

ORIGINAL ARTICLE

Unmet needs of the oldest old primary care patients with common somatic and psychiatric disorders—A psychometric evaluation

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Abstract

Objectives: Unmet needs are common in older patients and should be assessed via suitable instruments. The adapted German version of the Camberwell Assessment of Need for the Elderly (CANE) represents an often used tool to determine the needs in older individuals. Evidence on the psychometric properties of the CANE is still pending.

Methods: A sample of 231 patients with common somatic and psychiatric diseases were interviewed about their needs including their caring relatives and general practitioners (GPs). Frequencies of unmet needs were evaluated across the different perspectives. Interrater agreement, convergent and discriminant validity were evaluated.

Results: On average, psychiatric patients reported more unmet needs than somatic patients, particularly regarding to psychological distress and behavior. The interrater agreement was higher in the somatic subgroup than in the psychiatric subgroup, and higher between patients and relatives compared to patients and GPs. Evidence for construct validity was reported.

Conclusions: Patients with common somatic and psychiatric disorders report specific unmet needs that should be considered in healthcare. Moderate to good psychometric characteristics were found for the CANE. The use of valid instruments to record needs in health and nursing care can be useful and represents an important starting point for targeted interventions and effective treatment.

KEYWORDS

need assessment, old age, psychiatric disorders, psychometric quality, somatic diseases

1 | INTRODUCTION

In old age, multimorbidity and chronic health issues are common conditions in primary care. This is also reflected in the most frequent use of medical services in higher age groups while the general

practitioner (GP) plays a central role for older patients (Glaesmer et al., 2008). Recent research showed that the highest levels of utilization of primary care services (12-month prevalence) in registered doctors' practices was observed for patients in the age between 70 and 79 years with a population share of 83.4% (Rattay et al., 2013).

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GPs have the highest share of medical care and are usually the first contact point for older patients with somatic and psychiatric diseases. With regard to somatic diseases, cardiovascular and musculoskeletal disorders are among the most common physical illnesses in individuals over the age of 75 years while dementia and depression belong to the most common psychiatric diseases in older age groups (Fuchs et al., 2012, 2013).

The Camberwell Assessment of Need for the Elderly (CANE) was developed for the multidimensional assessment of medical and non-medical healthcare needs in the older population (Orrell & Hancock, 2004). Just recently, the adapted German version of the CANE was introduced (Stein et al., 2019). The questionnaire comprises 26 sections of physical, social, psychological and environmental needs including two sections for the needs of caregivers. Because the CANE is a comprehensive tool, it is usually applied as a structured interview. The assessment of patients' needs using the CANE can involve multiple perspectives including the perceptions of patients, family carers and healthcare professionals such as the GP (Walters et al., 2000). The use of the CANE is increasingly important, because older patients with common diseases often suffer from undetected and unmet healthcare needs. In this context, the best possible treatment and care for older patients presupposes a reliable and valid assessment of such needs.

In the past, the psychometric properties of the CANE including reliability and validity have been investigated in several international studies. As a measure of reliability (interrater reliability), the level of agreement between different assessment perspectives with regard to met and unmet needs was already examined, for example, in samples of older psychiatric patients (Hancock et al., 2003; Passos et al., 2017; Reynolds et al., 2000; Salehi et al., 2018), older GP patients (Stein et al., 2014; Walters et al., 2000), older institutionalized patients (Wieczorowska-Tobis et al., 2016), older patients with depression (Houtjes et al., 2011), bipolar disorders (Dautzenberg et al., 2016) or dementia (Bakker et al., 2014; Kerpershoek et al., 2018; Miranda-Castillo et al., 2013; Orrell et al., 2008; Stein et al., 2017; Van der Roest et al., 2008, 2009).

Construct and criterion validity have also been investigated for CANE ratings of people with dementia in a Dutch study showing acceptable values (Van der Roest et al., 2008). Further, validity was studied in dementia patients with the Korean version of the CANE (Park et al., 2018), the Persian version (Salehi et al., 2018), and the Portuguese version (Fernandes et al., 2009; Sousa et al., 2009) showing overall good psychometric properties. First evidence for construct validity of the German version of the CANE in terms of significant associations between CANE and other related or unrelated instruments or scores has also been reported (Stein et al., 2014). However, for the adapted German version of the CANE, the investigation of psychometric parameters is still pending, especially on the basis of older patient samples with common somatic and psychiatric diseases.

Thus, the aim of this study was to evaluate the unmet needs of older patients with the most common somatic and psychiatric

disorders. For this purpose, a sample of GP patients aged 75 years and older with cardiovascular and musculoskeletal disorders as well as with dementia and depression ought to be assessed via the adapted German version of the CANE. Several perspectives including the perspectives of patients, caring relatives and GPs were supposed to be collected. In this context, the current study aimed at the assessment of the most common unmet needs in these patient groups, and the psychometric evaluation of the CANE including reliability and validity.

2 | METHODS

2.1 | Study design

Analyses were based on data from study "Needs assessment in the oldest old: application, psychometric examination and establishment of the adapted German version of the CANE", which was funded by the German Research Foundation. Details on the study design can be found elsewhere (Stein et al., 2020).

2.2 | Procedure, instruments and sample

The sample consisted of older primary care patients, their caring relatives (if available) and GPs. All participants were recruited via GP practices in Leipzig, Germany and the surrounding area. The criteria for inclusion into the study were the following: (1) age of at least 75 years, (2) good or sufficient knowledge of German, (3) at least one GP visit within the last 6 months, (3) presence of at least one of the following ICD-10 primary diagnoses: cardiovascular diseases (I10-I15, I20-I25), musculoskeletal disorders (M15-M19, M40-M45, M80-M82), depression (F32-F33), cognitive disorder or dementia (F00-F03, F05.1, G30-G31, R54). Patients were excluded from the study if the following criteria were fulfilled: (1) suicidality and (2) severe somatic diseases (e.g., final cancer stage). The GPs were asked to invite patients according to the given criteria for inclusion and exclusion as well to inform them about the study. A written informed consent form was completed by eligible patients. The patients were contacted by the study staff of the University of Leipzig to make an appointment for the personal interview. Subsequently, a structured interview that included the adapted German version of the CANE (Stein et al., 2019) was used for the survey. In addition, socio-demographic information on age, gender, marital status, education, vocational training and domicile was collected. The standardized interviews were conducted by trained psychologists and health scientists in the home surroundings of the patients, and on request also in the study center or in the GP practices. If eligible, the relatives of the patients were invited to participate in the study. After a brief consultation with the study staff, they were also asked to sign a written informed consent form. The structured interviews of relatives were conducted either personally, by telephone or in writing. Additionally, the participating GPs were interviewed in writing with regard to the

needs of their patients by means of a questionnaire containing the CANE.

