between the two groups (traditional vs. online) in terms of demographic characteristics or symptom severity (see chapter 3.2).

Outpatient

1) Patients recruited by general practitioners / regarding their GP as their primary care provider (group "**GP**")

2) Patients recruited by psychotherapists / regarding psychotherapist as their primary practitioner (group "**PT**")

3) Patients regarding their outpatient psychiatrist as their primary practitioner (group "**PSY**")

Dayclinic

4) Dayclinic Care Patients (group "**DCP**")

Inpatient

5) Not Acutely Suicidal Inpatient Participants (group "**NASIP**")

6) Acutely Suicidal Inpatient Participants (group "**ASIP**")

Table 4 provides an overview of the mean values of demographics and symptom severity of various mental syndromes and suicidality in different treatment settings (outpatient - day clinic - inpatient) and overall, which will be analyzed in detail in the following sections.

Table 4. Settings, demographics and symptom severity

		Outpatient			Dayclinic	Inpatient		Total
		GP	PT	PSY	DCP	NASIP	ASIP	
Gender	*N*	211	115	51	74	30	22	520
	male	67 (31.8%)	33 (28.7 %)	14 (27.5%)	26 (35.1%)	10 (33.3%)	9 (39.1%)	165 (31.7%)
	female	144 (68.2%)	81 (70.4%)	37 (72.5%)	48 (64.9%)	19 (63.3%)	13 (56.5%)	353 (67.9%)
	Non-binary	0	1 (0.9%)	0	0	1 (3.3%)	0	2 (0.4%)
Age	*N*	211	115	51	73	30	22	519
	mean	**43.74**	**38.08**	**45.41**	**36.81**	**34.97**	**35.32**	**40.89**
	SD	15.049	13.450	14.128	12.510	13.657	10.200	14.319
	range	18-83	18-73	18-77	19-62	21-62	20-57	18-83
PHQ-9	*N*	210	115	51	72	30	21	516
	mean	**14.395**	**13.696**	**15.567**	**14.552**	**17.300**	**19.857**	**14.797**
	SD	4.765	5.331	4.518	4.048	4.714	4.972	4.968
	range	5-26	5-27	6-26	6-23	8-25	6-27	5-27
SuPr-X Protective items 1-4	*N*	209	115	50	74	29	21	519
	mean	**4.976**	**5.252**	**4.300**	**4.297**	**3.241**	**1.762**	**4.647**
	SD	2.680	2.649	2.493	1.757	2.309	1.670	2.597
	range	0-12	0-12	0-11	0-8	0-9	0-4	0-12
SuPr-X Risk items 5-11	*N*	209	115	50	74	29	21	516
	mean	**2.325**	**2.096**	**3.940**	**1.2703**	**6.414**	**14.000**	**2.981**
	SD	3.639	3.301	4.335	2.555	5.025	4.231	4.417
	range	0-17	0-17	0-16	0-15	0-17	2-21	0-21
BSS Screening items 1-5	*N*	207	115	50	74	30	20	513
	mean	**1.734**	**1.861**	**2.420**	**1.135**	**3.167**	**6.850**	**2.037**
	SD	2.318	2.232	2.540	1.547	2.365	3.199	2.504
	range	0-10	0-10	0-9	0-6	0-8	0-10	0-10
BSS Items 1-19	*N*	72	50	23	19	16	16	202
	mean	**12.694**	**13.200**	**14.609**	**9.316**	**13.438**	**24.813**	**13.718**
	SD	6.502	6.151	6.713	3.529	5.773	5.369	6.963
	range	3-29	3-31	2-28	5-17	4-25	14-32	2-32
GAD-7	*N*	208	112	50	73	29	21	510
	mean	**11.298**	**11.036**	**11.320**	**11.575**	**12.793**	**13.238**	**11.494**
	SD	4.714	5.033	4.002	3.639	4.843	5.029	4.634
	range	0-21	2-21	4-20	3-21	5-21	4-21	0-21
PHQ-15	*N*	188	108	45	66	24	21	469
	mean	**12.404**	**12.352**	**13.289**	**13.197**	**12.958**	**11.810**	**12.608**
	SD	4.875	5.205	4.630	4.978	4.515	6.882	5.033
	range	3-26	2-30	4-21	4-23	5-19	0-28	0-30
PC-PTSD-5	*N*	209	114	50	73	30	21	514
	mean	**2.498**	**2.675**	**2.740**	**2.630**	**3.000**	**3.000**	**2.650**
	SD	1.609	1.577	1.549	1.603	1.661	1.732	1.601
	range	0-5	0-5	0-5	0-5	0-5	0-5	0-5

GP= General practitioner, PT= Psychotherapist, PSY= Psychiatrist (outpatient), DCP= Dayclinic patients, NASIP = non-acutely suicidal inpatient, ASIP= acutely suicidal inpatient, BSS= Beck Scale for Suicide Ideation, PHQ-9= Patient Health Questionnaire 9 (depression), GAD-7= Generalized Anxiety Disorder, PHQ-15 = Patient Health Questionnaire 15 (somatoform disorder), PC-PTSD-5 = Post Traumatic Stress Disorder 5

3.3.1. Differences in demographics across treatment settings

Gender

A chi-square test showed no significant association between gender distribution and treatment setting χ^2 (10) = 10.798*, p =.373.*

Age

The age of the patients (Figure 7) differed significantly between the treatment settings (Welch's F(5, 112.526) = 7.093, p < .001, η^2=.064) with moderate effect sizes.

Post-hoc Games-Howell test showed that the GP sample was older than the psychotherapy (PT) group (mean dif. = 5.67, 95%-CI [.99, 10.34]), day clinic (DCP) sample (mean dif. = 6.94, 95%-CI [1.76, 12.11]), NASIP (mean dif. = 8.78, 95%-CI [.70, 16.86]) and ASIP (mean dif. = 8.43, 95%-CI [1.12, 15.73]) samples.

The psychiatric (PSY) sample was also significantly older than PT (mean dif. = -7.33, 95%-CI [.52, 14.15]), DCP (mean dif. = 8.604, 95%-CI [1.45, 15.76]), NASIP (mean dif. = 10.45, 95%-CI [1.09, 19.80]) and ASIP (mean dif. = 10.09, 95%-CI [1.41, 18.78]).

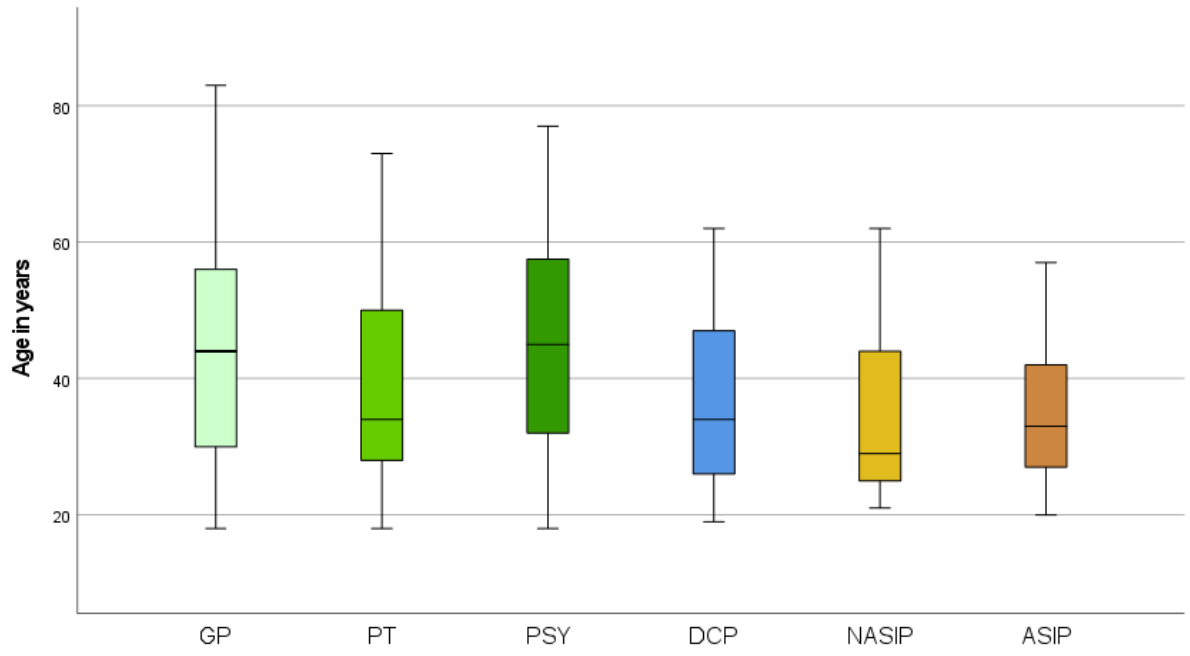

Figure 7. Age distribution in setting groups

GP= General practitioner, PT= Psychotherapist, PSY= Psychiatrist (outpatient), DCP= Dayclinic patients, NASIP = non-acutely suicidal inpatient, ASIP= acutely suicidal inpatient

3.3.2. Differences in symptom severity across treatment settings

We conducted a non-parametric Kruskal-Wallis test to determine group differences in symptom severity using non-metric-scaled questionnaires for depression (PHQ-9), suicidality (SuPr-X, BSS), anxiety (GAD-7), somatoform disorder (PHQ-15) and PTSD (PC-PTSD-5), which showed significant differences for depression (PHQ-9: H(5) = 35.960, p<.001) and suicidality (SuPr-X protective: H(5) = 47.462, p<.001; SuPr-X risk: (H(5) = 94.164, p<.001); BSS Screening: (H(5) = 55.058, p<.001); BSS: (H(5) = 39.373, p<.001)), but not for anxiety (GAD-7: H(5) = 6.918, p=.227), somatoform disorder (PHQ-15: H(5) = 4.151, p=.528) and PTSD (PC-PTSD-5: H(5) = 4.952, p=.422).

3.3.2.1. Depression

Subsequent Dunn-Bonferroni post-hoc comparisons showed that the ASIP group was significantly more depressed than all non-inpatient settings with small effect sizes (PHQ-9 GP: z=-4.504, p<.001, r=.202; PT: z=-5.060, p<.001, r=.227; PSY: z=-3.076, p=.031, r=.138; DCP: z=-3.980, p<.001, r=.178).

Additionally, NASIP were significantly more depressed than the PT group (z=-3.612, p=.005, r=.161).

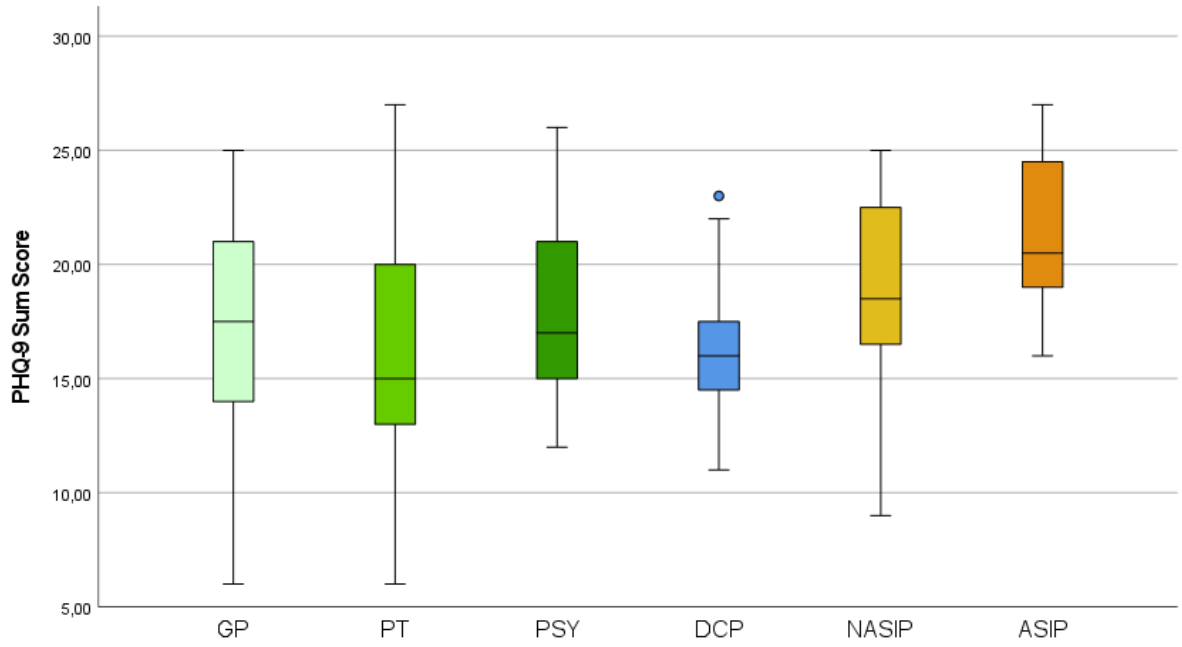

Figure 8. Distribution of depression score, group comparison

GP= General practitioner, PT= Psychotherapist, PSY= Psychiatrist (outpatient), DCP= Dayclinic patients, NASIP = non-acutely suicidal inpatient, ASIP= acutely suicidal inpatient

3.3.2.2. Suicidality

SuPr-X protective scale (Figure 9)

ASIP scored significantly less on the SuPr-X protective scale (item 1-4) than all non-inpatient settings with small effect sizes (GP: z=5.609, p<.001, r=.250; PT: z=5.751, p<.001, r=.257; PSY: z=4.060, p=.001, r=.181; DCP: z=4.092, p=.001, r=.183).

Additionally, NASIP scored significantly less on the SuPr-X protective scale than the GP (z=3.487, p=.007, r=.156) and PT group (z=3.716, p=.005, r=.166).

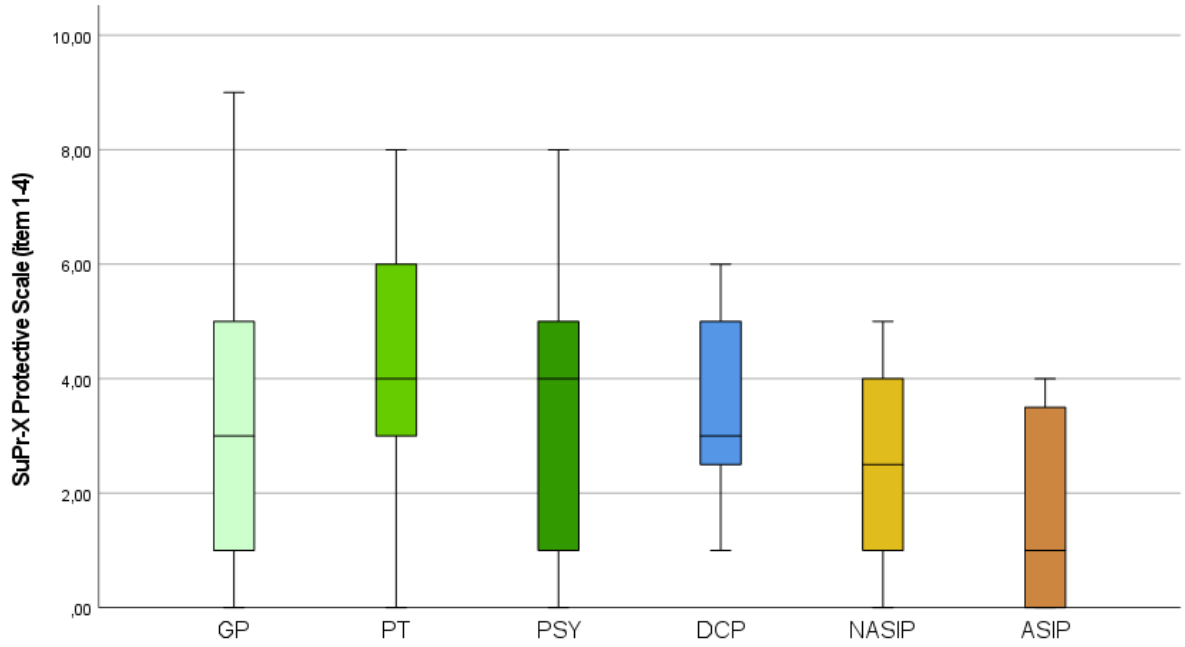

Figure 9. Distribution of protective scale (SuPr-X) score, group comparison

GP= General practitioner, PT= Psychotherapist, PSY= Psychiatrist (outpatient), DCP= Dayclinic patients, NASIP = non-acutely suicidal inpatient, ASIP= acutely suicidal inpatient

SuPr-X risk scale (Figure 10)

Regarding the SuPr-X risk scale (item 5-11), both inpatient settings (ASIP, NASIP) scored higher than all non-inpatient settings with moderate effect sizes (GP: z=-7.648, p<.001, r=.342; PT: z=-7.415, p<.001, r=.332; DCP: z=-8.160, p<.001, r=.365) and one exception: NASIP and the outpatient PSY group did not differ significantly (z=-2.114, p=.518).

ASIP had also significantly higher risk scores than NASIP (z=-2.997, p=.041, r=.134) and the PSY sample showed also a higher risk than DCP (z=3.695, p=.003, r=.165) – with small effect sizes.