For the survey, $n = 100$ psychiatric patients ($n = 50$ patients with dementia, $n = 50$ patients with depression) and $n = 100$ somatic patients with cardiovascular diseases ($n = 50$, hypertension, angina pectoris, myocardial infarction, chronic ischemic heart disease) as well as with musculoskeletal disorders ($n = 50$, osteoarthritis, osteoporosis) were recruited and asked about their needs.

2.3 | Statistical analyses

Patients were assigned to the one of the two patient groups according to their primary ICD-10 diagnosis: somatic patients (cardiovascular or musculoskeletal disease) and psychiatric patients (depression or dementia). Patients with multimorbidity were classified as dementia patients in the presence of dementia, although other diagnoses such as cardiovascular diseases co-existed. Similarly, patients with depression and co-morbid illnesses other than dementia have been included in the group of depressive patients. Patients who had both cardiovascular and musculoskeletal disorders were randomly classified into either musculoskeletal disorders ($n = 38$) or cardiovascular diseases ($n = 11$), so that sizes were equal in both somatic subgroups.

The distribution of unmet needs as reported by patients, their relatives and their GPs (means \pm standard deviations or frequencies with percentages) is shown separately for each of the four ICD-10 diagnoses using spider plots.

In order to analyze the interrater agreement as a measure of reliability, kappa coefficients for the surveyed dyads (patients/relatives, patients/GPs) and triads (patients/relatives/GPs) were determined in terms of the Cohens-Kappa coefficient (Landis & Koch, 1977; Price, 2017). To analyze the rater agreements between more than two perspectives (patients/relatives/GPs), the Fleiss kappa coefficient was calculated (Fleiss, 1971).

To investigate aspects of the construct validity (convergent and discriminant validity), a sum score for the 24 CANE sections was created, representing the number of unmet care needs as reported by the patients. Pairwise correlations between the total unmet needs sum score and other related or unrelated instruments or scores were examined to quantify the strength of relationships between CANE and (1) the preference-based population-representative index of the EQ-5D questionnaire on health-related quality of life (EQ-5D LQ Index), (2) the scale for the instrumental activities of daily living (IADL, total score ≤ 23 indicates impairment), (3) the German version of the Lubben Social Network Scale (LSNS), (4) the German short version of the Loneliness scale (UCLA), (5) the Six Item Cognitive Impairment Test (6-CIT), (6) the German version of the 15-item Geriatric Depression Scale (GDS), (7) the German short version of the Geriatric Anxiety Scale (GAI), and (8) visits by the GP or a specialist within the last 6 months.

The convergent validity assumes that higher scores on the IADL scale (higher functional impairments), in 6-CIT (higher

cognitive impairments), on the UCLA scale (higher loneliness), more doctor visits in the past 6 months (higher disease burden and multimorbidity), on the GDS (more depressive symptoms), on the GAI scale (higher anxiety scores) and a higher level of care were associated with a higher number of reported unmet needs. With regard to discriminant validity, it was assumed that lower values in the EQ-5D (higher health-related quality of life) and on the LSNS (less social inclusion) were associated with more reported unmet needs.

Furthermore, a regression analysis for the cross-sectional prediction of unmet needs was calculated to prove validity of the CANE. The number of unmet needs from the patients' perspectives was determined as the dependent variable. As predictors, the affiliations to the disease-specific subgroups (patients with cardiovascular disease, musculoskeletal disorders, depression, dementia) and the above-mentioned measures and scales adjusted for socio-demographic information were introduced into the model. A negative-binomial regression model was chosen as a model approach in order to adequately depict the skewed distribution and the high proportion of zero cases (no unmet needs). The results were presented as Incidence Rate Ratios (IRR) with associated 95% confidence intervals. The IRR can be interpreted as the percentage change in the number of unmet needs for an increase in a predictor by one unit. The evaluations were carried out using the STATA 14.1 MP statistical software (Stata-Corp LP). All analyzes were based on a significance level of $p < 0.05$.

3 | RESULTS

3.1 | Sample characteristics

The recruitment via the participating GP practices comprised a total of 260 patients. Of these, 29 patients were excluded from the investigation because they withdrew their participation ($n = 20$), were no longer attainable ($n = 6$), did not meet the age criterion of at least 75 years ($n = 1$), could not be interviewed due to significant cognitive impairment ($n = 1$) or deceased ($n = 1$). Finally, the analyzes were based on a total sample of $n = 231$ patients. Patients were divided into two groups with somatic disorders ($n = 51$ [22.08%] patients with cardiovascular diseases and musculoskeletal disorders) and psychiatric disorders ($n = 65$ [28.14%] patients with depression and $n = 64$ [27.71%] patients with dementia). GP interviews were conducted for all patients ($n = 231$) and $n = 168$ interviews with caring relatives could be carried out.

With regard to the socio-demographic data of the patients, average age was 81.85 years ($SD = 5.03$). Of the total sample, about two-thirds ($n = 155$, 67.10%) were female. With regard to marital status of patients, 45.45% ($n = 105$) were widowed, 42.42% ($n = 98$) were married and 12.12% ($n = 28$) were single or divorced. Half of the patients ($n = 115$, 49.78%) had an intermediate school-leaving certificate, a quarter of the patients ($n = 59$, 25.54%) had no school-leaving certificate or general elementary education, and

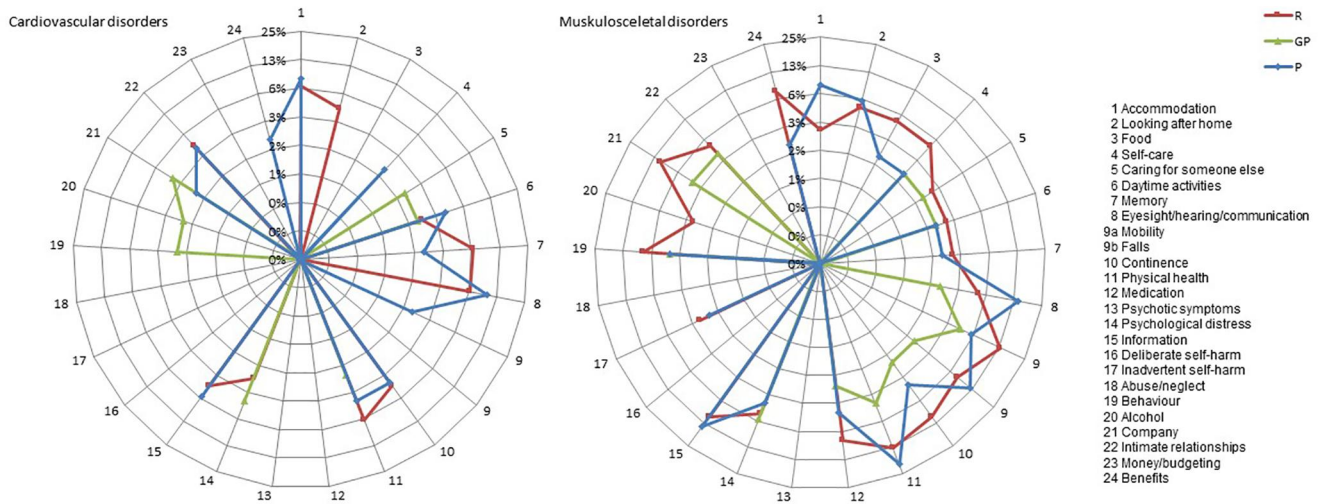


FIGURE 1 Distribution of unmet needs from three perspectives for cardiovascular und musculoskeletal disorders

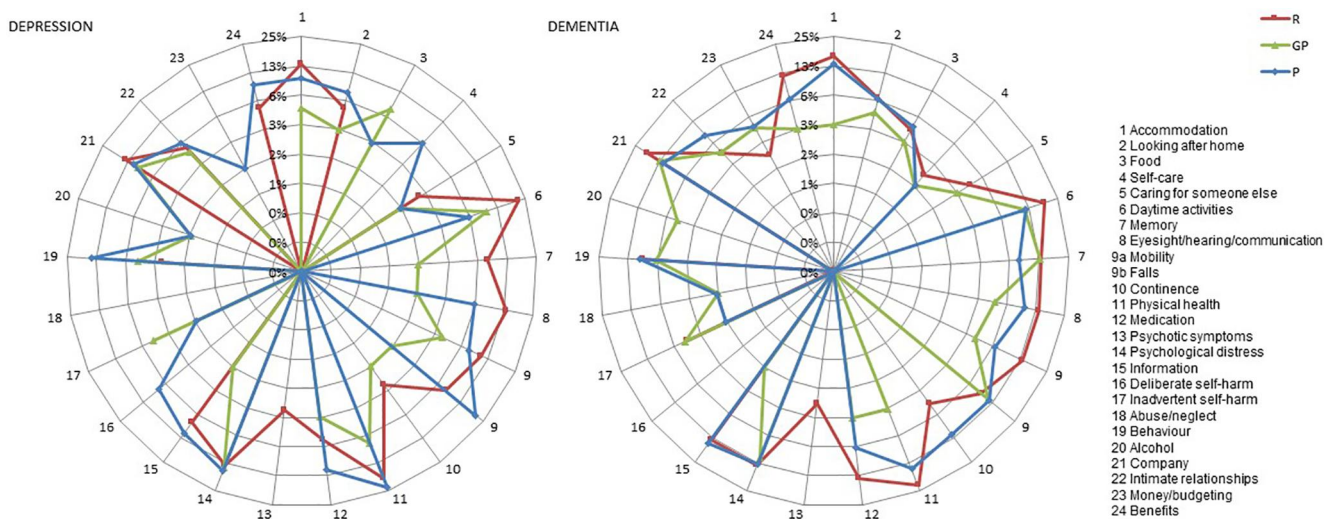


FIGURE 2 Distribution of unmet needs from three perspectives for depression and dementia

another quarter had the advanced technical college certificate or Abitur ($n = 57, 24.68\%$). With regard to the vocational education of patients, more than a third had completed an apprenticeship ($n = 83, 35.93\%$), 28.14% ($n = 65$) had a vocational school certificate and 25.11% ($n = 58$) had a college or university degree. Most of the patients lived either alone ($n = 101, 43.72\%$) or with their partner ($n = 99, 42.86\%$), 4.33% ($n = 10$) lived with others, and 9.09% ($n = 21$) lived in assisted living facilities or nursing homes.

3.2 | Unmet needs from the three different perspectives in psychiatric and somatic patients

Overall, significantly more unmet needs were expressed by patients with psychiatric disorders compared to patients with somatic diseases. In particular, in the subgroup with cardiovascular diseases, the proportion of patients with unmet needs was comparatively low.

Across all subgroups, physical needs accounted for the largest amount of unmet needs (35%–57%).

Figures 1 and 2 show the unmet needs across the groups with somatic and psychiatric disorders from the perspectives of patients, relatives and GPs. In the group of patients with cardiovascular diseases (Figure 1), most of the unmet needs were reported from the patients' perspective in the area of eyesight/hearing/communication ($n = 5; 9.80\%$), followed by the areas of accommodation ($n = 4; 7.84\%$) and information ($n = 3; 5.88\%$). The subgroup of patients with musculoskeletal disorders (Figure 1) reported the most unmet needs in the areas of physical health ($n = 10; 19.61\%$), eyesight/hearing/communication and information ($n = 7; 13.73\%$). Further, $n = 6$ (11.76%) and $n = 4$ (7.84%) patients with musculoskeletal disorders reported unmet needs in the areas of mobility and accommodation.

In the subgroup of patients with depression (Figure 2), unmet needs in the areas of physical health ($n = 15; 23.08\%$), mobility ($n = 13; 20.00\%$) and psychological distress ($n = 10; 15.38\%$) were

most commonly reported. Patients with dementia (Figure 2) most frequently reported unmet needs in the areas of information ($n = 9$; 14.75%), physical health ($n = 9$; 14.52%) as well as psychological distress and accommodation (each $n = 8$; 12.90%). In summary, across the disease-specific subgroups, the needs in the areas of physical health, information and mobility were most frequently stated as unmet needs from the patients' perspective, with the exception of the subgroup of cardiovascular diseases. In patients with a primary somatic diagnosis, the area of eyesight/hearing/communication was one of the five most common unmet needs compared to patients with a primary psychiatric diagnosis. In contrast, patients with dementia or depression, were more likely to report unmet needs in the areas of psychological distress and behavior than patients with a somatic disorder. While patients with cardiovascular diseases reported the fewest unmet needs, the most unmet needs were observed in the subgroup of patients with depression.