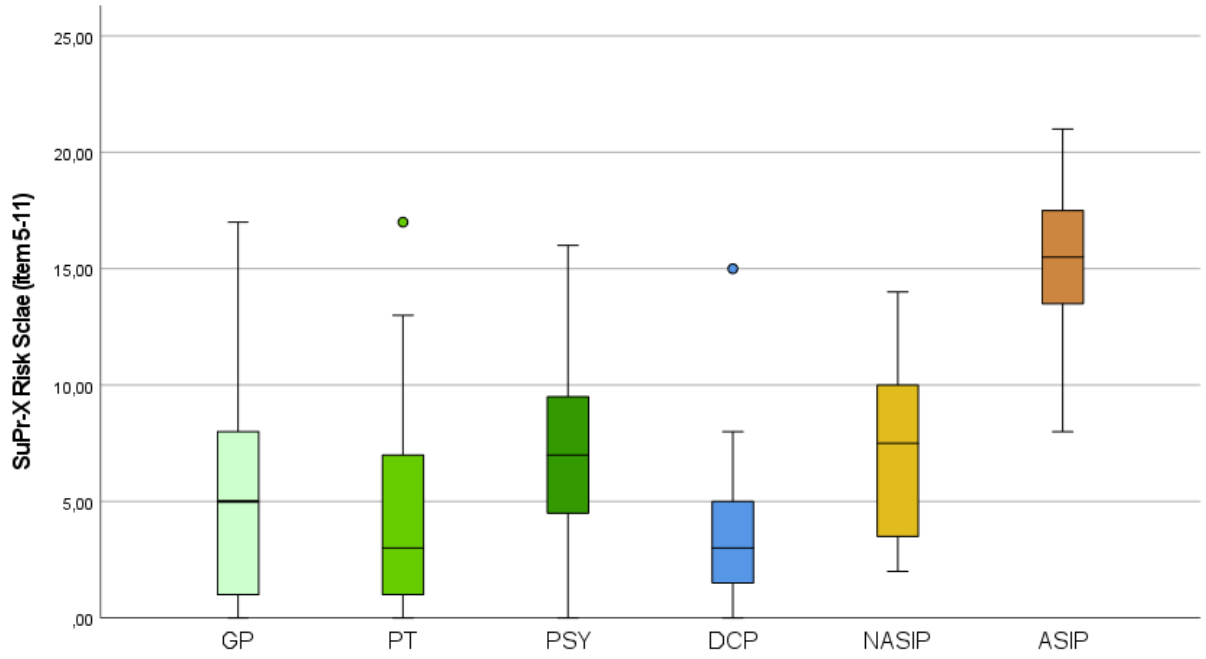

Figure 10. Distribution of suicide risk scale (SuPr-X) score, group comparison

GP= General practitioner, PT= Psychotherapist, PSY= Psychiatrist (outpatient), DCP= Dayclinic patients, NASIP = non-acutely suicidal inpatient, ASIP= acutely suicidal inpatient

Beck Scale for Suicide Ideation

Using the BSS Screening (item 1-5, Figure 11) as comparison, ASIP group was significantly more suicidal than all non-inpatient settings with small effect sizes (GP: z=-6.065, p<.001, r=.272; PT: z=-5.415, p<.001, r=.243; PSY: z=-4.184, p=.001, r=.188; DCP: z=-6.416, p<.001, r=.288). Additionally, NASIP were significantly more suicidal than the GP group (z=-3.414, p=.010, r=.153).

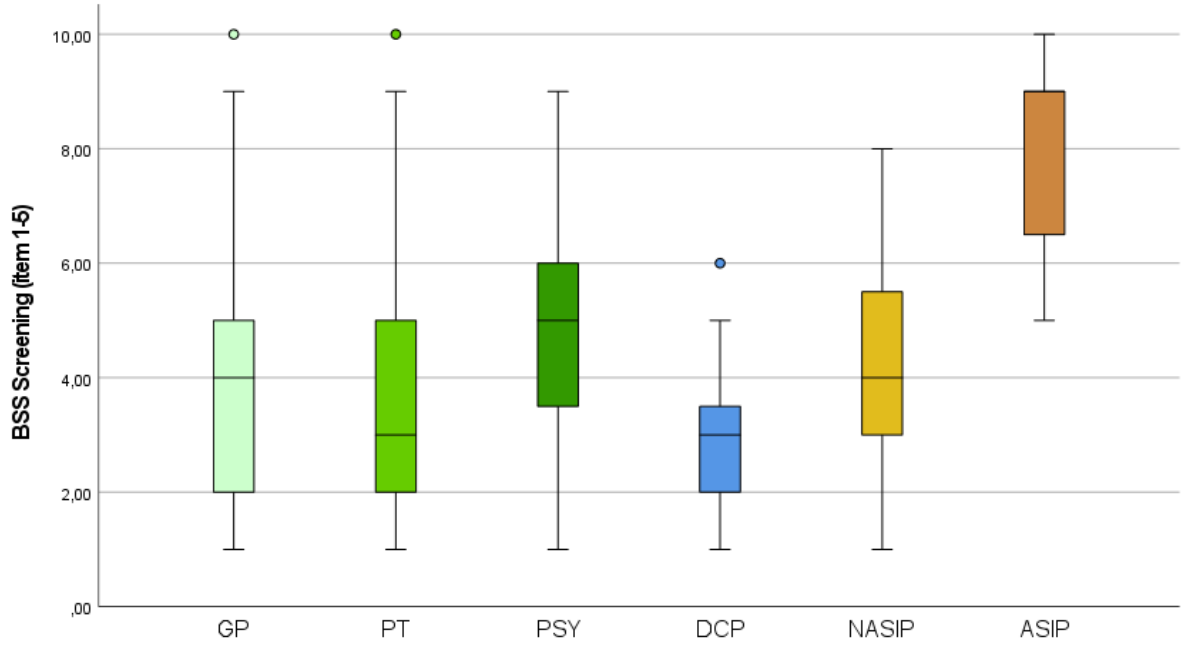

Figure 11. Distribution of BSS screening (item 1-5), group comparison

GP= General practitioner, PT= Psychotherapist, PSY= Psychiatrist (outpatient), DCP= Dayclinic patients, NASIP = non-acutely suicidal inpatient, ASIP= acutely suicidal inpatient

For the total BSS (item 1-19, Figure 12), only ASIP scored significantly higher than every other setting with small to moderate effect sizes (GP: z=-5.344 p<.001, r=.382; PT: z=-4.790, p<.001, r=.342; PSY: z=-3.586, p=.005, r=.256; DCP: z=-5.925, p<.001, r=.423; NASIP: z=-3.710, p=.003, r=.265).

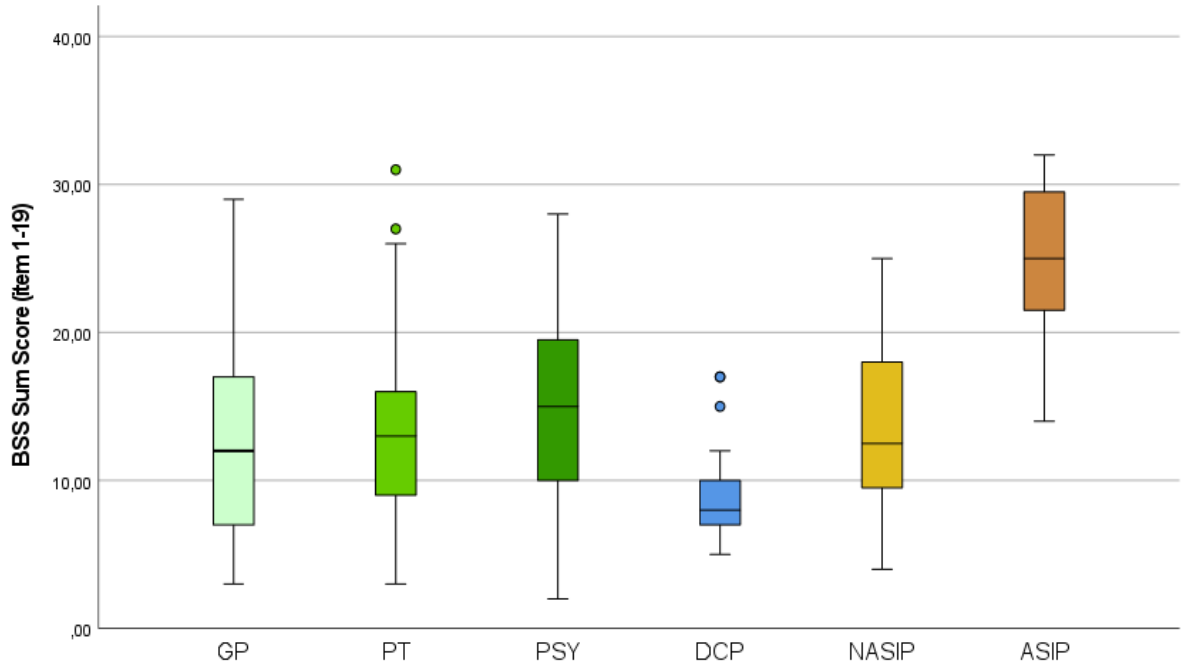

Figure 12. Distribution of BSS sum score (item 1-19), group comparison

GP= General practitioner, PT= Psychotherapist, PSY= Psychiatrist (outpatient), DCP= Dayclinic patients, NASIP = non-acutely suicidal inpatient, ASIP= acutely suicidal inpatient

3.3.3. Differences in preventive reasons across treatment settings

We summarized the reasons into internal and external protective aspects and classified the first three reasons as internal aspects (confidence in own strength, faith for improvement, own responsibility for others) vs. external aspects (support from others, fear of death, religious concerns, fear of disapproval,).

The decrease of internal reasons in the acutely suicidal inpatient setting (ASIP) shown in Figure 13 compared to all non-inpatient groups was statistically significant with small effect sizes (H(5) = 20.997, p<.001; GP: z=4.123, p=.001, r=.186; PT: z=3.796, p=.002, r=.171; PSY: z=3.796, p=.007, r=.158; DCP: z=4.038, p=.001, r=.182), NASIP: z=2.062, p=.588).

The analysis of the BRFL scale showed that the groups only differed significantly in the “survival and coping beliefs” factor (H(5) = 32.991, p<.001), which represents a similar

construct like our item response option (12.1) “Confidence in your own strength to be able to overcome the difficulties somehow“ (ρ =.433, p<.001). Subsequent Dunn-Bonferroni post-hoc comparisons showed that the ASIP group had significantly lower scores on this scale than all non-inpatient groups (GP: z=4.535, p<.001; PT: z=4.472, p<.001; PSY: z=3.153, p=.024; DCP: z=5.223, p<.001), but not the NASIP group (z=2.320, p=.305).

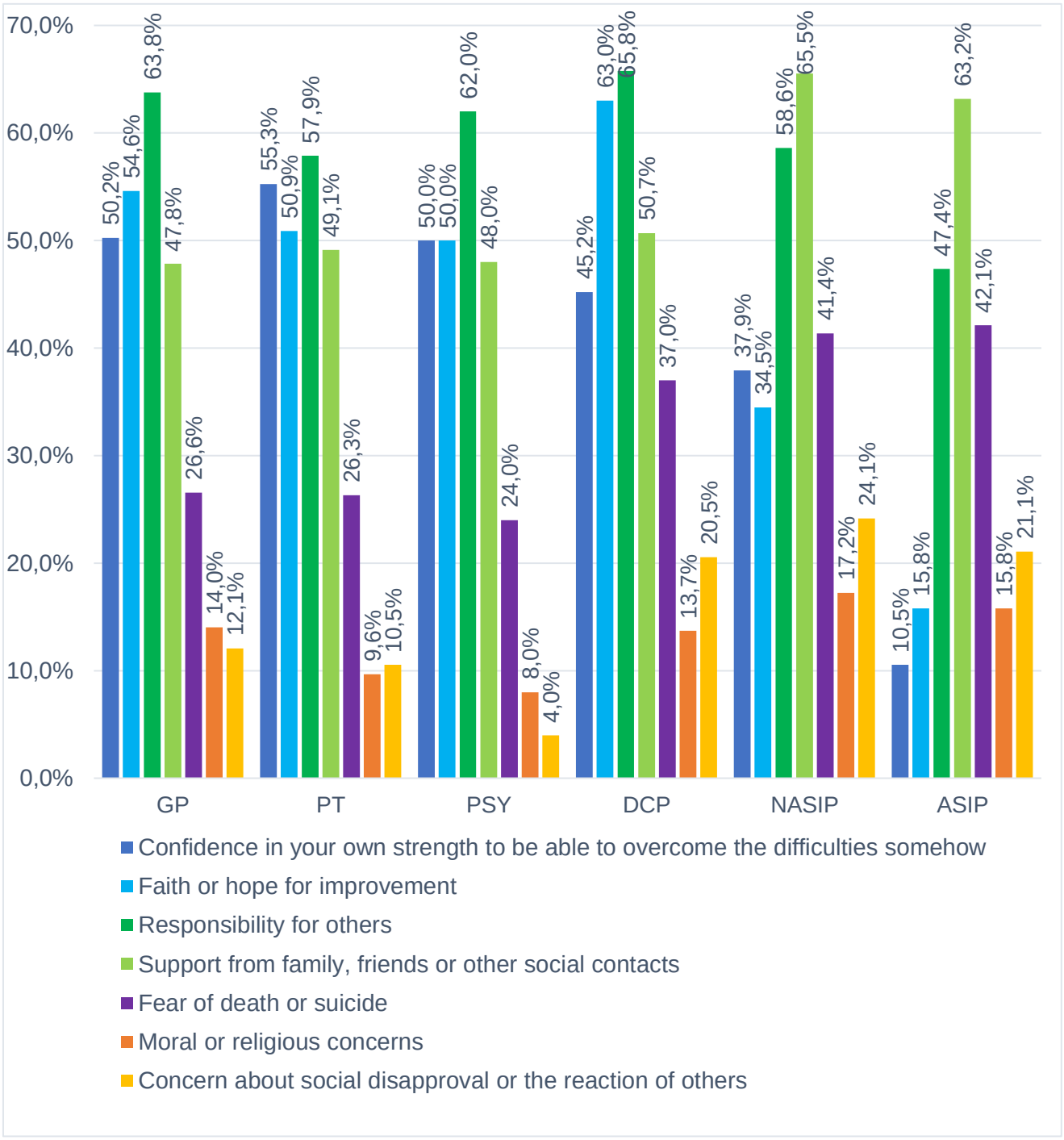

Figure 13. Reasons preventing suicide attempt, group comparison

GP= General practitioner, PT= Psychotherapist, PSY= Psychiatrist (outpatient), DCP= Dayclinic patients, NASIP = non-acutely suicidal inpatient, ASIP= acutely suicidal inpatient

3.4. Exploratory factor analysis (EFA)

Results from factor analysis are also part of a submitted paper by the author - currently under Review BJPsych Open [1].

The analyses identified two eigenvalues > 1 (I. 5,097, II. 1,680), which explained 61.62% of the variance (I. 46.33%, II. 15.28%) and indicated a two factors solution. The Velicer MAP achieves a minimum of 0.05 with 2 factors, BIC achieves a minimum of -59.79 with 3 factors. EKC and parallel analysis suggest two factors (Figure 14).

On the basis of theoretical considerations, both two factors (risk and protective factors) and three factors (suicidal ideation, suicidal behavior, protective aspects) are plausible. However, the actual way in which the variables load on the factors in a three-factor solution cannot be interpreted reasonably (Table 5).

In summary, and taking the extraction criteria into account, there were strong arguments in favor of the two-factor solution.

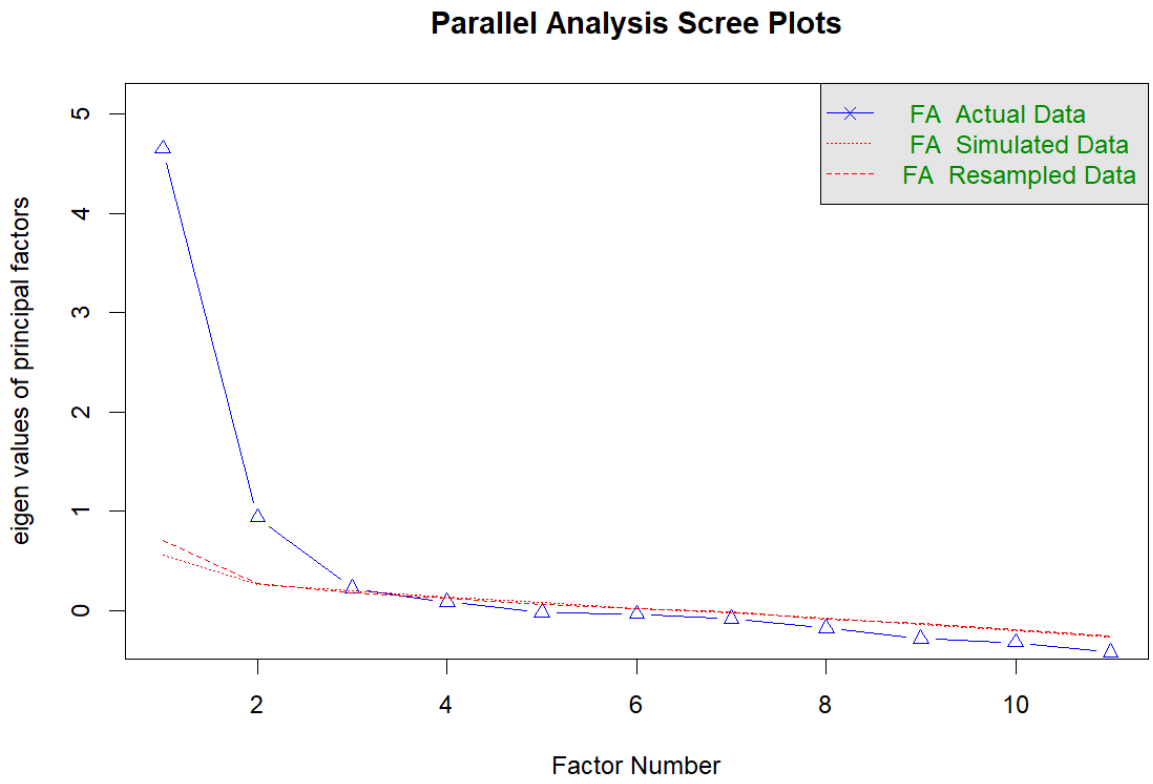

Figure 14. Factor extraction
The blue line, representing the actual data, begins to flatten notably after the second factor. The eigenvalues for the actual data are above the parallel analysis lines (simulated and resampled data, red lines) up to the second factor. After the second factor, the eigenvalues of the actual data are very close to or below the parallel analysis lines, indicating that the additional factors do not explain significantly more variance than would be expected by chance. FA= Factor analysis

The exploratory factor analysis with WLSMV estimation method and geomin oblique rotation resulted in the following factor loadings of the individual variables for the three-factor solution (Table 5) and subsequently the two-factor solution (Table 6), which is much easier to interpret and only has one double loading in item 10 ("I have made preparations for the time after my suicide").

In the two-factor solution, which can be interpreted as (1) protective scale and (2) risk scale, the factors correlated in the exploratory factor analysis by -.58.

Table 5. Three-factor solution - loading matrix

		Factors		
Items: **In the past two weeks…**		**1**	**2**	**3**
1	*…I was confident*	0.962	-0.029	0.017
2	*…I had goals in life.*	0.526	0.085	-0.061
3	*…I felt able to cope with life and its difficulties.*	0.685	0.039	-0.101
4	*…I was satisfied with my life.*	0.351	0.849	0.002
5	*…I have had the wish to die.*	0.003	-0.350	0.818
6	*…I have thought about taking my own life.*	0.013	-0.254	0.939
7	*…I have thought about a specific suicide method.*	-0.114	-0.160	0.853
8	*…I have thought about a specific suicide plan.*	-0.248	0.010	0.832
9	*…I have had the urge to realize my suicide plan.*	-0.177	0.016	0.865
10	*…I have made preparations for the time after my suicide.*	0.028	0.098	0.794
11	*...I have intentionally injured myself and / or put myself in danger, risking death*	-0.076	-0.113	0.614

Table 6. Two-factor solution - loading matrix

		Factors	
Items: **In the past two weeks…**		**1**	**2**
1	*…I was confident*	0.901	-0.000
2	*…I had goals in life.*	0.590	-0.035
3	*…I felt able to cope with life and its difficulties.*	0.710	-0.084
4	*…I was satisfied with my life.*	0.716	0.022
5	*…I have had the wish to die.*	-0.085	0.828
6	*…I have thought about taking my own life.*	0.013	0.969
7	*…I have thought about a specific suicide method.*	-0.056	0.904
8	*…I have thought about a specific suicide plan.*	-0.042	0.934
9	*…I have had the urge to realize my suicide plan.*	0.042	0.980
10	*…I have made preparations for the time after my suicide.*	0.307	0.926
11	*...I have intentionally injured myself and / or put myself in danger, risking death*	-0.032	0.651

3.5. Item selection and repeated EFA

Item difficulty varied between .32 and .47 for the protective factor scale with a mean of .39, indicating a good value >.20. For the risk scale, items ranged between .05 and .29. Item 10 (.05) and 11 (.06) are considered too difficult regarding the general threshold <.20 plus their strong deviation from the mean difficulty of the risk scale (.14), see Table 7.

Discriminability varied between .57 (item 2) and .72 (item 1) for the protective factor scale with a mean of .64. For the risk factor scale, it varied between 0.45 (item 11) and .86 (item 6) with a mean of .72, indicating good value.

The high values of items 6-8 must be viewed critically with regard to redundancy. Spearman's Inter-item-correlations showed high correlations within each factor, but no correlations >.90, see Figure 15.

Communality varied between .35 (item 2) and .81 (item 1) for the protective factor scale with an average of .55. For the risk factor scale, communality varied between .42 (item 11) and .96 (item 9), with an average of .81.

The total communality means of .71 indicates a good reliability. Possible reasons for low communality are that the items are too difficult, or that too few factors may have been extracted and thus the communality of the item may have been underestimated, see Table 7.

Table 7. Itemanalyses

FACTOR	Item	M	SD	Skewness	Kurtosis	Item diff.	Item discr.	α, when item deleted	Com.
1	**1**	1,24	0,76	0,19	-0,31	0,41	0,72	0,73	0,81
	2	1,41	0,87	0,02	-0,70	0,47	0,57	0,81	0,35
	3	1,58	0,80	0,33	-0,43	0,35	0,64	0,77	0,51
	4	0,95	0,80	0,45	-0,43	0,32	0,63	0,77	0,51
	M					0,39	0,64		0,55
2	**5**	0,88	1,06	0,79	-0,77	0,29	0,75	0,88	0,69
	6	0,64	1,00	1,29	0,24	0,21	0,86	0,86	0,94
	7	0,58	0,95	1,42	0,68	0,19	0,84	0,87	0,82
	8	0,32	0,72	2,41	5,05	0,11	0,83	0,87	0,87
	9	0,26	0,66	2,84	7,80	0,09	0,79	0,88	0,96
	10	0,14	0,50	3,91	15,76	0,05	0,53	0,90	0,95
	11	0,19	0,55	3,27	10,73	0,06	0,45	0,91	0,42
	M					0,14	0,72		0,81
TOTAL						0.23	0.69		0.71

M=Mean, SD= Standard deviation, Diff.=Difficulty, Discr.=Discrimination, Com.=Communality

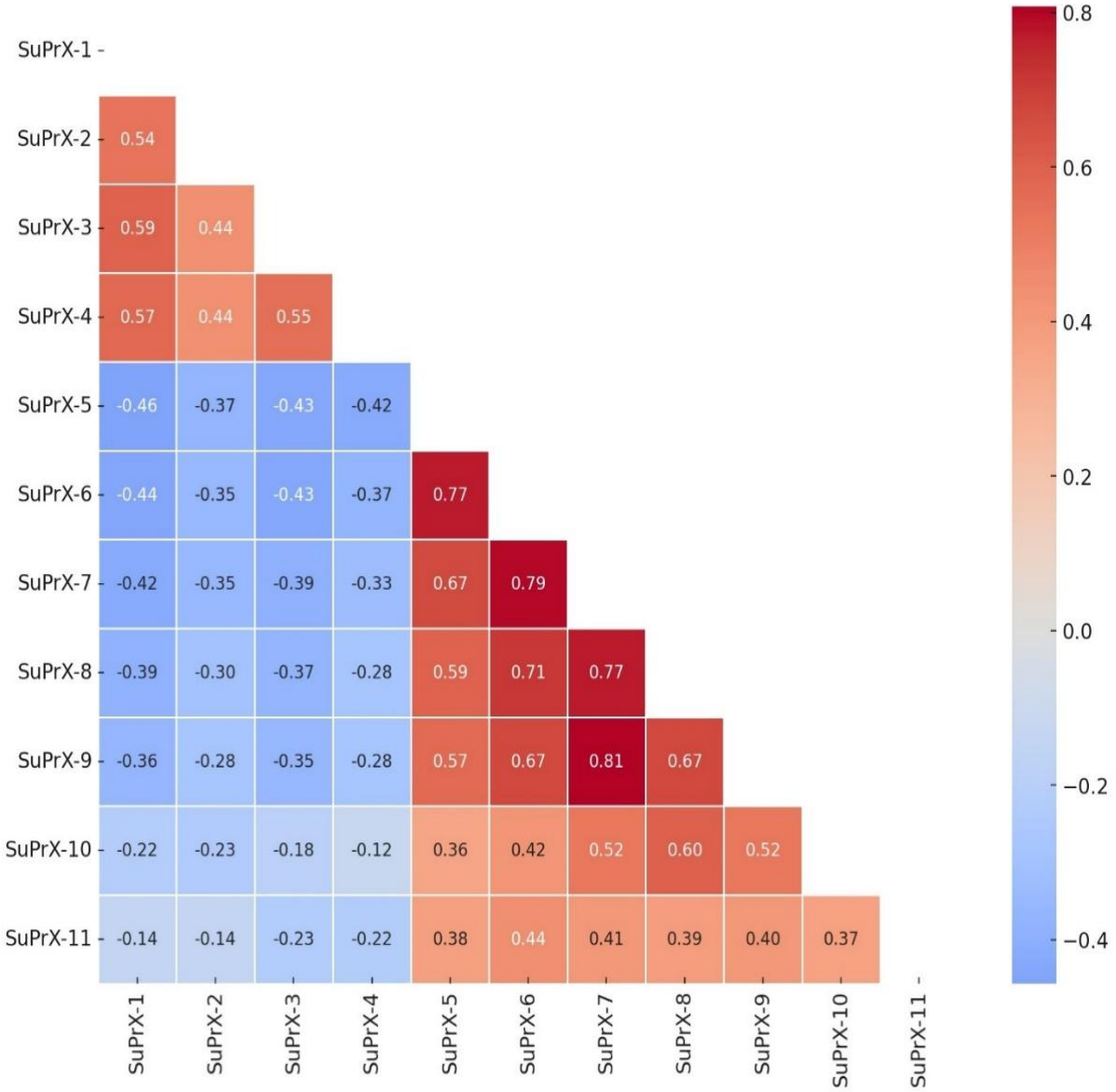

Figure 15. Spearman correlation heatmap
Positive correlations are shown in red and negative correlations in blue, with higher values represented by darker shades.

With regard to the item selection, it is also important to look at the extent to which the response patterns of the acutely suicidal patients "ASIP" differed from all other participants in terms of criterion validity.

When comparing the average response of an acutely suicidal person, it can be seen that they scored highest on the items 5.-9. of the risk factor scale (Figure 16).

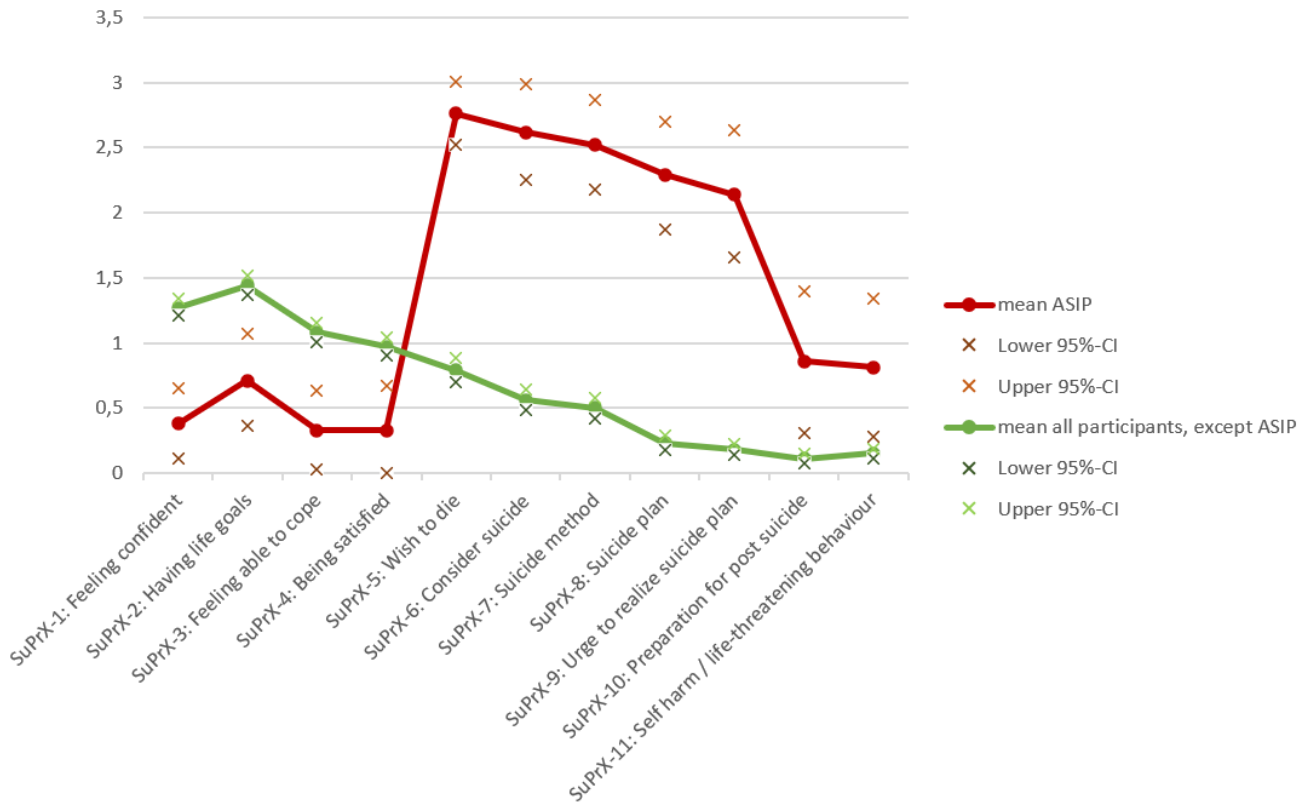

Figure 16. Response pattern of patients classified as acutely-suicidal (ASIP) vs. not

This Figure is part of a submitted paper by the author - currently under Review BJPsych Open [1].

For item selection in the sense of data reduction, we took item analysis, response patterns and content considerations into account and removed item 10 and item 11 of the questionnaire. The repeated EFA with the remaining items showed again a two-factor solution with high factor loadings and correlating factors by -.60, see Figure 17.

The final questionnaire now contains four items on the protective scale and five remaining items on the risk scale, together with an additional item asking about preventive reasons - giving a total of ten items, which led to the final name of the questionnaire: **SuPr-10.**

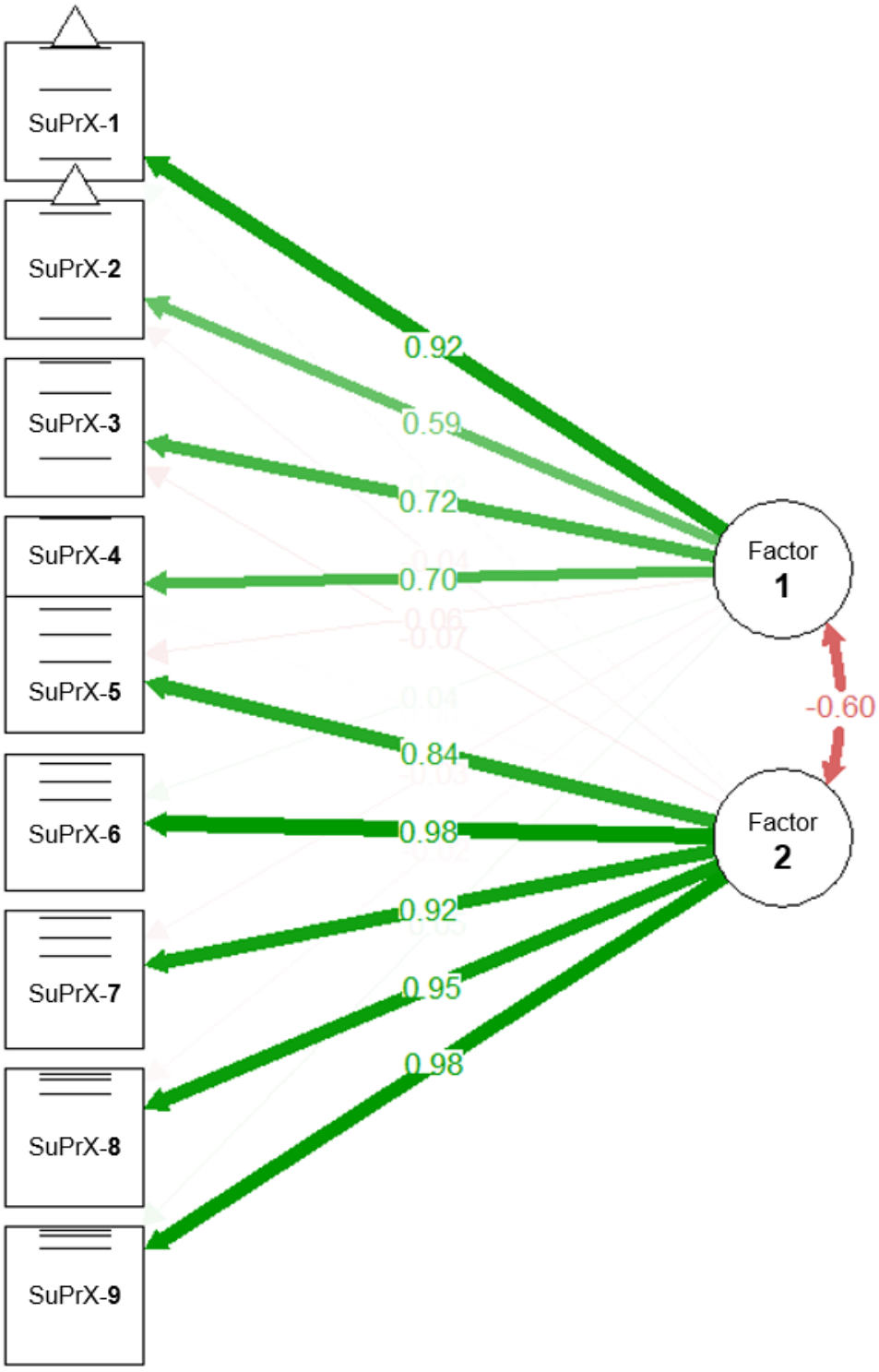

Figure 17. SEM Plot of two factor solution with remaining SuPr-10 items 1-9

3.6. Confirmatory factor analysis (CFA)

The two-factorial model of the SuPr-10 was then analyzed on the basis of the randomly assigned second sub-sample (n = 259) with regard to its model fit.