Overall, the GPs identified significantly fewer unmet needs than relatives and patients themselves. For example, in the group of cardiovascular diseases around 10% of patients ($n = 5$ of 51) and 7% of the relatives ($n = 3$ of 46) reported unmet needs in the area of eyesight/hearing/communication, while none of the GPs reported unmet needs in this area. The assessments of patients and relatives were very similar for all disease groups, with some exceptions. For example, only around 6% ($n = 4$ of 65) of the patients with depression reported unmet needs in daytime activities, while 21% ($n = 8$ of 38) of the relatives identified unmet needs in this area.

3.3 | Reliability

Tables 1–3 show the kappa values as a measure of the quality of agreement between patients/relatives, patients/GPs and patients/relatives/GPs across all CANE areas for the patient groups with somatic and psychiatric diseases. In general, the highest level of interrater agreement was observed in the group of somatic patients. As can be seen in Table 1, the agreement was highest between patients and relatives with kappa values between -0.03 (intimate relationships) and 0.73 (mobility) in the group of somatic patients and between 0.08 (inadvertent self-harm) and 0.57 (mobility) in the group of psychiatric patients.

The agreement between patients and GPs (Table 2) was comparatively lower, with kappa values ranging from -0.05 (accommodation) to 0.46 (mobility) in the group of somatic diseases and from -0.04 (eyesight/hearing/communication) to 0.43 (continence) in the group of psychiatric diseases.

The interrater agreement regarding the appraisal of unmet needs from all three perspectives (patients, relatives and GPs) was shown in Table 3. With kappa values between -0.01 (alcohol) and 0.56 (mobility) in the group of somatic diseases and between -0.02 (abuse/neglect) and 0.50 (mobility) in the group of psychiatric diseases, medium to low or non-existent matches were achieved when comparing the perspectives of patients, relatives and GPs.

In all three comparison groups (patients/relatives, patients/GPs and patients/relatives/GPs), the highest levels of agreement were observed in the categories of physical and environmental needs. The highest levels of agreement were achieved in the CANE areas of mobility, continence, selfcare, food and accommodation. In sum and regardless of the perspective, in the patient group of the somatic diseases a higher level of agreement with regard to reported unmet needs was observed. Further, there was a higher level of agreement in unmet needs achieved between the patients and their relatives compared to the agreement between the patients and the GPs. In some cases, no agreement was found across all CANE categories, in particular between patients and GPs (Table 3).

3.4 | Validity

Table 4 summarizes the results of the correlation analysis for examining the construct validity (convergent and discriminant) of the CANE for the groups of somatic and psychiatric patients and for the total sample. In the total sample, significantly positive correlations were observed as expected between an increased number of unmet needs and a higher functional impairment (IADL, $r = 0.3601$), a higher reported loneliness (UCLA, $r = 0.3273$), a higher number of depressive symptoms (GDS, $r = 0.4967$) and higher anxiety values (GAI, $r = 0.3736$). The observed correlations had medium to strong effects. There was also a tendency towards positive linear relationships between unmet needs and the existence of a care level ($r = 0.1730$) and increased doctor visits ($r = 0.1992$); however, these relationships did not reach statistical significance. Furthermore, significant negative linear correlations (mean effects) were found between an increased number of unmet needs and a lower health-related quality of life (EQ-5D LQ index, $r = -0.3759$) and lower social integration (LSNS, $r = 0.2325$). No linear relationship was found between unmet needs and cognitive impairment (6-CIT, $r = -0.0070$). In the group of psychiatric patients, these discovered relationships were found in a similar way, whereby in some cases (IADL, LSNS) only the tendency was determined without statistical significance. These relationships were also found to a lesser extent in the group of somatic diseases. Here, significant positive linear relationships of medium strength were found between an increased number of unmet needs and higher functional impairments (IADL, $r = 0.3765$) and a higher number of depressive symptoms (GDS, $r = 0.3866$). In all other areas there were no significant results in the expected directions observed (Table 4).

Table 5 shows the results of the negative-binomial regression analysis to evaluate the multivariate association of the patient-reported number of unmet needs and related constructs, adjusted for age, gender, marital status, school education and domicile for the total sample as well as for the patient groups with somatic and psychiatric diseases. For the overall sample, the relevant influencing factors for the number of unmet needs that have been identified were higher loneliness (UCLA; IRR = 1.13; 95% CI = 1.00; 1.26), a higher level of impairment in the instrumental activities of daily living (IADL; IRR = 2.37; 95% CI = 1.23; 4.56) as well as a higher number of

TABLE 1 Interrater agreement between patients and relatives across all CANE areas

CANE area	Patients/Relatives					
	Somatic diseases			Psychiatric diseases		
	<i>n</i>	Kappa ^a	CI	<i>n</i>	Kappa ^a	CI
Environmental needs						
Accommodation	85	0.16	[-0.05; 0.42]	81	0.30	[0.12; 0.53]
Looking after home	85	0.44	[0.20; 0.64]	81	0.47	[0.30; 0.63]
Food	85	0.48	[0.18; 0.69]	81	0.44	[0.24; 0.63]
Money/Budgeting	85	0.15	[-0.06; 0.56]	81	0.48	[0.21; 0.67]
Benefits	85	0.49	[0.25; 0.69]	80	0.38	[0.19; 0.56]
Caring for someone else	85	0.19	[0.00; 0.50]	81	0.32	[-0.02; 0.79]
Physical needs						
Physical health	85	0.36	[0.13; 0.56]	81	0.20	[0.04; 0.39]
Medication	84	0.39	[0.03; 0.67]	80	0.46	[0.30; 0.66]
Eyesight/Hearing/Communication	85	0.31	[0.11; 0.56]	81	0.28	[0.06; 0.50]
Mobility	85	0.73	[0.60; 0.84]	81	0.57	[0.43; 0.74]
Falls	85	0.69	[0.54; 0.83]	81	0.46	[0.27; 0.64]
Selfcare	85	0.48	[0.15; 0.75]	81	0.43	[0.27; 0.64]
Continence	85	0.67	[0.50; 0.81]	80	0.50	[0.31; 0.66]
Psychological needs						
Psychological distress	85	0.36	[0.14; 0.59]	81	0.48	[0.26; 0.64]
Memory	84	0.31	[0.12; 0.53]	83	0.41	[0.24; 0.59]
Behavior	85	0.20	[-0.02; 0.49]	81	0.33	[0.09; 0.55]
Alcohol	-	-	-	81	0.41	[-0.02; 0.79]
Deliberate self-harm	-	-	-	81	-	-
Inadvertent self-harm	85	0.58	[-0.01; 1.00]	81	0.08	[-0.07; 0.39]
Psychotic symptoms	-	-	-	81	0.47	[0.00; 0.79]
Social needs						
Company	85	0.01	[-0.07; 0.20]	81	0.24	[0.04; 0.46]
Intimate relationships	85	-0.03	[-0.07; -0.01]	81	0.33	[0.08; 0.62]
Daytime activities	85	0.40	[0.15; 0.67]	80	0.34	[0.15; 0.54]
Information	85	0.18	[-0.06; 0.43]	81	0.34	[0.10; 0.59]
Abuse/Neglect	-	-	-	81	-	-

Note: Somatic diseases comprise cardiovascular and musculoskeletal disorders; Psychiatric diseases comprise depression and dementia.

Abbreviations: CANE, Camberwell Assessment of Need for the Elderly; CI, confidence interval; *n*, number of cases.

^aCohen's Kappa, Kappa values < 0 indicate a "poor or non-existent agreement", values between 0 and 0.20 a "low agreement" and kappa values of 0.21–0.40 a "sufficient agreement", the range of 0.41–0.60 represents a "medium agreement" and the range of 0.61–0.80 a "substantial agreement". The "(almost) perfect match" is interpreted using kappa values between 0.81 and 1.00.

depressive symptoms (GDS; IRR = 1.18; 95% CI = 1.08; 1.29). These factors had a significant influence on the number of unmet needs, regardless of the groups of diseases (1–4). The number of unmet needs did not differ in terms of care levels, doctor visits, social

network, health-related quality of life, cognitive impairment and anxiety symptoms.

In the group of somatic patients, a higher number of unmet needs was associated with significantly more doctor visits (IRR = 1.08; 95%

TABLE 2 Interrater agreement between patients and GPs across all CANE areas

CANE areas	Patients/GPs					
	Somatic diseases			Psychiatric diseases		
	n	Kappa ^a	CI	n	Kappa ^a	CI
Environmental needs						
Accommodation	102	-0.05	[-0.08; -0.02]	127	0.06	[-0.05; 0.17]
Looking after home	102	0.10	[-0.07; 0.30]	127	0.32	[0.19; 0.47]
Food	102	0.20	[0.01; 0.44]	127	0.32	[0.16; 0.45]
Money/Budgeting	102	-0.04	[-0.08; -0.01]	127	0.29	[0.14; 0.47]
Benefits	102	-0.03	[-0.18; 0.15]	127	0.14	[0.00; 0.32]
Caring for someone else	102	0.21	[-0.03; 0.56]	127	0.24	[0.04; 0.51]
Physical needs						
Physical health	101	-0.01	[-0.15; 0.17]	125	0.02	[-0.09; 0.14]
Medication	100	0.08	[-0.06; 0.24]	126	0.17	[0.05; 0.35]
Eyesight/Hearing/Communication	102	-0.02	[-0.12; 0.07]	127	-0.04	[-0.12; 0.05]
Mobility	83	0.46	[0.30; 0.63]	101	0.33	[0.18; 0.47]
Falls	102	0.04	[-0.12; 0.22]	127	0.14	[0.00; 0.29]
Selfcare	102	0.23	[0.00; 0.48]	126	0.33	[0.16; 0.48]
Continence	102	0.41	[0.24; 0.58]	127	0.43	[0.25; 0.55]
Psychological needs						
Psychological distress	102	0.04	[-0.10; 0.21]	127	0.13	[0.02; 0.24]
Memory	101	0.12	[-0.05; 0.28]	128	0.18	[0.04; 0.33]
Behavior	101	0.01	[-0.07; 0.17]	126	0.07	[-0.06; 0.21]
Alcohol	102	-0.01	[-0.03; 0.00]	127	0.16	[-0.03; 0.40]
Deliberate self-harm	102	0.00	-	127	0.11	[-0.02; 0.33]
Inadvertent self-harm	102	-0.03	[-0.08; -0.01]	127	-0.01	[-0.10; 0.19]
Psychotic symptoms	-	-	-	127	0.07	[-0.06; 0.32]
Social needs						
Company	101	0.09	[-0.09; 0.35]	126	-0.03	[-0.14; 0.08]
Intimate relationships	102	0.19	[-0.05; 0.52]	127	0.11	[-0.06; 0.28]
Daytime activities	102	0.16	[-0.02; 0.40]	124	0.11	[0.01; 0.23]
Information	101	0.03	[-0.07; 0.17]	125	-0.01	[-0.10; 0.07]
Abuse/Neglect	-	-	-	127	-0.02	[-0.05; -0.01]

Note: Somatic diseases comprise cardiovascular and musculoskeletal disorders; Psychiatric diseases comprise depression and dementia.

Abbreviations: CANE, Camberwell Assessment of Need for the Elderly; CI, confidence interval; GP, general practitioner; n, number of cases.

^aCohen's Kappa, Kappa values < 0 indicate a "poor or non-existent agreement", values between 0 and 0.20 a "low agreement" and kappa values of 0.21–0.40 a "sufficient agreement", the range of 0.41–0.60 represents a "medium agreement" and the range of 0.61–0.80 a "substantial agreement". The "(almost) perfect match" is interpreted using kappa values between 0.81 and 1.00.

CI = 1.03; 1.13). Patients with less social involvement had a significantly higher estimated number of unmet needs (LSNS; IRR = 0.93; 95% CI = 0.87; 0.98). In the group of patients with psychiatric diseases, significant associations were found between a higher number

of unmet needs and greater loneliness (UCLA; IRR = 1.22; 95% CI = 1.07; 1.39) and a higher number of depressive symptoms (GDS; IRR = 1.23; 95% CI = 1.09; 1.40), independently of socio-demographic characteristics.