Due to the WLSMV estimation method, we report robust global fit indices: X^2 (p = .008), CFI (= 0.954), RMSEA (= 0.144 [90%-CI = 0.082 - 0.204]), SRMR (= 0.028).

Model adjustments based on local fit indices and the gradual allowance of critical correlations, e.g., due to increased modification indices or residual covariances, did not lead to any substantial improvement in the global fit index, which is why no model adjustment of this kind was carried out.

3.7. Psychometric criteria

The report of psychometrics are part of a submitted paper by the author - currently under Review BJPsych Open [1].

Internal consistency

According to McDonald Omega, the protective factor scale (items 1.-4.: ω = .817) and the risk factor scale (items 5.-9.: ω = 0.928) showed both sufficient internal consistencies.

Construct validity

Convergent validity in the sense of attenuation-corrected correlations with established instruments that measure similar or dissimilar constructs and mental disorders can be found in Table 8.

Table 8. Attenuation-corrected correlations between SuPr-10 and other constructs

	SuPr-10 protective scale Items 1.-4.	**SuPr-10 risk scale Items 5.-9.**	**Beck Scale of Suicide Ideation BSS Item 1.-19.**
BSS	**-.529**, n=202**	**.854**, n=201**	
Suicide attempt *(SuPr-10 item c.)*	**-.131, n=519**	**.214**, n=514**	**.271**, n=200**
PHQ-9	**-.736**, n=515**	**.626**, n=513**	**.616**, n=202**
GAD-7	**-.416**, n=509**	**.179*, n=507**	**.183*, n=200**
PHQ-15	**-.264**, n=467**	**.205**, n=465**	**.178, n=181**
PC-PTSD-5	**-.113, n=513**	**.124, n=511**	**.061, n=201**
SuPr-10 (risk * protective)	**-.562**, n=516**		

*** = p < .01; * = p < .05. BSS= Beck Scale of Suicide Ideation, PHQ-9= Patient Health Questionnaire 9 (depression), GAD-7= Generalized Anxiety Disorder, PHQ-15 = Patient Health Questionnaire 15 (somatoform disorder), PC-PTSD-5 = Post Traumatic Stress Disorder 5.*

This Table is part of a submitted paper by the author - currently under Review BJPsych Open [1].*

Suicidality and particular symptoms

With regard to the individual aspects assessed in the given instruments, suicidality correlated most highly with the single items that asked about low mood (PHQ-9 item 2: r=.452), worthlessness (PHQ-9 item 6: r=.461), excessive worry (GAD-7 item 3: r=.341), difficulties relaxing (GAD-7 item 4: r=.340), feelings of estrangement (PC-PTSD-5 item 4: r=.253) and rapid heartbeat (PHQ-15 item 10: r=.201), all correlations were significant (p<.001).

Correlations of preventive reasons assessed in SuPr-10 and BRFL

Correlations between the responses SuPr-10' last item on the reasons that prevent a suicide attempt and the corresponding factors of the BRFL scale show moderate to high correlations that are marked in the corresponding color of the associated construct (Table 9).

Table 9. Spearman Rho correlation map reasons for living, preventing suicide attempt

SuPr-10' last item Preventive reasons		**SC**	**RF**	**CC**	**FS**	**MO**	**SD**
		BRFL					
Confidence in your own strength	**ρ**	**.433****	.074	-.022	.039	.017	-.044
	p	<.001	.103	.774	.386	.701	.325
	N	477	493	180	499	497	500
Faith or hope for improvement	**ρ**	**.422****	**.199****	.140	**.214****	**.130****	.040
	p	<.001	<.001	.061	<.001	.004	.367
	N	477	493	180	499	497	500
Responsibility for others	**ρ**	.063	**.421****	**.343****	-.012	.042	.042
	p	.171	<.001	<.001	.798	.347	.354
	N	477	493	180	499	497	500
Support from family, friends	**ρ**	.183**	**.294****	.085	**.122****	.076	**.110***
	p	<.001	<.001	.257	.007	.091	.014
	N	477	493	180	499	497	500
The fear of death or suicide	**ρ**	.039	.000	-.078	**.471****	.057	**.151****
	p	.402	.997	.298	<.001	.209	.001
	N	476	492	179	498	496	499
Moral or religious concerns	**ρ**	.046	.077	.041	.051	**.450****	**.106***
	p	.316	.087	.580	.258	<.001	.018
	N	477	493	180	499	497	500
Concern about disapproval	**ρ**	-.033	.041	-.020	.044	**.106***	**.295****
	p	.479	.365	.791	.326	.018	<0.001
	N	477	493	180	499	497	500

** = p < .01; * = p < .05; SC= Survival and coping beliefs (3+12); RF= Responsibility to family (2+5); CC= Child concerns (4+7); FS= Fear of suicide (1+10); MO = Moral objections (6+9); SD = Fear of social disapproval (8+11)

3.8. Diagnostic accuracy

Results concerning diagnostic accuracy, positive and negative predictive value are part of a submitted paper by the author - currently under Review BJPsych Open [1].

The binomial logistic regression model to determine whether SuPr-10 risk scale could predict attempts in medical history was statistically significant $\chi^2(1) = 70.935$, $p < .001$, indicating that our model provides a significant predictive value.

The goodness of fit assessed by the Hosmer-Lemeshow test was significant, $\chi^2(4) = 12.932$, $p = .012$. Nagelkerke's $R^2 = .205$ shows an acceptable amount of explained variance.

The SuPr-10 risk factor scale with its sum score of the remaining items (5.-9.) contributed significantly ($p<.001$) to the prediction of previous suicide attempts as a major indicator for further attempts: A one-point increase in the SuPr-10 score was associated with an increase of the odds of a previous attempt by the factor 1.25, i.e., Exp(B) = 1.250 (95%-CI [1.183, 1.320]).

The results of Receiver Operating Characteristic (ROC) analysis showed an AUC of .765 (95%-CI: .712-.819), indicating an acceptable ability of the SuPr-10 risk scale to discriminate between patients with and without a history of suicide attempts as a predictor of further attempts. In comparison, the AUC for BSS [.652 (95% CI: .574 - .730)] and PHQ-9 [.696 (95% CI: .639 - .753)] was lower.

The optimal threshold for SuPr-10 risk scale according to Youden index is ≥2 (Table 10).

3.8.1. Positive and negative predictive value

Given that universal screening is not the intention, the calculation of positive predictive value (PPV) and negative predictive value (NPV) was based on the a priori probability of individuals having depressive symptoms, rather than relying on the overall prevalence of suicide attempts in the general population.

In this sample, the prevalence of previous suicide attempts was 21.5%, which can be considered as our a-priori probability, given the individual risk factor of depressive symptoms.

Table 10. Diagnostic accuracy of SuPr-10 risk factor scale (Item 5.-9)

Cut-Off	***Sensitivity***	***Specificity***	***Youden-Index***	***PPV depressive symptoms****	***NPV depressive symptoms****
≥1	83,17%	56,17%	39,34%	34,20%	92,42%
≥2	78,22%	68,77%	46,98%	40,68%	92,02%
≥3	66,34%	74,58%	40,91%	41,68%	89,00%
≥4	59,41%	79,90%	39,31%	44,74%	87,79%
≥5	51,49%	82,81%	34,29%	45,06%	86,17%
≥6	45,54%	87,65%	33,20%	50,25%	85,46%
≥7	38,61%	89,59%	28,20%	50,39%	84,20%
≥8	33,66%	92,25%	25,92%	54,34%	83,55%
≥9	28,71%	94,67%	23,39%	59,62%	82,90%
≥10	25,74%	95,88%	21,63%	63,14%	82,50%
≥11	20,79%	96,85%	17,64%	64,40%	81,70%
≥12	18,81%	98,06%	16,87%	72,68%	81,52%
≥13	14,85%	98,06%	12,91%	67,74%	80,79%
≥14	7,92%	98,55%	6,47%	59,89%	79,62%
≥15	2,97%	98,55%	1,52%	35,90%	78,76%

*A-priori probability suicide attempt: 21,5% in study sample with depressive symptoms.

3.8.2. Thresholds

With regard to criterion validity, however, the response patterns of the acutely suicidal ASIP group should be taken into account when recommending threshold values.

The patients classified as acutely suicidal by the treating physicians of the protected psychiatric wards (ASIP) all scored higher than 7 points on the SuPr-10 risk scale on the remaining items 5.-9., with the exception of one outlier who scored 2 points (Figure 18).

The mean SuPr-10 Score in the ASIP group was 12,33 (95%-CI: 10,80-13,87) and Mdn=13. For the NASIP inpatient group it was m=5,57 (95%-CI: 3,86-7,27) and Mdn=5. ASIP scored significantly higher than all other samples, with non-inpatients showing a significant difference (p<.001, r= .332-.366, indicating moderate effect sizes) and NASIP displaying a smaller but still significant difference (p=.036, r=.163, indicating small effect sizes).

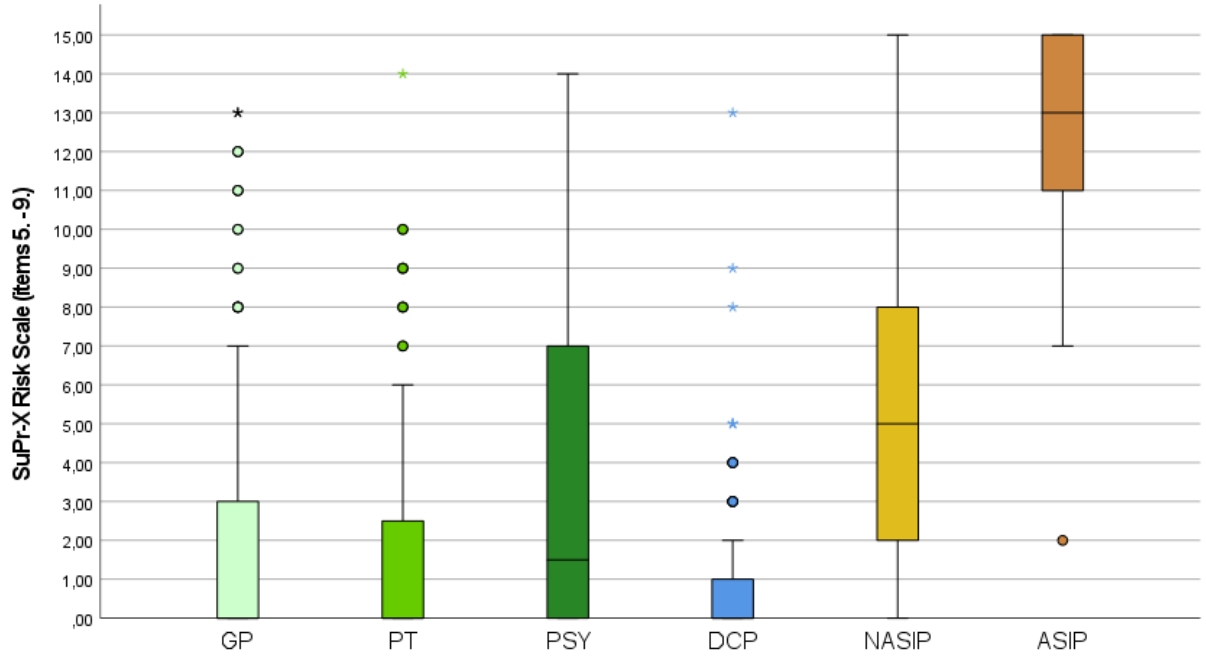

Figure 18. Distribution of SuPr-10 risk scale (remaining items 5.-9.), group comparison

In addition, the SuPr-10 protective scale also provides insight. As the distribution chart (Figure 9 in chapter 3.3.2.2) shows, the range is significantly smaller compared to the SuPr-10 risk scale and the groups did not differ as much.

In the ASIP group, however, no more than four points were ever achieved. The upper limit of the interquartile range for NASIP is also four points.

The sensitivity and specificity of the scale for determining a suicide attempt in the medical history are poor with the best combined accuracy (highest Youden-Index) at a threshold of ≤4 (Table 11).

A threshold of ≤5 was found to be the highest Youden index for identifying current suicidal tendencies (SuPr-10 risk scale >0).

Table 11. Sensitivity and specificity of SuPr-10 protective scale to identify attempters / current suicidality

	Accuracy to identify previous attempters			***Accuracy to identify current suicidality***		
	Sensitivity	**Specificity**	**Youden-Index**	**Sensitivity**	**Specificity**	**Youden-Index**
≤1	15,69%	95,65%	11,34%	14,76%	98,69%	13,45%
≤2	31,37%	91,55%	22,92%	29,52%	98,37%	27,89%
≤3	41,18%	84,30%	25,48%	41,43%	93,46%	34,89%
≤4	53,92%	74,64%	28,56%	51,90%	83,33%	35,24%
≤5	70,59%	55,56%	26,14%	72,38%	65,69%	38,07%
≤6	82,35%	41,06%	23,42%	84,29%	50,33%	34,61%
≤7	91,18%	26,81%	17,99%	93,33%	34,31%	27,65%
≤8	97,06%	15,94%	13,00%	97,62%	20,59%	18,21%
≤9	100,00%	8,21%	8,21%	99,05%	10,13%	9,18%
≤10	100,00%	4,35%	4,35%	100,00%	5,88%	5,88%
≤11	100,00%	2,17%	2,17%	100,00%	2,94%	2,94%
≤12	100,00%	1,69%	1,69%	100,00%	2,29%	2,29%

3.9. Acceptance of new instrument and further adjustment considerations

We implemented the acceptability questionnaire with a time delay. When we started to collect the additional questionnaire as part of the validation study, 60 patients were already enrolled in the study, which is why the feedback from these patients is unfortunately missing. Additionally, we received feedback from 28 practitioners (16 GP, 12 PT).

The vast majority of practitioners (96.2%, n=25 out of a valid total of n= 26, missing data = 2) found the questionnaire useful. Independent of our study, 28.6% (n=8) would use the questionnaire for all patients with mental illness, 60.7% (n=17) would only use it for selected patients, especially those with depression, and only 10.7% (n=3) would not use the questionnaire in everyday clinical practice. The effects on treatment were rated as positive by 64.3% (n=18), as neutral by 32.1% (n=9) and as negative by 3.6% (n=1).

Similarly, 94.6% of patients (n=434 out of a valid total of n= 459, missing data = 62) felt that completing the questionnaire was okay, whereas 5.4% (n=25) stated that they did not like doing it. The majority reported that it was not difficult (89.2%, n=411 out of a valid total of n= 461, missing data = 60) nor too time-consuming (98.3%; n=450 out of a valid total of n= 458, missing data = 63). With regard to medical care, 88.8% (n=388 out of a valid total of n= 438, missing data = 83) believe that it contributes to improved treatment and 96.5% (n=442 out of a valid total of n= 458, missing data = 63) would be willing to complete the questionnaire repeatedly.

Additional statements of patients

Many patients find it difficult to specify exact times and frequencies of their suicidal thoughts. The questionnaire – like every other questionnaire on this topic - can cause emotional reactions and some patients found it stressful to complete. Some patients doubted whether they will answer honestly, especially when asked direct questions about suicidal behavior. Trusting their doctor is a basic requirement for honest answers. Some patients also requested more detailed scales to allow more nuanced responses. Concerns were raised that without subsequent therapeutic support, the questionnaire could lead to a significant deterioration of their mental health condition.

These comments resulted in the following adjustments to the questionnaire: Most importantly, a professional emergency contact (0800 1110111 of German “Telefon Seelsorge Deutschland e. V”) was added to the questionnaire. Additionally, providers were instructed to discuss the results with the patients in any case to ensure patient safety. The open question about how often suicidal thoughts occurred was removed as it caused irritation. A text field was added to the questionnaire where patients could make further specifications.

3.10. New layouts of final questionnaire version SuPr-10

SuPr-10 Fragebogen

Bitte lesen Sie die Fragen sorgfältig durch. Es gibt keine richtigen oder falschen Antworten. Es ist auch in Ordnung, wenn Sie keine Antwort geben können oder wollen. Notieren Sie in diesem Fall bitte „k.A." daneben.

Teil I: Wie stark treffen folgende Aussagen auf Sie zu?	Trifft gar nicht zu	Trifft eher nicht zu	Trifft eher zu	Trifft völlig zu
1. In den letzten zwei Wochen war ich im Allgemeinen zuversichtlich.	**0**	**1**	**2**	**3**
2. In den letzten zwei Wochen hatte ich Ziele im Leben.	**0**	**1**	**2**	**3**
3. In den letzten zwei Wochen fühlte ich mich dem Leben und seinen Schwierigkeiten gewachsen.	**0**	**1**	**2**	**3**
4. In den letzten zwei Wochen war ich alles in allem zufrieden mit meinem Leben.	**0**	**1**	**2**	**3**
			Summe 1.-4.:	

Teil II:

a. Manchmal sind Menschen so sehr niedergeschlagen, dass sie den Wunsch haben, nicht am Leben zu sein. Haben Sie sich jemals gewünscht, lieber nicht am Leben zu sein?

□ Nein

□ Ja wenn ja, wann zuletzt? _____

b. Haben Sie jemals versucht sich das Leben zu nehmen?

□ Nein

□ Ja wenn ja, wann? _____

wie oft? _____

wie? _____

*Wenn Sie Suizidgedanken haben, wenden Sie sich an Ihre/n Behandler*in*
oder an die kostenlose Telefon Seelsorge unter 0800 1110111 (täglich 24h erreichbar).

Teil III: Wie stark trafen folgende Aussagen auf Sie zu?
**Suizid ist ein anderes Wort für Selbsttötung.*

	Trifft gar nicht zu	Trifft eher nicht zu	Trifft eher zu	Trifft völlig zu
5. In den letzten zwei Wochen hatte ich den Wunsch zu sterben.	**0**	**1**	**2**	**3**
6. In den letzten zwei Wochen habe ich darüber nachgedacht mir das Leben zu nehmen.	**0**	**1**	**2**	**3**
7. In den letzten zwei Wochen habe ich mir Gedanken zu einer bestimmten Suizidmethode* gemacht.	**0**	**1**	**2**	**3**
8. In den letzten zwei Wochen habe ich über einen konkreten Suizidplan* nachgedacht.	**0**	**1**	**2**	**3**
9. In den letzten zwei Wochen hatte ich den Drang meinen Suizidplan* umzusetzen.	**0**	**1**	**2**	**3**

Summe 5.-9.:

10. Haben Sie in den letzten zwei Wochen einen Suizidversuch* unternommen?
    - □ Ja
    - □ Nein
      - → 10.1 Welche Gründe schützten Sie vor einem Suizidversuch? *(Mehrfachauswahl möglich)*

        □ Das Vertrauen in die eigene Stärke, die Schwierigkeiten schon irgendwie bewältigen zu können
        □ Die Zuversicht oder Hoffnung auf Besserung
        □ Die Verantwortung für andere
        □ Die Unterstützung durch Familie, Freunde oder andere soziale Kontakte
        □ Die Angst vor dem Tod oder der Selbsttötung
        □ Moralische oder religiöse Bedenken
        □ Die Sorge vor Missbilligung oder der Reaktion des Umfelds
        □ Sonstige Gründe: _____

Ich möchte noch folgende weitere Anmerkung machen:

_____

_____

_____

SuPr-10 questionnaire

Please read the questions carefully. There are no right or wrong answers. It is also okay if you cannot or do not want to give an answer. In this case, please write "n/a" next to it.

Part I: How strongly do the following statements apply to you?	Strongly disagree	Rather disagree	Rather agree	Strongly agree
1. In the last two weeks, I was generally confident.	**0**	**1**	**2**	**3**
2. In the last two weeks, I have had goals in life.	**0**	**1**	**2**	**3**
3. In the last two weeks, I felt able to cope with life and its difficulties.	**0**	**1**	**2**	**3**
4. In the last two weeks, I was satisfied with my life.	**0**	**1**	**2**	**3**
	Total 1st-4th:			

Part II:

a. Sometimes people are feeling so depressed that they wish they were not alive. Have you ever wished you were not alive?

□ No

□ Yes, if yes, when was the last time?

_____

b. Have you ever tried to take your own life?

□ No

□ Yes If yes, when? _____

how often? _____

how? _____

If you have suicidal thoughts, contact your doctor / therapist
or call the free telephone counseling service on 0800 1110111 (available 24 hours a day).

Part III: How strongly do the following statements apply to you?
**Providing a German alternative in plain language ("Selbsttötung").*

5.	In the last two weeks, I have wished to be dead.	**0**	**1**	**2**	**3**
6.	In the last two weeks, I have thought about taking my own life.	**0**	**1**	**2**	**3**
7.	In the last two weeks, I have thought about a specific suicide method*.	**0**	**1**	**2**	**3**
8.	In the last two weeks, I have thought about a specific suicide plan*.	**0**	**1**	**2**	**3**
9.	In the last two weeks, I have had the urge to realize my suicide plan*.	**0**	**1**	**2**	**3**

Total 5th-9th:

10. Have you attempted suicide* in the last two weeks?

□ Yes

□ No

→ 10.1 What reasons prevented you from a suicide attempt? *(multiple choice possible)*

□ Confidence in your own strength that you will be able to overcome the difficulties somehow

□ Faith or hope for improvement

□ Responsibility for others

□ Support from family, friends or other social contacts

□ The fear of death or suicide

□ Moral or religious concerns

□ Concern about disapproval or the reaction of the environment

□ Other reasons: _____

I would like to make the following additional comment:

_____

_____

_____

4. Discussion

The aim of this methodological validation study was to develop and validate a new short questionnaire for the assessment of suicidality, optimized for the primary care setting. The newly developed questionnaire **Su**icide prevention in **Pr**imary Care (SuPr-10) assesses lifetime suicidal ideation and suicide attempts, as well as suicidal tendencies and protective factors in the past two weeks. The protective aspects reflect the moderating construct of positive mental health as well as common reasons that prevent people from attempting suicide.

During the development phase, the perspective of the primary care physician and the patient was taken into account and adjustments were made according to their needs.

In the subsequent validation phase, in addition to the SuPr-10, reference questionnaires on suicidality and details on socio-demographics and other mental or somatic conditions were collected.

A total of 521 patients were enrolled, half of whom were recruited online and enrolled by the author at the Institute of General Practice and Family Medicine, LMU Munich. The other half of the sample was recruited in 39 collaborating practices, day clinics, and psychiatric wards in Germany (mostly Bavaria) and Austria. Thus, the sample included subgroups of outpatients (general practitioners, psychotherapists, psychiatrists), day clinics, and inpatients (including acutely suicidal patients).

We analyzed descriptive characteristics of the sample and group differences, as well as the factor structure, psychometric properties including convergent validity and internal consistency, as well as diagnostic accuracy of the instrument, including cutoffs. Finally, we assessed the acceptability and practicability of the new questionnaire among clinicians and patients.

4.1. Discussion of the methodology

This chapter highlights the methodological strengths and limitations of the study.

Some of these have already been mentioned in papers submitted by the author, currently under review (JMIR Mental Health [105] and BJPsych Open [1]).

4.1.1. Questionnaire development

In the context of the research training group, it was possible to benefit from a wide range of interdisciplinary experience and expertise when developing the questionnaire. This process enabled a sound theoretical basis that was in constant exchange with the practical requirements of the clinical care situation. The instrument is characterized by a high level of content validity, which was achieved through the iterative adaptation process and the evaluation with regard to its usability. This is particularly important as the questionnaire is intended to be used in everyday practice.

The study design considers both qualitative and quantitative approaches and the structure of the questionnaire is oriented towards both target groups (patient and practitioner). This dual approach first allowed us to gain important explorative insights, which were then empirically supported by quantitative validation.

Particularly worth mentioning are the cognitive pretests carried out, which provided valuable insights and demonstrate the importance of such practice in research. These pretests ensured that the questionnaire was comprehensible and well suited for use in the GP setting.

One of the GPs' principal demands was for the instrument to be short and efficient. Due to the need to reduce the number of items, the questionnaire cannot cover all the risk factors known in the literature. Instead, the questionnaire focuses on the continuum of escalation levels from a wish to die to a suicide attempt, but also takes protective aspects into account. These protective elements provide valuable insights for the holistic approach and offer direct indications for further supportive communication with the patient.

The inclusion of the patient perspective also contributed significantly to the high content validity of the instrument.

4.1.2. Study participation

With regard to the inclusion criteria, we decided to choose mild depressive symptoms as a low-barrier inclusion criterion, although various mental and somatic disorders are associated with an increased risk of suicide. This decision is based on the assumption that comorbid affective impairment is the most plausible common element.

Due to the low cut-off, patients with primarily non-depressive syndromes such as anxiety, trauma-related complaints, psychosomatic problems, eating disorders, etc. were also included. Many of the symptoms assessed in the PHQ-9 are not exclusive to depression. For example, affected mood, inner restlessness, impaired concentration, reduced self-esteem, changes in sleep or loss of energy are symptoms that are also commonly observed in the other diagnoses mentioned above, even in the absence of comorbid major depression.

By lowering the cut-off from the usually chosen ">= 10 points on the PHQ-9 or last question on suicidal ideation > 0" to ">= 6 or suicidal ideation > 0", 43 patients with a lifetime medical history of suicidal ideation and 8 patients with current suicidal ideation could be included in the study who otherwise would not have been detected by the PHQ-9 screening.

Altogether, our low inclusion criteria should reflect a realistic scenario and represent a broad patient sample. Nonetheless, it is important to note that only adult patients were included in this study, which is why no conclusion can currently be derived regarding the generalizability of the results for underage patients.

Exclusion criteria in studies always represent an impairment of external validity in the sense of generalizability of the results. We have deliberately defined few exclusion criteria in our study. Nevertheless, we must also exclude certain people from participation due to ethical guidelines if informed consent cannot be given.

Of course, people with severe cognitive impairment can also be affected by suicidal tendencies. Unfortunately, this group of people is not included in our study. Nevertheless, it would be important to develop specific studies tailored to their needs and abilities. The difficulty of including certain patient groups could indicate the need to develop alternative methods of data collection that are also suitable for patients with cognitive impairment or severe psychotic symptoms.

4.1.3. Recruitment

At the start of the SuPr-X study in 2022, the rapid spread of the highly contagious COVID-19 omicron variant [148] made it difficult to find general practitioners willing to collaborate. It became increasingly difficult to conduct research on other topics [149].

It wasn't until spring 2023 that the situation began to improve and some patients could be recruited through GP practices. By then, however, any buffer for recruitment delays had been exhausted. It was therefore unlikely that the initial recruitment target of n=500 could be achieved using conventional methods. To support the project, an online recruitment strategy was implemented from September 2023, which almost doubled the number of patients recruited within a few months.

The recruitment strategies resulted in a broad study sample. Although the recruiting sites were mainly located in Bavaria and in the Munich metropolitan area, practices in northern, eastern and western Germany were also represented, which is beneficial for external validity.

4.1.4. Data collection

The selection of questionnaires for the assessment of the different mental disorders was decided in the POKAL consortium. The use of validated and standardized questionnaires is economical and practicable, especially in studies with large numbers of patients.

We are aware that a questionnaire score cannot replace a clinical diagnosis according to ICD-10 or a structured diagnostic interview and has comparatively lower validity and reliability.

On the other hand, there are also studies that show that people make more valid statements in self-reports when it comes to suicidality [150] compared to external assessment through a clinican.

Furthermore, distortions e.g. due to social desirability are lower in questionnaire assessment than in interviews [151, 152], which in turn would speak in favor of using questionnaires.

4.1.5. Statistical analyses

This section details the statistical analyses conducted including group comparisons, factor analysis, evaluation of psychometric criteria and assessment of diagnostic accuracy.

For external quality assurance, the analyses were reviewed by Prof. Dr Markus Bühner, Chair of Psychological Methodology and Diagnostics at LMU, and Philipp Sterner, a member of this chair, who are both part of the official statistical advisory team of the POKAL Research Training Group.

4.1.5.1. Group comparison

When collecting questionnaire data to assess self-reported mental health symptoms, non-parametric tests should be used as best practice. This is because ordinal scales do not meet the requirements for parametric tests, such as assuming a normal distribution or metric data.

Non-parametric tests, such as the Mann-Whitney U test or the Kruskal-Wallis test, provide a methodologically appropriate alternative because they do not require strict assumptions. They are more robust than parametric tests and can be used in more situations, but have the disadvantage of less statistical power [92].

To counteract the risk of a Type I error in the context of multiple testing (i.e., rejecting a null hypothesis without an actual significant effect), an alpha adjustment was performed using Bonferroni correction, which is widely regarded as a very conservative method. This ensured that the reported differences are not overestimated and gives the results that exceed this conservative threshold greater credibility and robustness [153].

4.1.5.2. Factor analysis

Various recommendations on sample sizes for factor analyses can be found in the literature. Some rules of thumb are based on the number of items (e.g., 4-20 respondents per item), others recommend a general minimum size of, e.g., >100 or >200 [154]. Another also frequently referred rule of thumb is a minimum sample size of 250 people, as correlations stabilize above this size [155]. Therefore, our sample size seems adequate.

We refrained from providing specifications and interpretations regarding possible threshold values of our reported global robust model fit indices, as the commonly cited threshold values were developed for maximum likelihood estimation and should only be interpreted for calculations using this specific estimation method.

Simulations have shown that the WLMSV estimation method can lead to a better model fit for smaller samples and ordinal data, but the typical thresholds for global fit indices should be

critically reviewed and possibly adjusted. Further developments in research are still pending in this regard. However, based on our data, the WLMSV estimation method seemed to be the most appropriate method of choice [156].

4.1.5.3. Psychometric criteria

In suicide research, there is actually no generally recognized gold standard tool for criterion validation [69, 70]. Additionally, a final confirmation of suicidality (e.g. a completed suicide) cannot ethically be used as a direct standard of comparison. Therefore, it is common in research to focus on constructs such as construct validity, where the validity of an instrument is tested by comparison with other, already validated and established instruments or by theoretical agreement with known patterns.

Since no gold standard is available, we defined acute suicidality in a clinical sense: hospitalization after a suicide attempt in the immediate past (two weeks retrospectively), court-ordered hospitalization or involuntary confinement on protected psychiatric wards due to clinical perception of acute danger.

According to this definition, 23 acutely suicidal patients were enrolled in the study in order to compare their response patterns and gain insights for the new instrument. This is a comparatively small sample to make representative statements.

Nevertheless, most validation studies in the field of suicidality focus on construct validity, as this is easier to establish by comparing the results of the new instrument with established reference instruments [114, 157]. Criterion validity remains difficult to obtain because direct, objective criteria (actual suicide attempt) are ethically problematic.

4.1.5.4. Diagnostic accuracy

Hosmer-Lemeshow test for logistic regression was significant, indicating a poor model fit. As the test is very sensitive, the interpretation should not be too rigid. Even if the goodness of fit according to the Hosmer-Lemeshow test is not given, the binomial logistic regression can provide good and valid results [158].

In order to make a statement about threshold values, we looked at the extent to which the risk scale of the questionnaire with reference to the past two weeks can predict whether patients have already attempted suicide in their medical history. Previous attempts are considered as a major predictor of whether an attempt could be repeated [143]. Since it is morally critical for diagnostic and intervention studies to wait and see whether a patient actually attempts suicide, the retrospective view is a diversion that is common in suicide research [72].

However, a major limitation in terms of diagnostic accuracy is that the study does not include a long-term follow-up. It therefore remains unclear whether and which patients have shown suicidal behavior after participating in the study or will show suicidal behavior in the future. We can only make statements about whether patients who were classified as suicidal during the study were correctly classified.

As with all screening tools for assessing suicidality, our predictive power is therefore severely limited [159]. Considering the response pattern of the acutely suicidal group can partially compensate for this limitation, but again, this tool does not guarantee a reliable prediction. It serves more as an interview guide than as a diagnostic instrument in the classical sense.

4.2. Discussion of results

In this chapter, we will discuss the key findings of our study. Furthermore, we reflect on differences in recruitment strategies and treatment settings. We also address the psychometric properties of the questionnaire and evaluate the structure and relevance of the cut-off values. Finally, we discuss the limits and limitations of the study and its implications for suicide prevention in primary care.

4.2.1. Composition of our sample: Sociodemographics

In this chapter, we contextualize the socio-demographic characteristics of the participants, including gender, age, social environment, marital status and educational level and compare them with general population in terms of representativeness:

4.2.1.1. Gender

Our data showed an overrepresentation of women compared to men in a ratio of 2:1. Given that the sample was pre-screened for depressive symptoms, this ratio is consistent with the general gender distribution of depression [160].

4.2.1.2. Age

Our sample covered a wide age range (18-83). However, the average age of our sample (40.89 years) was slightly lower than the average age of the population (44.6 years in 2023) [161].

A German survey found that 8.3% of adults in Germany reported depressive symptoms in the past two weeks (8.8% women, 7.5%% men). Especially in the age group of young adults up to 29 years, the proportion for women was higher (11.6%). The lowest prevalence of depressive symptoms was found in the age group 65-79 years (5% women, 4.4% men) [162]. Given our preselected sample, this may have lowered the average age to some extent.

4.2.1.3. Social environment and marital status

Our sample had a disproportionate number of single people (~54%) compared to the general population (~27%) [163].

Marital status has long been known to influence the prevalence of depression, with married people having lower rates than those who are single, widowed or divorced [164].

The increased incidence of depression among separated or divorced people may be due to two factors: first, the greater likelihood of marital disruption among people who suffer from

depression, and second, the increased risk of developing depression among people who are divorced or separated [165].

Approximately two-thirds of our patient sample is childless, which is much higher than the average childlessness rate. While the proportion of temporarily childless people in Germany decreases with increasing age (74% among 25-29 year olds, 43% among 30-35 year olds, 27% among 35-39 year olds), the rate of permanent childlessness among women aged 45 and over stabilizes at around 20% [166].