TABLE 3 Interrater agreement between patients, relatives and GPs across all CANE areas

CANE areas	Patients/Relatives/GPs					
	Somatic diseases			Psychiatric diseases		
	n	Kappa ^a	CI	n	Kappa ^a	CI
Environmental needs						
Accommodation	85	0.07	[-0.04; 0.18]	83	0.17	[0.03; 0.29]
Looking after home	85	0.31	[0.18; 0.47]	83	0.42	[0.30; 0.55]
Food	85	0.27	[0.12; 0.49]	83	0.44	[0.30; 0.58]
Money/Budgeting	85	0.11	[-0.05; 0.33]	83	0.36	[0.20; 0.50]
Benefits	85	0.13	[0.02; 0.28]	83	0.23	[0.11; 0.37]
Caring for someone else	85	0.16	[-0.04; 0.37]	83	0.21	[0.02; 0.39]
Physical needs						
Physical health	85	0.06	[-0.02; 0.15]	83	0.07	[-0.03; 0.18]
Medication	85	0.11	[-0.03; 0.31]	83	0.35	[0.22; 0.48]
Eyesight/Hearing/Communication	85	-0.07	[-0.19; 0.03]	83	0.01	[-0.09; 0.16]
Mobility	85	0.56	[0.42; 0.68]	83	0.50	[0.39; 0.63]
Falls	85	0.28	[0.15; 0.43]	83	0.24	[0.13; 0.38]
Selfcare	85	0.35	[0.15; 0.56]	83	0.41	[0.28; 0.56]
Continence	85	0.44	[0.30; 0.58]	83	0.47	[0.35; 0.60]
Psychological needs						
Psychological distress	85	0.17	[0.04; 0.38]	83	0.17	[0.06; 0.31]
Memory	85	0.21	[0.07; 0.35]	83	0.31	[0.19; 0.44]
Behavior	85	0.26	[0.10; 0.41]	83	0.18	[0.04; 0.33]
Alcohol	85	-0.01	[-0.02; 0.00]	83	0.34	[0.01; 0.62]
Deliberate self-harm	-	-	-	83	-0.02	[-0.03; -0.01]
Inadvertent self-harm	85	0.27	[0.07; 0.43]	83	0.18	[0.04; 0.36]
Psychotic symptoms	-	-	-	83	0.19	[-0.04; 0.47]
Social needs						
Company	85	0.06	[-0.03; 0.18]	83	0.11	[0.00; 0.22]
Intimate relationships	85	0.11	[-0.03; 0.28]	83	0.17	[0.04; 0.31]
Daytime activities	85	0.30	[0.12; 0.50]	83	0.22	[0.10; 0.38]
Information	85	-0.02	[-0.10; 0.09]	83	0.05	[-0.05; 0.19]
Abuse/Neglect	-	-	-	83	-0.02	[-0.04; -0.01]

Note: Somatic diseases comprise cardiovascular and musculoskeletal disorders; Psychiatric diseases comprise depression and dementia.

Abbreviations: CANE, Camberwell Assessment of Need for the Elderly; CI, confidence interval; GP, general practitioner; n, number of cases.

^aFleiss kappa coefficient, Kappa values < 0 indicate a "poor or non-existent agreement", values between 0 and 0.20 a "low agreement" and kappa values of 0.21–0.40 a "sufficient agreement", the range of 0.41–0.60 represents a "medium agreement" and the range of 0.61–0.80 a "substantial agreement". The "(almost) perfect match" is interpreted using kappa values between 0.81 and 1.00.

4 | CONCLUSIONS

The aim of this study was to evaluate the psychometric quality of the adapted German version of the CANE. Based on a sample of older

patients with cardiovascular diseases, musculoskeletal disorders, depression and dementia, frequent unmet needs were assessed. On this basis, evidence for the reliability (interrater agreement) and validity (construct and criterion validity) of the CANE was presented.

TABLE 4 Correlations between CANE unmet needs and other related or unrelated scores or scales

Variables	Somatic diseases		Psychiatric diseases		Total sample	
	N	r	n	R	N	r
EQ-5D LQ Index	102	-0.2216	128	-0.3948*	230	-0.3759*
IADL	91	0.3765*	96	0.2972	187	0.3601*
LSNS	102	-0.1489	126	-0.1837	228	-0.2325*
UCLA	102	0.2735	123	0.2987*	225	0.3273*
6-CIT	102	0.0204	129	-0.1133	231	-0.0070
GDS	100	0.3866*	126	0.4963*	226	0.4967*
GAI	101	0.2408	124	0.4124*	225	0.3736*
Care level	102	0.0798	125	0.1114	227	0.1730
Doctor visits	102	0.2963	126	0.2429	228	0.1992

Note: Somatic diseases include cardiovascular diseases and musculoskeletal disorders; Psychiatric diseases include depression and dementia.

Abbreviations: 6-CIT, Six Item Cognitive Impairment Test; Doctor visits, visits by the GP or specialists within the last 6 months; EQ-5D LQ Index, preference-based, population-representative index of the EQ-5D questionnaire on health-related quality of life; GAI, German short version of the Geriatric Anxiety Scale; GDS, German version of the 15-item Geriatric Depression Scale; IADL, instrumental activities of daily living, total score ≤ 23 indicates impairment; LSNS, German version of the Lubben Social Network Scale; r, correlation; UCLA, German short version of the Loneliness scale.

*significant on the level $\alpha < 0.001$.

4.1 | Distribution of unmet needs

The findings of the current study with regard to most commonly identified unmet needs across the disease-specific subgroups are partially in line with previous findings. For example, Hoogendijk and colleagues reported that physical health, mobility, eyesight/hearing/communication were among the most common overall patient needs in a sample of 1137 elderly primary care patients with an average age of 81 years (Hoogendijk et al., 2014). Physical unmet needs, such as in the area of continence were also reported as one of the most common needs in the general elderly population aged 75 years and older (Stein et al., 2019). Further, in a previous study in primary care patients aged 65+ years, the CANE need areas physical health, mobility, eyesight/hearing/communication were most commonly observed as unmet (Smith & Orrell, 2007). Moreover, these authors also found the patients' psychological distress among the most common unmet needs, which was also shown in another study of GP patients aged 75 years and older interviewed with the CANE (Walters et al., 2000). In the present study, psychological distress has been identified by GPs as the most common unmet need, but not from the perspectives of patients or relatives. Also, the GPs in the current study identified company and daytime activities as the most common unmet needs of patients, which is in line with the top five unmet needs from the perspective of the medical staff in the study of Walters et al. (2000). However, unlike

Walters et al. the GPs in the current study identified unmet needs in accommodation and mobility. While the relatives in their study mainly found unmet needs for mobility, eyesight/hearing/communication and accommodation, the relatives in the present study reported unmet needs particularly in the patients' physical health, daytime activities and company. Walters et al. remarked that relatively few of the unmet needs identified by patients themselves were identified by the healthcare professionals. These authors assumed that healthcare professionals may have a different understanding of the concept of need or have differing information about patients' daily life (Walters et al., 2000). This could also be an explanation for the closer agreement with regard to unmet needs between patients and relatives compared to patients and GPs in the present study.

To our knowledge, unmet needs of older individuals with primary somatic diagnoses were rarely explored so far. The present study, for the first time, closes a research gap and describes the need situation of older primary care patients with cardiovascular and musculoskeletal disorders as assessed via the CANE. Previously, the needs of patients with suspected myocardial infarction using the Nottingham Health Needs Assessment (NHNA) tool were evaluated. However, the NHNA differs greatly from the CANE as it does not take into account psychological needs, and mainly addresses physical, informational and social needs. In their study, problems in social areas were most frequently reported in a sample of 242 patients at the average age of 70 years. The authors emphasized that social factors such as living alone and social isolation require special attention in the care of elderly cardiac patients (Asadi-Lari et al., 2003).

Taken together, patients with somatic disorders, especially with cardiovascular diseases, reported significantly less unmet needs than patients from the other subgroups in this study. One could speculate that the group of patients with cardiovascular diseases also included patients with hypertension. Although hypertension is related to severe health consequences, it can remain unnoticed for a long time and therefore does not necessarily cause any impairments, which could be associated with less perceived unmet needs (Raji et al., 2017). Otherwise, it may be easier to identify and address the needs of patients with somatic versus psychiatric diseases. Consequently, those patients can be supplied with substantially better healthcare services. Previous research emphasized that psychiatric disorders such as depression often remain unrecognized in old age, not least because of comorbidities and occurring somatic symptoms (Kok & Reynolds, 2017; Mitchell et al., 2010). Consequently, it may be more difficult to detect and address the needs of patients with psychiatric disorders compared to patients with somatic diseases.

4.2 | Reliability

In general, the interrater agreement determined in this study was average to low. With regard to the needs of the patients, the level of agreement between the patients and their relatives was rather low compared to previous studies. For example, Reynolds et al. (2000) and Fernandes et al. (2009) found, compared to our work, a high

Model variables ^a	Total sample		Somatic patients		Psychiatric patients	
	IRR	95% CI	IRR	95% CI	IRR	95% CI
Group 1	1.00	[1.00; 1.00]	-	-	-	-
Group 2	1.42	[0.75; 2.69]	-	-	-	-
Group 3	1.70	[0.78; 3.70]	-	-	-	-
Group 4	1.49	[0.80; 2.77]	-	-	-	-
Care level	0.76	[0.42; 1.37]	1.19	[0.27; 5.30]	0.76	[0.40; 1.47]
Doctor visits	1.05	[1.00; 1.10]	1.08***	[1.03; 1.13]	0.99	[0.91; 1.09]
LSNS	0.97	[0.93; 1.02]	0.93*	[0.87; 0.98]	1.01	[0.96; 1.08]
UCLA	1.13*	[1.00; 1.26]	1.04	[0.73; 1.47]	1.22**	[1.07; 1.39]
EQ-5D VAS	1.00	[0.99; 1.01]	1.00	[0.98; 1.02]	1.00	[0.99; 1.02]
6-CIT	1.14	[0.59; 2.18]	0.75	[0.20; 2.86]	1.93	[0.73; 5.09]
IADL	2.37**	[1.23; 4.56]	2.37	[0.97; 5.82]	1.97	[0.61; 6.34]
GDS	1.18***	[1.08; 1.29]	1.11	[0.91; 1.37]	1.23**	[1.09; 1.40]
GAI	1.03	[0.87; 1.24]	0.99	[0.72; 1.35]	1.12	[0.86; 1.45]
BIC	559.425	-	265.336	-	349.865	-
Log-likelihood	-212.4225	-	-81.17851	-	-123.3133	-
N	177	-	88	-	89	-

Note: Group 1 = cardiovascular disorders; Group 2 = musculoskeletal disorders; Group 3 = depression; Group 4 = dementia.

Abbreviations: 6-CIT, Six Item Cognitive Impairment Test; BIC, Bayesian information criterion; CI, confidence interval; Doctor visits, visits by the GP or specialists within the last 6 months; EQ-5D LQ Index, preference-based, population-representative index of the EQ-5D questionnaire on health-related quality of life; GAI, German short version of the Geriatric Anxiety Scale; GDS, German version of the 15-item Geriatric Depression Scale; IADL, instrumental activities of daily living, total score ≤ 23 indicates impairment; IRR, Incidence Rate Ratio; LSNS, German version of the Lubben Social Network Scale; UCLA, German short version of the Loneliness scale.

^aadjusted for age, gender, marital status, school education and domicile.

*significant on the level $\alpha < 0.05$; **significant on the level $\alpha < 0.01$; ***significant on the level $\alpha < 0.001$.

agreement between the assessment perspectives of patients and relatives (Fernandes et al., 2009; Reynolds et al., 2000). In these studies, the samples consisted of elderly patients with mental health problems and substantial to almost complete agreement with regard to the needs was shown. A moderate agreement was also found by Hancock et al. (2003). In their study, the sample consisted of older patients with various mental diagnoses and the agreement of the needs between the patients' and their relatives' point of view was $K = 0.53$ (Hancock et al., 2003). To our knowledge, the current study analyzed for the first time the interrater agreement with regard to unmet needs in patients with frequent somatic diseases, such as cardiovascular diseases and musculoskeletal disorders. Compared to other studies, we observed that assessors tended to agree more in these groups. A comparison with other studies also showed that the level of agreement with regard to the needs was higher in some CANE areas than in other areas. The agreement in the CANE area continence, for example, was similarly high in this work as in previous studies, regardless of the differences in the study designs and samples (Hancock et al., 2003; Miranda-Castillo et al., 2013). This finding

TABLE 5 Results of the negative-binomial regression analysis for the prediction of unmet needs (patient-reported unmet needs)

probably reflects the fact that incontinence is common in old age (Linde et al., 2017) and often accompanied by unmet needs as observed in this investigation. One could speculate, that unmet needs of patients with somatic disorders are generally more visible and identifiable than unmet needs in the area of psychiatric diseases. The differences between the perspectives of patients and relatives could also be explained by the person-centered approach of the CANE. So, perceptions of unmet needs can differ greatly depending on the point of view and a relative can, for example, perceive the patient's social needs (social contacts, everyday activities, close relationships) as unmet, while the patient himself feels well cared for in his social sphere. Further, certain response tendencies and biases, such as social desirability, taboos, or fear of stigmatization can influence the responses when reporting unmet needs (Crome & Phillipson, 2000).