Although a committed partnership is not a necessary condition for having children, 80% of minor children in Germany are raised in marital or cohabiting relationships [167]. The high proportion of singles in our sample may also mean that people do not have a significant other in their lives with whom they could start a family.

Involuntary childlessness is known to be a major psychological burden that can lead to the development of depressive symptoms [168] which, however, does not apply to voluntary childlessness [169]. Nevertheless, it can be assumed that the high proportion of childlessness in our sample is not only due to involuntary childlessness (e.g. due to infertility), as these represent the smaller percentage [170].

In contrast, our study population had a higher average number of children (1.89) compared to the low birthrate in the general population (1.35 in 2023) [171].

4.2.1.4. Educational level

Overall, our sample has a high level of education, with about half having a high school diploma and about 90% having a vocational or university degree. A higher level of education also seems to be associated with a higher likelihood of participating in clinical trials [172, 173].

In contrast, the employment rate of 61% in our sample is below the average employment rate in Germany (76.8% in 2022) [174]. At this point, it remains unclear whether patients may have misclassified themselves as non-working in the self-report because they were on long-term sick leave due to a mental disorder at the time of participation in the study, although they were still employed during their absence from work.

4.2.2. Composition of our sample: Symptom severity

In this chapter, we review the severity of symptoms in our sample, with a particular focus on depression and suicidality, including suicide methods and family history of suicidality.

4.2.2.1. Depression

The severity of depressive symptoms appeared to be normally distributed, with just under two-thirds of patients having moderate symptoms and just under one-fifth each having mild or severe symptoms.

Although we chose a low prescreening value as inclusion criterion, the average PHQ-9 score of 14.8 was in the moderate to moderate-severe range, in other words well above the inclusion criterion (≥6), which could indicate a selection bias. It might be assumed that the data from participants in the more intensive treatment settings are responsible for the higher average level of depressive symptoms, but similar values can be observed when looking only at the GP sample (Table 4).

Participants with higher levels of distress may have been more motivated to participate in a study on depression and suicidality.
On the other hand, more severely affected people may have feared study participation due to required effort. Nevertheless, the very low no-show rate in the cohort recruited online indicated a high level of commitment, which may have been encouraged by reminder emails.

A selection bias may have also occurred in the traditionally recruited cohort, as the practitioners were supposed to approach suitable patients for the study. Although current suicidality or a diagnosed major depression were no mandatory condition, practitioners may have been unconsciously inhibited from approaching patients with a mildly depressed mood for a suicide study. Instead, they may have approached patients who already showed suicidal tendencies or more severe depressive symptoms.

Although a confirmed diagnosis of depression was not a required criterion for participation in the study, more than 80% of participants reported having been diagnosed with depression by their physician or therapist, reinforcing the suggestion of potential selection bias.

4.2.2.2. Suicidality

Approximately three-quarters of the patients had experienced suicidal ideation in their lifetime, and about half reported suicidal ideation in the previous two weeks at the time of study enrollment with increasing tendency in more depressed individuals. One in five participants had attempted suicide at least once.

Reported prevalence of suicidal ideation and attempts among people with depression vary, which might be due to different settings and assessment method [175]. Overall, both suicidal ideation and suicide attempts appear to be somewhat more prevalent in our sample than in other studies, but is still within the reported range of prevalence among depressive patients suicidal ideation: 35-88% [175-178] and suicidal attempts: 12-31% [177, 179-181]).

The heterogeneity of depression (e.g. occurring with or without suicidality) is a challenge for clinical practice and research. Mathematically, there are 119 combinations of symptoms that could be used to diagnose depression [182]. In some cases, the symptoms are completely opposite (insomnia or hypersomnia; weight gain or loss; retardation or agitation). Researchers have therefore tried to define different subtypes, for example, to investigate the background of "suicidal depression" as a subtype diagnosis. A major focus has been on the role of specific psychopathological factors as significant risk factors that differentiate suicidal from non-suicidal depressed individuals.

In particular, thoughts of worthlessness, guilt, hopelessness, depressive delusions, agitation, panic attacks, anxiety, sleep disturbances, and a history of suicidal behavior are highlighted as particularly important [183].

Suicidal tendencies were mainly associated with patients who exhibited stronger manifestations in all symptom categories and were therefore classified as "severely depressed" but also with a group of "cognitive-emotionally depressed" patients who, in addition to suicidal tendencies, were also characterized by feelings of worthlessness and concentration problems [184].

The fact that our patients also experienced an increased proportion of suicidal tendencies with increasing depression would be consistent with this classification. In addition, the correlations of suicidality with instruments for assessing various mental disorders showed that suicidality correlated most highly with the single items that asked about low mood, worthlessness, excessive worry, trouble relaxing, feeling distant or disconnected and heart race. This would also be in line with the above characterizations [183, 184].

4.2.2.3. Suicide methods

Among patients who had already made one or more suicide attempts, poisoning was by far the most frequently chosen method. This was followed by attempted suicide caused by sharp objects and hanging or strangulation. In the P4 validation study, poisoning/overdose and cutting were also among the three most common methods, with intentional vehicular accidents, which played a minor role in our data, being the second most common [88].

In Germany, suicide death by hanging is the most chosen method reported for completed suicides. Poisoning due to drug abuse comes in second, followed by jumps from high places [8].

Obviously, the more violent and lethal means of suicide (e.g. hanging, drowning [185, 186]) are under-represented in our study, as in these cases people often die during the first suicide attempt, whereas the lethality of poisoning (8%) or cutting (4%) is comparatively low [186].

A common suicide myth is the assumption that people who are serious about attempting suicide would choose the more lethal means of killing themselves. If this is not the case, and a less lethal method is chosen, then the suicide attempt is not serious. The myth is closely linked to the assumption that suicidal behavior is done to seek attention [187].

While the mortality rates above show that self-poisoning is twice as likely to be fatal as a suicide attempt by cutting, there are studies that show that in the long term people who chose cutting as a method in previous suicide attempts had a higher risk of eventually dying by suicide than people who chose self-poisoning [188].

Since 95% of our participants reported a moderate to high desire to die during suicide attempts, as measured by the BSS, the choice of a less lethal method is unlikely to be attributed to ambivalence or indecision. No conclusions regarding the seriousness of the suicide attempt should be drawn on the basis of the chosen suicide method. Every suicide attempt must be taken seriously, regardless of the method chosen. Contrary to what the above-mentioned suicide myth might suggest, there is simply no such thing as a “non-serious suicide attempt”.

4.2.2.4. Family history of suicide

Although family history of suicides are known to be a risk factor for suicidal behavior [189, 190], our data did not show a correlation. We excluded this question from the final version of the questionnaire, as it likely plays a subordinate role in the decision-making process for further treatment from a (family) doctor's perspective in daily practice.

4.2.3. Composition of our sample: Preventive reasons

The social network as the most important reason for not attempting suicide is consistent with the results of the P4 validation study, that identified the “4 F’s: family, future hope, faith and fear of failing” as major preventive reasons [87, 88].

A connection between increased suicidal tendencies and lower self-efficacy is also reported in many other studies [191-194], as well as the protective effect of social support [194-198]. Both aspects should therefore play a central role in the treatment of suicidal tendencies: The strengthening of self-efficacy and inner stability as well as the mobilization of social support.

The fear of death, that was also mentioned by a third in our sample, can also be used in the conversation to strengthen ambivalence and work out reasons for living.

4.2.4. Group comparison: Demographics, symptom severity, preventive reasons

This chapter discusses the observed differences in our sample regarding gender and age distribution, as well as depression and suicidality scores across different recruitment strategies and treatment settings. We also examine the differences in reported preventive reasons for not attempting suicide associated with various treatment settings.

4.2.4.1. Differences among recruitment strategies

The following paragraphs discussing online recruitment strategies were also reported in a submitted paper by the author, currently under review (JMIR Mental Health [105]).

Our current analysis found no significant differences between patients recruited traditionally and online in terms of age, gender or inclusion criteria for depressive symptoms. A further analysis of the online recruitment channels showed that TikTok was particularly effective in reaching a younger audience, which makes it a strategic tool for the recruitment of younger participants. Due to ethical committee concerns, the online advertisements for the study mentioned only depression and not suicidal ideation. Both samples (traditional and online) showed an over-representation of women compared to men, with a ratio of 2:1, which is in line with the general gender distribution of depression [160].

The observed correlation between time spent on social media ($r = .11$), addictive use ($r = .29$) and depressive symptoms, as well as anxiety, poor sleep quality and reduced self-esteem in adolescents, supports the use of social media for recruitment in mental health studies [199]. For female participants, this association appeared to be stronger [200]. Similar to other studies on suicide prevention, Facebook was found to be an effective way to generate a wide and favorable reach in order to attract participants to the study [201]. There was, however, an over-representation of young women, which has also been observed in previous recruitment campaigns using Facebook [201, 202]. The representativeness of the data collected is a commonly cited limitation of using social media in research. However, as these campaigns can be targeted to a certain extent, social media advertising can be used to directly reach underrepresented groups to increase patient diversity. Of course, this would increase the cost of advertising.

Patients recruited online were well-suited for the validation study because they showed slightly higher mean values of suicidality than those recruited by traditional methods, providing valuable data for the validation of our new suicidality questionnaire. The online cohort also

included ten people from a population referred to as "under-the-radar", i.e., people who are mentally distressed and experiencing suicidal tendencies but who have only minimal or no contact with the healthcare system and are therefore often not reached by prevention initiatives [203]. We defined these as individuals who reported current suicidal tendencies in the questionnaire, but who were not receiving medical care and had not sought help due to mental distress. In spite of this, the campaign was successful in reaching them, and they were included in the study. The social media adverts did not mention suicidality, yet the campaign appeared to reach a demographic that may have been missed by traditional methods. Including such underrepresented patients highlights the importance of social media campaigns in diversifying research studies and clinical trials.

4.2.4.2. Differences among treatment settings

The following paragraphs discussing different treatment settings were also reported in a submitted paper by the author, currently under review (BJPsych Open [1]).

In summary, the treatment groups differed only in age, severity of depression, suicidality and protective reasons. In terms of age, the GP and outpatient psychiatric sample was approximately ten years older than the inpatient psychiatric cohort, which was approximately five years younger than the average for the total sample.

As expected, scores for depression and suicidality on all instruments were significantly higher in the inpatient sample, particularly among acutely suicidal patients and especially compared to the non-inpatient sample. For suicidality, the acutely suicidal inpatient subsample had scores twice as high as the rest of the inpatient cohort. Compared to the non-inpatient groups, the scores were even multiple times higher.

A more differentiated look into reported protective reasons among the treatment settings reveals an interesting picture: The reasons shifted from intrinsic aspects as main preventive factor in the non-patient groups, such as one's own self-confidence or one's own responsibility for others, to extrinsic aspects in the inpatient setting, such as external support from others. Both inpatient groups showed significantly lower self-efficacy in this respect than the outpatient and day clinic groups. Once again, the need for safety planning to support aspects of self-efficacy and the importance of the social network is highlighted.

4.2.5. Factor structure

The following paragraphs discussing factor structure were also reported in a submitted paper by the author, currently under review (BJPsych Open [1]).

The two-factor solution seemed obvious, with high factor loadings for the risk and protective scales, with only one double loading on an item that was later removed. Item difficulty was particularly high for the post-suicide precautions and self-endangering behaviors.

Low item difficulty scores may indicate that certain aspects of suicidality are extremely rare, rather than an inherent difficulty of the item itself.

However, these two items may have been measuring something else, as the ability to discriminate was also notably lower compared to the other items. Communality, a measure of the reliability of how well items fit the factors, was also below average for item 11.

Precautions (item 10) regarding the suicide environment may be more indicative of certain personality traits (e.g., self-critical people are more likely to prevent discovery [204]) rather than acute suicidality. Precautions in terms of leaving a suicide note may also rather indicate certain life circumstances (e.g., interpersonal conflicts or loneliness [205-208]) than acute suicidality. Furthermore item 11 may have referred to non-suicidal self-harming behavior, which is different phenomenon [89].

After eliminating items 10 and 11, the factor loadings remained high. The factors correlate relatively strongly and negatively with each other. This is not surprising, as the protective scale reflects satisfaction with life, goals, and coping strategies, which to some extent may contradict a death wish.

4.2.6. Psychometric properties

The following paragraphs discussing different treatment settings were also part of a submitted paper by the author, currently under review (BJPsych Open [1]).

As expected, the correlations of the SuPr-10 risk scale are highest for suicidal tendencies, followed by high values for depression and slight correlations with the other mental and psycho(somatic) disorders and previous suicide attempts. Comparable values were obtained for the BSS with 19 items (Table 8).

The SuPr-10 protective scale showed the strongest negative correlation with depression, followed by suicidality, which also had highly negative values, and anxiety with a moderate correlation.

The convergent validity of the SuPr-10' protective scale in assessing aspects that reduce the risk of suicidality is supported by the significant negative correlations with established measures of suicidality and various mental disorders. The significant positive correlations with the same measures support the convergent validity of the SuPr-10' risk scale.

The correlations between the SuPr-10 and questionnaires measuring the constructs of suicidality or depression are similar or even higher than for comparable instruments validated in other studies. For example, our instrument shows similar high correlations with depression as reported for the SSEV [99] or SIS-Q [209], but higher values compared to the SBQ-R [210], P4 [88] or SIDAS-M . Correlations with the construct of suicidality are also higher in our study than reported for the SSEV [99], SIDAS [211] and SIDAS-M [212], for example.

However, this could also be due to the fact that some studies used different instruments as a reference standard (e.g. PHQ-9 vs. BDI-II for depression).

Reasons that prevent a suicide attempt, which were assessed in the last item of the questionnaire, also demonstrated convergent validity of our modified selection and adjustment through moderately strong correlations with the scales of the BRFL scale (Table 9).

Additionally, sufficient internal consistency was found for each of the individual scales, indicating good reliability.

4.2.7. Cut-off considerations

The following paragraphs discussing cut-off considerations were also reported in a submitted paper by the author, currently under review (BJPsych Open [1]).
(For a German handout summarizing the application of SuPr-10, see Apendix A – Handout: Recommended application of SuPr-10 (German))

This chapter evaluates how different threshold values influence diagnostic accuracy and practical application. The focus is on adapting the risk scale for use in outpatient care and on the possible use of the protective factor scale as an introductory screening. The aim is to determine optimal cut-off values for risk assessment in practice.

Based on the Youden index [146], a cut-off of ≥2 is recommended for the SuPr-10 risk scale due to its optimal combined diagnostic accuracy. However, the Youden index does not take into account the different clinical consequences of low sensitivity versus low specificity. In the context of suicide risk screening, sensitivity is of particular importance. Therefore, we suggest a lower cut-off to increase sensitivity while maintaining the overall accuracy indicated by the Youden Index. Specifically, a sensitivity greater than 80% and a specificity greater than 50% were suggested by Runeson et al. (2017) as practical thresholds that suicide screening tools should aim for [213]. Given these factors, there is a strong rationale for an initial cut-off above 0, which is consistent with Runeson's criteria, resulting in an achieved sensitivity of 83% and specificity of 56%.

4.2.7.1. Applying the SuPr-10 risk scale in (primary) outpatient healthcare

The cut-off values were derived from an in-sample evaluation. Further validation is necessary. Nevertheless, they provide an initial guideline for use in primary care and future research:

a. Increased risk (score >0): If a patient scores greater than 0 on the SuPr-10 risk scale (sum of items 5-9), this indicates an increased risk for suicidal behavior. General practitioners (GPs) should be aware of this risk and safety planning should be implemented [214]. The protective factors identified by the SuPr-10 can be used directly in this planning (for more detailed guidance, see for example [215] or Apendix B – Handout: Crisis management (German), Apendix C - Handout: Worksheet for crisis management (German)). Initial interventions should focus on strengthening the patient's self-efficacy and mobilizing social support.

b. Consider inpatient treatment (score ≥4): A score of 4 or higher indicates that inpatient treatment should be seriously considered and discussed with the patient.

c. High risk (score ≥7): A score of 7 or higher reflects a response pattern similar to that of acutely suicidal patients typically found in secure psychiatry wards. Such cases require very close monitoring, which is most effectively provided by inpatient care.

d. Cave: Even a patient scoring zero on the risk scale does not completely exclude the possibility of suicidal behavior [159, 216].

4.2.7.2. Additional implications for the SuPr-10 protective scale

Additionally, to the SuPr-10 risk scale, the protective scale offers valuable insights into response patterns and current mood states, although its function is more about buffering than predicting. Given that the protective scale shows a stronger correlation with depression than with suicidality (see Table 1), a low score on this scale should not automatically be interpreted as an indication of suicidality and must be evaluated with caution. The SuPr-10 protective scale should therefore be considered an additional indicator, complementing the SuPr-10 risk scale. The risk assessment should be repeated regularly if all items on the risk scale are negative but the score on the protective scale is very low. The protective scale also allows for a more gradual approach to suicide assessment, in line with the preferences of general practitioners. For outpatient care, we recommend the following guidelines:

a. A score of ≤5 on the protective scale offers the best combined accuracy for assessing current suicidality.

b. A score of ≤4 is optimal for identifying individuals who have attempted suicide and may indicate an increased risk of depression and suicidality.

c. A score of ≤2 aligns with the response pattern observed in acutely suicidal patients in secured psychiatric wards.

d. Even high scores on the protective scale do not entirely rule out the possibility of suicidal behavior [159].