In this study, the average agreement between patients and GPs showed a lower agreement with regard to unmet needs compared to the agreement between patients and relatives. In previous studies, however, very high levels of agreement were found between patients and GPs (Fernandes et al., 2009; Miranda-Castillo et al., 2013;

Reynolds et al., 2000). In other studies (Dautzenberg et al., 2016; Hancock et al., 2003; Wieczorowska-Tobis et al., 2016), moderate agreement was found between patients and practitioners (nurses, psychiatrists, social workers, therapists). In contrast, Houtjes et al. (2011), similar to our findings, found a lower agreement between patients and practitioners of $K = 0.28$ (Houtjes et al., 2011). Along with this, Stein et al. found rather low levels of agreement between patients and GPs (Stein et al., 2016b). The differences may be partly because of the sample structures. While in the current study only GPs were interviewed, the samples of other studies included various practitioners such as therapists, social workers, psychiatrists and psychiatric staff (Hancock et al., 2003) or experienced specialists, clinical psychologists and psychiatrists (Miranda-Castillo et al., 2013). The discrepancies compared to previous results may also be explained by differences in the amount of care required and differing needs in patient care. In this context, through more intensive treatment and care of these patients by the practitioner, there could have been greater proximity and associated knowledge of the patients' unmet needs. The sample of the present study mainly consisted of older patients living alone or with their partner who, if necessary, were cared for by their relatives and who had been treated regularly by a GP with at least one contact in the last 6 months. Here, the question arises whether information about the needs is missing or how the low agreement in this work can be explained. It seemed that some needs were inadequately communicated between the patients and GPs and that insufficient information was available. Certain areas, such as alcohol consumption, may be shameful and not reported by patients. Compared to relatives, GPs are probably less involved in the patient's personal needs. It can be assumed that relatives usually have a better relationship with the patients, that there is greater closeness and that the needs of the patients are less often hidden from the relatives than from the GPs, who see the patients less often. It can also be assumed that patients speak to their GPs less or not at all about their unmet needs. Nevertheless, the present study showed the tendency that the agreement with regard to unmet needs in the group of patients with somatic diseases was higher, which in turn may indicate that unmet needs in the somatic area are easier to identify than needs in the area of psychiatric diseases. In the latter, unmet needs may often remain undetected because they are more difficult to objectify and increasingly linked to communication. In addition, psychiatric diseases and the associated unmet needs are likely to be concealed more often in the already time-limited GP setting.

4.3 | Validity

To determine the convergent and discriminant validity in terms of the construct validity, the relationships between the CANE (unmet needs) with other measures and scales were analyzed. In agreement with an earlier study on the validation of the CANE (Stein et al., 2014), patients with higher levels of depression, higher functional impairment, greater loneliness and higher use of health services (doctor visits) reported more unmet needs. The relationship between higher depression scores and a higher number of unmet

needs is a robust, often replicated finding (Dautzenberg et al., 2016; Fernandes et al., 2009; Houtjes et al., 2011; Passos et al., 2017; Stein et al., 2016a). In addition to previous research results, the present work showed the relationship between higher anxiety symptoms and more frequent unmet needs. In line with further previous results, a higher health-related quality of life and higher social inclusion were associated with a lower number of unmet needs (Stein et al., 2014). In a validation study on the Persian version of the CANE (Salehi et al., 2018), evidence for the construct validity was also reported in the form that significantly correlative relationships between a higher number of needs and a reduced quality of life as well as restricted activities of daily living (Barthel-Index) were found. Furthermore, in contrast to earlier studies (Field et al., 2004; Hoe et al., 2004; Van der Ploeg et al., 2013), it was repeatedly shown that cognitive impairment and unmet needs were hardly or not at all associated with one another. Presumably, the sample proportions of cognitively impaired people were too small to be able to identify connections between cognitive impairment and unmet needs. In addition to the correlation analysis, the regression analysis showed associations in the hypothetical directions, which was in line with earlier findings. Like Stein et al. reported, a higher number of unmet needs was associated with higher values for depression, functional impairment and loneliness (Stein et al., 2014). In the work of Hoogendijk et al. (2014), which dealt with older, physically frail GP patients, a significant correlation between unmet needs and functional impairment was shown (Hoogendijk et al., 2014). This association was also shown in the present study with regard to more frequent doctor visits in patients with somatic diseases.

4.4 | Strengths and limitations

As part of this study, the psychometric quality of the adapted German version of the CANE was examined comprehensively for the first time, taking into account different perspectives (patients, relatives, GPs), which are significant strengths of this work. The assessment of unmet needs comprised different patient groups in the elderly population in order to map a broad spectrum of common diseases in old age. Another strength of the present study was that, in contrast to many previous studies, it included patients with psychiatric disorders as well as patients with primary somatic diseases. Further, as part of the structured clinical interview that was carried out with the participants, not only the standardized version of the CANE but also a number of other established research instruments and scales (such as the Geriatric Depression Scale, GDS) were used. One of the study's limitations refers to the cross-sectional design. Future studies with a longitudinal design and larger sample sizes would be desirable. Even if the classification of subjects was realized in a random manner, it cannot be ruled out that the comparison of patients with cardiovascular and musculoskeletal disorders may differ slightly. Also, it is conceivable that the assessment of unmet needs may be biased by certain factors, such as reduced attention and cognitive capacities

interfering with the validity of the patients' answers, especially in dementia patients. In addition, it was unfortunately not possible in this study to interview all relatives of the patients. In many cases, no relatives were available in the patients' households or the survey could not be carried out due to time constraints, especially of the caring relatives. Nonetheless, it was possible to include a significant number of relatives into the survey.

5 | SUMMARY AND FUTURE DIRECTIONS

First, the present study showed that older groups of patients with the most common somatic and psychiatric diseases have specific unmet needs that should be carefully considered in primary, clinical and nursing care. The CANE should be used for a reliable and valid need assessment. Based on this, implications for the health and social care of elderly patients should be derived. Finally, appropriate and tailored treatment should be initiated or relevant information should be made available.

In summary, the results of the present study offer substantial evidence for the reliability and construct validity of the adapted German version of the CANE. Based on a person-centered approach, the adapted German version of the CANE represents a reliable and valid instrument for the determination of met and unmet needs in the elderly population. The use of the CANE has proven to be suitable for both telephone and oral surveys. In the future, further studies on the psychometric quality of the adapted German version of the CANE in different samples and settings would be desirable. These could, for example, examine further aspects of reliability (test–retest) and validity (criterion validity) in the context of a longitudinal study design.

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CONFLICT OF INTEREST

None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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