4.2.7.3. Possible application of protective scale as pre-screening

If the protective scale was utilized as a pre-screener with the risk scale only administered to patients scoring ≤5, ten patients at increased risk (≥4) would have been missed in the general practice setting. Assessment of both risk and protective factors is therefore strongly recommended. It is important to note that questions about suicidality will not increase the likelihood of suicidal behavior [217]. In fact, patients support the assessment of suicidality in primary care settings [218].

4.2.8. Suicide prediction vs. suicide prevention

It is important to acknowledge that accurately predicting suicide is nearly impossible, as all predictive models developed over the past 50 years have demonstrated a predictive ability only slightly better than chance [159].

Although cut-off scores are mentioned here, it should not be implied that suicide attempts can be predicted based on "low, medium, high" risk stratification or that treatment should be offered (or not offered) on the basis of questionnaire results alone. According to the National Institute for Health and Care Excellence (NICE) guidelines [219], questionnaires should be used as tools for comprehensive exploration, follow-up, and documentation purposes. The clinical impression gained during the debriefing is essential. Nevertheless, the use of questionnaires and screening instruments can be a valuable aid in risk assessment, especially in a sense of risk formulation. Risk formulation is a collaborative effort between the person at risk and a (mental) health professional, aimed at identifying the individual's current risks and challenges while gaining an insight of why these issues may be occurring. This understanding helps to guide appropriate treatment and safety planning. The formulation should include historical risk factors and events, recent difficulties, as well as the person’s coping strengths and available resources [219]. Our questionnaire covers these aspects and also integrates individual reasons that prevent a suicide attempt, which should be considered during subsequent treatment.

The SuPr-10 does not claim to be a definitive assessment in the usual diagnostic sense. Instead, it serves as a valuable assessment guide and complementary decision-making tool

for outpatient care and general practitioners. While awareness and use of the proposed thresholds can help with treatment planning and contribute in a beneficial way to suicide prevention, it is important to remember that reliance on a questionnaire should not create a false sense of certainty. Ultimately, overall clinical judgment remains the critical factor in making informed decisions.

4.2.9. Evaluation of acceptability and usability

Comparing patient and clinician feedback with the data collected during the evaluation of the PHQ-9 [111], it appears that our instrument achieved comparable rates and was generally well approved by both patients and clinicians (Table 12, Apendix F - Comparison of SuPr-10 and PHQ-9 in terms of acceptability and usability). Considering that suicidality is probably an even more taboo and stigmatized aspect of depression, this is a very satisfying result.

Practitioner Feedback

- SuPr-10: 96.2% found the questionnaire useful.
- PHQ-9: 96.9% found the questionnaire useful.

Use of Questionnaire (Practitioners)

- SuPr-10: 28.6% would use it for all mental illnesses
  60.7% for selected patients (especially depression)
  10.7% would not use it.
- PHQ-9: 25.0% would use it for all mental illnesses
  68.8% for selected patients (especially depression)
  6.3% would not use it.

Effects on Treatment (Practitioners)

- SuPr-10: 64.3% positive, 32.1% neutral, 3.6% negative.
- PHQ-9: 72.7% positive, 27.3% neutral, 0.0% negative.

Patient Acceptance

- SuPr-10: 94.6% felt that completing the questionnaire was okay.
- PHQ-9: 96.9% felt that completing the questionnaire was okay.

Difficulty (Patients)

- SuPr-10: 89.2% found it not difficult.
- PHQ-9: 88.4% found it not difficult.

Time Consumption (Patients)

- SuPr-10: 98.3% found it not too time-consuming.
- PHQ-9: 83.6% found it not too time-consuming.

Contribution to Treatment (Patients)

- SuPr-10: 88.8% believe it contributes to improved treatment.
- PHQ-9: 93.8% believe it contributes to improved treatment.

Willingness for Repeated Use (Patients)

- SuPr-10: 96.5% would be willing to complete the questionnaire repeatedly.
- PHQ-9: 99.3% would be willing to complete the questionnaire repeatedly.

4.3. Implications for primary care

4.3.1. Prevention and postvention

As mentioned before, a large proportion of people with depression are treated with the involvement of general practitioners [220], which includes suicide prevention.

In contrast to mental health specialists, GPs are faced with the challenge that patients with mental problems are likely to describe physical symptoms or to remain vague (e.g. 'I feel a bit weak') in more than half of all cases, which affects the detection rate [221]. Despite this, it is important to identify patients at risk so that appropriate internal or external treatment can be initiated.

In addition, postvention is an important aspect of GP care, as patients discharged from mental health services or emergency departments after a suicide attempt are most likely to have frequent contact with their GP [222]. The risk of suicide is among the highest after discharge from a psychiatric hospital and requires the implementation of aftercare [223]. Unfortunately, GPs often do not receive the necessary discharge reports and information for further treatment [224].

4.3.2. Barriers and facilitators in risk assessment

Regarding depression, it often takes many years for people to decide to seek medical or therapeutic treatment [225]. However, approaching a general practitioner is often easier than approaching a psychiatrist. A strong, trusting relationship can help patients open up to their healthcare providers and discuss difficult topics such as suicidal ideation. In our online-recruited cohort, patients were asked who they considered to be their main healthcare provider. Around half identified their GP to be mostly involved, although some were also receiving psychiatric or psychotherapeutic care. This may indicate that patients have a high level of trust in their GPs and have regular contact with them.

At the same time, a study showed that only every fifth to tenth person reports suicidal thoughts to their family doctor before a suicide attempt [226, 227], compared with around one third who consulted a psychiatrist prior to an attempt [226].

Patients often see their healthcare provider as responsible for exploring suicidal thoughts and find it helpful to be asked specifically about it [228]. However, studies have shown that GPs inquire about suicidality in only about a third of depressed patients at high risk [229, 230].

There is also a tendency for both psychiatrists and GPs to phrase these questions in negative terms (e.g. "you don't have any thoughts of suicide, do you?”). This type of wording can reduce the chances of patients admitting to having such thoughts. Often the exploration of suicidality ends when this one question was denied, and the opportunity for a deeper discussion was missed [231]. Friendly, empathetic and attentive dialogue were again factors that made it easier to disclose suicidal ideation. Time constraints present a challenge here. However, patients found it helpful when they were offered a follow-up appointment [228].

4.3.3. Training and collaborative care

Specific training is seen as a key facilitator in addressing suicidality in clinical practice [228]. Such training is crucial because it directly influences the perceived competence of healthcare providers, which in turn increases their willingness to work with suicidal patients and to assess suicidal tendencies during consultations [232]. These findings suggest that adequate suicide-related training, focusing on risk assessment, may reduce clinician uncertainty and increase confidence in managing suicide risk [233].

In our study, a significant proportion of patients with mental illness and associated psychosomatic comorbidity were seen by general practitioners as well as psychotherapists and psychiatrists. This illustrates the complexity of managing such patients and highlights the importance of multidisciplinary collaborative care. Continuous care by general practitioners allows early detection of depression symptoms. In addition, continuous treatment promotes

greater acceptance of referrals to specialist care. Concerns can be addressed and barriers can be overcome by engaging in a trusting relationship [234].

In addition, case management provided by practice-based healthcare assistants in primary care has been shown to reduce depression symptoms and improve the care process for patients with major depression more than usual care [235].

4.3.4. SuPr-10 for risk assessment in primary care

Screening instruments can contribute to the time-efficient assessment of suicidality in primary care and support general practitioners in their communication with patients.

In our study, SuPr-10 was developed and validated in German and in patients with depressive symptoms according to PHQ-9. Many of the symptoms assessed in the PHQ-9 are not specific to depression. Therefore, patients with other syndromes such as anxiety, trauma or psychosomatic problems were also included. While broader use of the questionnaire in primary care patients is not precluded, our cut-off recommendations are based on a sample selected by PHQ-9. Further validation studies are needed before cut-off considerations can be generalized to other (mental) disorders or languages.

To date, the SuPr-10 can be used as a complement to the PHQ-9 for in-depth assessment of suicidality, since the PHQ-9 single item on suicidality does not allow sufficient exploration. However, our questionnaire should not only be used when the question about suicidality in the PHQ-9 is answered affirmatively. If further exploration of suicidality had only been carried out in our study in those participants with an affirmative response to the suicide item in the PHQ-9, we would have missed 7% (n=36) of patients with suicidal tendencies in the previous 2 weeks. In 7 cases, the severity of suicidality in our questionnaire would have been high enough for us to consider inpatient treatment according to our cut-offs (<=4).

Debriefing of patient responses should always be face-to-face. The questionnaire should not be used alone to make treatment decisions. However, the tool can be used to support the clinician in the decision-making process and to guide the communication with the patient.

4.4. Conclusion

We aimed to develop and validate a brief questionnaire specifically designed to assess suicidality in primary care settings. The resulting tool, ***Su****icide prevention in* ***Pr****imary care (SuPr-10)*, assesses lifetime suicidal ideation and attempts, as well as recent suicidal ideation in the past two weeks and protective factors. The questionnaire considers protective factors related to positive mental health and common reasons that might prevent people from attempting suicide. By placing items that address risk factors between items that address protective aspects, this structure facilitates both a supportive opening and a resource-oriented closing of the interview.

The development of SuPr-10 within the POKAL Research Training Group benefited from strong interdisciplinary expertise, resulting in a tool with high content validity and usability. This was achieved through an iterative adaptation process and cognitive interviews that involved feedback from both GPs and patients.

Social media recruitment as well as recruitment among various treatment settings successfully reached a diverse sample, including hard-to-reach individuals. Overall, compared with the general population, our participants were more likely to be female, slightly younger, single and childless, well educated, but more often unemployed. This picture was similar when compared with other studies of depressed patients. Overall, the proportion of patients with suicidal tendencies was relatively high. By lowering the PHQ-9 cut-off from ≥10 to ≥6 points, the study enrolled additional patients with a history of suicidal ideation who would otherwise have been missed.

The questionnaire has been developed and validated in German language and within a population with depressive symptoms, but further validation is needed for wider use – especially regarding different (mental) disorders, languages and its application for minors and minorities. Further limitations of the study included the small sample size of acutely suicidal patients for criterion validation in absence of a gold standard, the potential for selection bias, and the lack of long-term follow-up data, which limits predictive accuracy.

Among people with depressive symptoms, the SuPr-10 questionnaire with its two-factorial structure has strong psychometric properties, including high content validity and patient acceptance. It is a reliable tool for the assessment of risk and protective factors in outpatient and primary care settings, although its ability to predict suicidal behavior remains limited.

When used together with the PHQ-9, the SuPr-10 offers a more comprehensive evaluation of suicidality including suicidal tendencies and protective factors. Patients from more intensive treatment settings were found to have minimal self-efficacy regarding their suicidal tendencies and coping with their situation. External factors became more important. Overall, the social

network was the most important protective factor in all groups. These reasons can be used directly by general practitioners in risk assessment for subsequent safety planning, which should include interventions to increase self-efficacy and mobilize social support.

Importantly, patient responses should always be reviewed in a direct, face-to-face interaction, and treatment decisions should not rely solely on the questionnaire.

To conclude, the SuPr-10 can effectively assist clinicians in exploring the suicidal tendencies of their patients and in structuring patient-practitioner interactions, as well as treatment planning. Suicidality should always be addressed directly.

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Apendix A – Handout: Recommended application of SuPr-10 (German)

Empfehlung zur Handhabung des SuPr-10 Fragebogens (Risiko- und Schutzfaktorenskala) zur Erfassung von Suizidalität in der ambulanten Primärversorgung

1. Anwendung der SuPr-10 Risikoskala (Summe der Antworten 5.-9.)

a. Erhöhtes Risiko:

- Ein Summenwert **>0** auf der SuPr-10-Risikoskala deutet auf ein erhöhtes Risiko für suizidales Verhalten hin.
- Hausärzte*innen sollten bei diesen Personen besonders wachsam sein und gemeinsam mit ihnen einen Krisenplan erstellen.
- Die im Rahmen von SuPr-10 erhobenen Gründe, die einen Suizidversuch verhindert haben, können zur Erstellung des Krisenplans herangezogen werden.
- Erste Ansätze sollten die Selbstwirksamkeit fördern und soziale Unterstützung mobilisieren.
- Angehängtes Handout kann hierfür genutzt werden

b. Stationäre Behandlung erwägen:

- Bei einem Wert von **≥4** Punkten sollte eine stationäre Behandlung in Erwägung gezogen und dies mit den betroffenen Personen besprochen werden.

c. Hinweis auf akute Suizidalität:

- Ein Wert von **≥7** Punkten entspricht dem Antwortmuster einer akut suizidalen Person in einer geschützten psychiatrischen Station.
- Eine sehr engmaschige Überwachung ist angezeigt, die am besten im Rahmen einer stationären Versorgung gewährleistet werden kann.

d. Cave:

- Auch bei einem Summenwert von null Punkten auf der Risikoskala kann suizidales Verhalten nicht ausgeschlossen werden. Behandlungsentscheidungen sollten nie alleine auf Fragebogen-Scores beruhen.

2. Weitere Implikationen für die SuPr-10 Schutzfaktorenskala (Items 1.-4.)

Die SuPr-10 Schutzfaktorenskala liefert zusätzliche Informationen über Antwortmuster und das aktuelle Befinden und sollte als *ergänzender* Indikator zur SuPr-10 Risikoskala interpretiert werden.

- Ein Summenwert von ≤5 kann auf Depression und suizidale Tendenzen hinweisen.
- Ein Summenwert von ≤4 kann auf ein erhöhtes Risiko für suizidales Verhalten hinweisen.
- Ein Summenwert von ≤2 entspricht dem Antwortmuster akut suizidaler Personen auf einer geschützten psychiatrischen Station.

Cave: Selbst bei sehr hohen Werten auf der Schutzfaktorenskala kann suizidales Verhalten nicht ausgeschlossen werden.

Die regelmäßige Wiederholung der Risikoeinschätzung ist wichtig, besonders wenn die Schutzfaktorenskala sehr niedrig ausfällt, auch wenn alle Items der Risikoskala verneint wurden. Die Schutzfaktorenskala bietet Behandler*innen einen sanfteren Einstieg in die Einschätzung suizidaler Tendenzen und kann wertvolle ergänzende Informationen liefern.

Apendix B – Handout: Crisis management (German)

Akuthilfe zur Krisenbewältigung & Selbstmanagement bei psychischer Belastung

Menschen haben im Laufe ihres Lebens immer wieder stressreiche Herausforderungen zu bewältigen. Eine psychische Krise kann dann entstehen, wenn die individuellen Ressourcen zur Bewältigung einer bestimmten Lebenslage nicht ausreichen. Menschen können dann in starke Anspannung geraten, Schlafstörungen, depressive Verstimmungen, Panikattacken oder andere psychische Belastungssymptome aufzeigen und/oder Suizidgedanken entwickeln. Allgemeinmediziner*innen sind auch bei psychischer Belastung häufig die erste Ansprechperson. Folgende Handreichung soll helfen mit ein paar hilfreichen Strategien Betroffenen unterstützend zur Seite zu stehen durch erste Krisenintervention und Förderung des Selbstmanagements.

1. **Sichere Umgebung schaffen**
   - Gibt es bestimmte Situationen oder Auslöser, die Sie als stressig empfinden oder die zu Ihren Suizidgedanken beitragen?
   - Zu welchen Dingen haben Sie Zugang, die bei einem Suizidversuch verwendet werden könnten?
   - Wie können wir einen Plan entwickeln, um Ihren Zugang zu diesen Mitteln einzuschränken und diese Situationen zu vermeiden?

2. **Skills bei Stress und zur Krisenbewältigung**
   - Fragen Sie nach: Was machen Sie, wenn Sie gestresst sind? Was half Ihnen durch frühere stressreiche Phasen zu kommen? Was tut Ihnen gut? Was brauchen Sie gerade? Wodurch können Sie sich etwas Entlastung schaffen?
   - Unterscheiden Sie dabei zwischen *Problemverhalten* (kurzfristig hilfreich, langfristig schädlich) und *hilfreichen Skills* (kurzfristig hilfreich, langfristig unschädlich): Emotionsregulation durch bspw. Konsum (Drogen/Alkohol/Nikotin/Beruhigungsmitteln, Schokolade/Süßigkeiten, Shopping, Medien, usw.) ist langfristig dysfunktional und nicht zuträglich für die psychische Gesundheit, wenn auch kurzzeitig wirksam als Ablenkung oder „Aufheiterung".
   - Sammeln Sie gemeinsam hilfreiche Strategien im Umgang mit Stress, Angstzuständen, schwierigen Gefühlen & Grübel Tendenzen.
     Hier eine kleine Auswahl:
     - 5-4-3-2-1 Übung zur Lenkung der Aufmerksamkeit ins Hier & Jetzt (5 Dinge sehen, 4 hören, 3 tasten/fühlen, 2 riechen, 1 schmecken). Übungsanleitung z.B.: https://www.youtube.com/watch?v=r9psBo88Wj8
       (Mit freundlicher Genehmigung von Dipl.-Psych. Dr. phil. Yvonne Radtke)
     - Stressregulation mithilfe von Stimulation der Sinnesorgane (Igelball, Akkupressurring, Duftöl, Akkupressurpunkte, Wechselduschen, Eiswürfel lutschen, Zitrone beißen, Musikhören, Tee trinken, …)
     - Stressregulation durch körperliche Aktivierung (Spazieren, Laufen, „heißer Stuhl", Plank, usw.)
     - Bauchatmung & weitere Atemtechniken zur Aktivierung des Parasympathikus und Entspannung
     - Realitäts-Check: Gedanken sind keine Tatsachen – welche Beweise gibt es für diesen unangenehmen Gedanken, den ich habe? Könnte es auch anders sein?

Wie möchte ich mich fühlen? Ist der Gedanke dafür hilfreich? Welchen alternativen Gedanken gibt es?

- Grübel-Stopp: Detaillierte Imagination eines STOP-Schildes um Gedankenschlaufe zu unterbrechen; Gehirn-Jogging um den Kopf anderweitig beschäftigt zu halten (100-7 runterzählen; rückwärts buchstabieren; 20 Worte finden mit bestimmten Anfangsbuchstaben; Stadt-Land-Fluss im Kopf, usw.).
- Imaginationstechnik sicherer Ort; Ort der Gelassenheit. Übungsanleitung z.B. https://www.youtube.com/watch?v=6OUUqOdcVA4
  (Mit freundlicher Genehmigung von Dipl.-Psych. Dr. phil. Yvonne Radtke)
- Progressive Muskelrelaxation hilft, um durch vorherige Anspannung der Muskulatur mehr in die Entspannung zu kommen, Kontrast wahrzunehmen. Übungsanleitung: z.B. https://www.youtube.com/watch?v=gBDWlSRBIu4
  (Mit freundlicher Genehmigung von Dipl.-Psych. Dr. phil. Yvonne Radtke)

1. Mobilisierung sozialer Unterstützung

Soziale Unterstützung ist mit einer der wichtigsten protektiven Faktoren

- Fragen Sie nach: Gibt es jemand der Ihnen nahesteht? Gibt es jemanden, dem Sie vertrauen? Bei wem könnten Sie sich denn jetzt Unterstützung suchen? Bei wem fühlen Sie sich wohl? Wen können Sie anrufen, wenn es Ihnen nicht gut geht?
- Signalisieren Sie: „Ich bin da, ich habe Zeit, ich höre zu“ – aber machen Sie keine falschen Versprechungen, oder unrealistisches Überangebot ~~„Ich bin immer für Sie da“.~~
- Manchmal können mehrere (telefonische) Kurzkontakte gut sein zur Überbrückung bis zum nächsten Termin. Telefonate (5min) sollen dabei kurz und zielführend sein, z.B. zur gemeinsamen Strukturierung des Tages.
- Geben Sie örtliche (Kliniken) und überregionale Anlaufstellen für professionelle Hilfe mit und bestehen Sie darauf, dass Betroffene sich eine relevante Telefonnummer (z.B. Krisendienst Oberbayern 0800 655 3000) direkt ins Handy abspeichern.
  Man könnte auch mal gemeinsam während der Sitzung dort anrufen und die betroffene Person ein paar Fragen stellen lassen, um die Hemmschwelle herabzusetzen:
  Pat.: „Mir geht es aktuell nicht so gut, ich habe noch keinen Therapieplatz und ich wollte fragen, ob ich auch nachts oder am Wochenende anrufen kann, wenn es mir nicht gut geht“
  Krisendienst: „Natürlich können Sie sich auch nachts oder am Wochenende melden, bei uns ist immer jemand da“.

2. Beschwerden erfassen & Frühwarnzeichen erkennen

Eine Depression, Angststörung oder andere psychische Erkrankungen beginnen oft schleichend und es selten von heute auf morgen der gesamte Symptomkatalog erfüllt. Einige Symptome (z.B. veränderter Schlaf) machen sich oft frühzeitig bemerkbar, während andere Beschwerden erst mit der Zeit dazukommen. Es ist hilfreich, wenn Pat. ihre individuellen Frühwarnzeichen kennen und einordnen können, damit schnell reagiert werden kann.

Fragen Sie nach: *Woran merken Sie, dass es Ihnen nicht gut geht? Was hat sich verändert? Welche Beschwerden nehmen Sie bei sich wahr? Was haben Sie als erstes wahrgenommen? Woran würden Sie merken, dass es Ihnen wieder schlechter geht? Woran erkennen Sie, dass Ihr Krisenplan zum Einsatz kommen sollte?*

3. **Psychohygiene zur Förderung psychischen Wohlbefindens**
   Unterstützen Sie Ihre Patient*innen ein paar Grundvoraussetzungen für ein psychisches und körperliches Wohlbefinden zu schaffen, um der Psyche eine Chance zu geben sich zu stabilisieren und Vulnerabilität abzubauen: Schmerzen, Schlafmangel, unregelmäßige Ernährung, Substanzmissbrauch usw. macht dünnhäutige und zieht Energiereserven, die dringend gebraucht werden, um die Herausforderungen in der jeweiligen Lebenswelt bewältigen zu können.
   - Regelmäßige ausgewogene Mahlzeiten, ausreichend Flüssigkeit, Bewegung, ein geregelter Tagesablauf mit ausreichend Erholung und Schlaf unterstützen die psychische Gesundheit.
   - Der Verzicht auf Alkoholkonsum und Rauchen ist langfristig ebenso zuträglich, wobei in akuten Krisen Nikotinentzug vermutlich eher zu weiterer Anspannung sorgt.
   - Bei ständiger Nervosität auch bestenfalls auf Koffein verzichten.
   - Helfen Sie Ihren Patient*innen bei der Tagesstrukturierung und fördern Sie deren Selbstwirksamkeit durch gesundheitsförderlichem Verhalten.
   - Hilfreiche Eselsbrücke: **GESUnD** - **G**ymnastik, **E**rnährung, **S**chlaf, **Un**tersuchungen (Wahrnehmen medizinischer Behandlungen und Medikamenteneinnahme, sofern indiziert), **D**rogenverzicht

4. **Wissen abrufen, Selbstmanagement prüfen**:
   Nachdem Sie mit den Patient*innen einige Strategien besprochen haben und ein individueller Krisenplan erstellt wurde, fragen Sie nochmal nach, ob das eben erarbeitete Wissen im Zweifelsfall auch abgerufen werden kann: *„Mal angenommen, Sie wachen morgen früh auf und merken es geht Ihnen ganz schlecht. Was machen Sie?“*

   - Krisenplan sollte schriftlich fixiert werden und greifbar sein. Hierfür kann das angehängte Arbeitsblatt genutzt werden.
   - Krisenpläne / „Safety Plan“ kann man auch digital verfügbar machen z.B. mit der kostenlosen App *Life Step* oder *KrisenKompass.*

Apendix C - Handout: Worksheet for crisis management (German)

Mein Krisenplan

Checkliste Selbstfürsorge (GESUnD):

- Ausgeglichene Tagesstruktur mit Pausen?
- Ausreichend Bewegung?
- Regelmäßig / ausgewogene Mahlzeiten eingenommen?
- Genug getrunken?
- Regelmäßiger / ausreichend Schlaf?
- Medizinische Untersuchungen wahrgenommen?
- Kein (übermäßiger) Konsum von Alkohol, Nikotin, Medikamenten, Drogen?
-

Meine Frühwarnzeichen psychischer Belastung:

-
-
-
-

Meine Skillskette:

➔ Skills bei leichter Anspannung:
-
-
-

➔ Skills bei mittler Anspannung:
-
-
-

➔ Skills bei starker Anspannung:
-
-
-

Meine sicheren Orte / Wohlfühlorte:

-
-
-
-

Meine Vertrauenspersonen:

- Name:
  Telefonnummer:
- Name:
  Telefonnummer:
- Name:
  Telefonnummer:

Apendix D – Handout: Munich emergency telephone list (German)

Notfalltelefonliste für Patient*innen

Wenn Sie wegen einer akuten seelischen Krise einen kompetenten Ansprechpartner benötigen, so stehen Ihnen folgende Kliniken zur Verfügung:

München:

Klinik/Einrichtung	Telefonnummer / Adresse
Isar-Amperklinikum	089 / 4562-0 Vockestr. 72, 85540 Haar bei München (muss alle Patienten aufnehmen!)
Atriumhaus	089 / 7678 - 0 Bavariastr. 11, 80336 München
Psychiatrische Uniklinik der LMU	089 / 4400 - 555 11 Nußbaumstr. 7, 80336 München (Pforte, 24 Std. besetzt)
Max-Planck-Institut	089 / 30 622-325 Kraepelinstr. 2 - 10, 80804 München (Pforte)
Heckscher-Klinikum (Kinder- und Jugendliche)	089 / 99 99- 0 Kinder- und Jugendpsychiatrie Psychosomatik Psychotherapie Deisenhofener Str. 28, 81539 München

Telefonische Anforderung von Hilfe (überregional):

Dienst	Telefonnummer / Webseite
Krisendienst Psychiatrie	0800 / 655 3000 https://www.krisendienste.bayern/oberbayern/
Telefon Seelsorge	0800 / 1110111 https://www.telefonseelsorge.de/sorgen-themen/suizidpraevention/
Ärztlicher Bereitschaftsdienst	116 117
Notarzt	112
Giftnotruf	0800 111 0 111

**Liste in Anlehnung an Notfalltelefonliste der KIRINUS Ausbildungsambulanz, München. Stand 08/2024*

Apendix E – Handout: Blank emergency telephone list (German)

Notfalltelefonliste für Patient*innen

Wenn Sie wegen einer akuten seelischen Krise einen kompetenten Ansprechpartner benötigen, so stehen Ihnen folgende Kliniken zur Verfügung:

München:

Klinik/Einrichtung	**Telefonnummer / Adresse**

Telefonische Anforderung von Hilfe (überregional):

Dienst	**Telefonnummer / Webseite**
Krisendienst Psychiatrie	0800 / 655 3000 https://www.krisendienste.bayern/oberbayern/
Telefon Seelsorge	0800 / 1110111 https://www.telefonseelsorge.de/sorgen-themen/suizidpraevention/
Ärztlicher Bereitschaftsdienst	116 117
Notarzt	112
Giftnotruf	0800 111 0 111

**Liste in Anlehnung an Notfalltelefonliste der KIRINUS Ausbildungsambulanz, München. Stand 08/2024*

Apendix F - Comparison of SuPr-10 and PHQ-9 in terms of acceptability and usability

Table 12. Comparison of SuPr-10 and PHQ-9 in terms of acceptability and usability

	SuPr-10	***PHQ-9***
Practitioner Feedback	96.2% found the questionnaire useful	96.9% found the questionnaire useful
Use of Questionnaire (Practitioners)	28.6% for all mental illnesses 60.7% for selected patients (especially depression), 10.7% would not use the questionnaire	25.0% for all mental illnesses 68.8% for selected patients (especially depression), 6.3% would not use the questionnaire
Effects on Treatment (Practitioners)	64.3% positive 32.1% neutral 3.6% negative	72.7% positive 27.3% neutral 0.0% negative
Patient Acceptance	94.6% felt that completing the questionnaire was okay	96.9% felt that completing the questionnaire was okay
Difficulty (Patients)	89.2% found it not difficult	88.4% found it not difficult
Time Consumption (Patients)	98.3% found it not too time-consuming	83.6% found it not too time-consuming
Contribution to Treatment (Patients)	88.8% believe it contributes to improved treatment	93.8% believe it contributes to improved treatment
Willingness for Repeated Use (Patients)	96.5% would be willing to complete the questionnaire repeatedly	99.3% would be willing to complete the questionnaire repeatedly

Affidavit

Affidavit

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I hereby declare, that the submitted thesis entitled:

Development and validation of the brief questionnaire SuPr-10 for suicidality assessment among patients with depressive symptoms in primary care

is my own work. I have only used the sources indicated and have not made unauthorized use of services of a third party. Where the work of others has been quoted or reproduced, the source is always given.

I further declare that the dissertation presented here has not been submitted in the same or similar form to any other institution for the purpose of obtaining an academic degree.

München, 03.03.2025

place, date

Carolin Haas

Signature doctoral candidate

Confirmation of congruency

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Promotionsbüro Medizinische Fakultät

MMRS

Confirmation of congruency between printed and electronic version of the doctoral thesis

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I hereby declare, that the submitted thesis entitled:

Development and validation of the brief questionnaire SuPr-10 for suicidality assessment among patients with depressive symptoms in primary care

is congruent with the printed version both in content and format.

München, 03.03.2025

place, date

Carolin Haas

Signature doctoral candidate

List of publications

First author, submitted under review:

- Haas, C., Sterner, P., Younesi, P., Wang, E., Pitschel-Walz, G., Gensichen, J., Bühner, M.& Lukaschek, K., Suicidality assessment in patients with depressive symptoms: Development and validation of a questionnaire for primary care. under Review (BJPsych Open), o.J.
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Before POKAL:

- Wedlich, K. & Haas, C. (2018). Morbus Perthes: Potentielle psychologische Auswirkungen und Interventionsstrategien. In C. Krinner, N. Sarubin, K. Wedlich et al. (Hrsg.). Angewandt-wissenschaftliche Perspektiven der Psychologie: Abschlussarbeiten an der Hochschule Fresenius. (S. 79-92). München: CIP-Medien.
- Wedlich, K. & Haas, C. (2017). Psychologiestudium mit integriertem psychotherapeutischem Propädeutikum: Mehr als ein Modellversuch? In S. K. D. Sulz & T. Bronisch (Hrsg.). Psychotherapie 22|2. (S. 182-193). München: CIP-Medien.

Congress symposia, presentations and posters:

1. Nordic Congress of General Practice (NCGP), Turku, Finland, 11-14 June 2024: https://ncgp2024.fi/symposiums-workshops
   - Symposium: *Suicide prevention in primary care - development of a brief german questionnaire. Carolin Haas, Philipp Sterner, Constantin Brand, Puya Younesi, Jochen Gensichen, Karoline Lukaschek for the POKAL group*

2. International Association of Suicide Prevention (IASP), Piran, Slovenia, 19-23 September 2023: https://www.iasp.info/wp-content/uploads/IASP-32nd-World-Congress-Abstract-Book-2023.pdf
   - Poster: *Development of a brief suicide prevention questionnaire for primary care, including patients' and general practitioners' perspectives. Carolin Haas, Philipp Sterner, Constantin Brand, Puya Younesi, Jochen Gensichen, Karoline Lukaschek for the POKAL group*

3. Congress of the Deutsche Gesellschaft für Psychiatrie und Psychotherapie, Psychosomatik und Nervenheilkunde (DGPPN), Berlin, Germany, 23-26 November 2022:

https://kongress.dgppn.de/_Resources/Persistent/f273a0a2835f13a07d43a97cdc6931e5d9cbaf4e/DGPPN-Kongressprogramm%202022.pdf

- Symposium I: *Suizidale Patienten in der Primärversorgung – was kann der Hausarzt tun? Carolin Haas, Sabine Schlüssel, Karoline Lukaschek, Jochen Gensichen für die POKAL Gruppe*
- Symposium II: *Entwicklung eines Kurzfragebogens zur Suizidprävention in der Primärversorgung (SuPr-X). Carolin Haas, Markus Bühner, Gabriele Pitschel-Walz, Philipp Sterner, Jochen Gensichen, Karoline Lukaschek für die POKAL Gruppe*

4. Deutsche Gesellschaft Suizidprävention (DGS), Jena, Germany, 22-24 September 2022: https://www.suizidprophylaxe.de/wp-content/uploads/2023/01/Programmheft_DGS_Tagung_Jena_2022a.pdf
   - Poster: *Suizidprävention in der Primärversorgung - Entwicklung eines Kurzfragebogens. Carolin Haas, Jochen Gensichen, Karoline Lukaschek für die POKAL-Gruppe*

5. Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin (DEGAM), Greifswald, Germany, 15-17 September 2022: *https://www.egms.de/static/de/meetings/degam2022/22degam108.shtml*
   - Presentation: *Suizidprävention in der Primärversorgung - Entwicklung eines Kurzfragebogens. Carolin Haas, Jochen Gensichen, Karoline Lukaschek für die POKAL-Gruppe:*

Award:

The POKAL project ‘Suicide Prevention in Primary Care’ was awarded 2nd place in the DESAM-ForNet Prize in the category ‘New Tools for Practice’ on 11 March 2022. https://www.desam-fornet.de/wp-content/uploads/2022/02/D4N_Preis20220311_Suizid_AbstractLS.pdf

Press articles:

- 05.06.2023: Leichtere Suizidprävention: Psychologin forscht gemeinsam mit Hausärzten (ÄrzteZeitung). Interview mit Carolin Haas. Access: https://www.aerztezeitung.de/Wirtschaft/Leichtere-Suizidpraevention-Psychologin-forscht-gemeinsam-mit-Hausaerzten-

439755.html?searchtoken=%2fy0GYsJHhUW8HMnP7Bew%2bxP2UAs%3d&starthit=16

— 31.01.2023: Rasche hausärztliche Einschätzung von Suizidalität (AERZTE Steiermark). Access: https://www.aekstmk.or.at/books/2023/01/26/

— 28.11.2022: Warum braucht es den Fragebogen zur Suizidprävention für Hausarztpraxen? (ÄrzteZeitung). Podcast mit Carolin Haas (Psychologin im DFG-Graduiertenkolleg POKAL). Access: https://www.aerztezeitung.de/Podcasts/Warum-braucht-es-den-Fragebogen-zur-Suizidpraevention-fuer-Hausarztpraxen-434599.html