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THE "QUALITOUCH ACTIVITY INDEX" AS A PRACTICAL CLINICAL ASSESSMENT TOOL TO MONITOR PHYSIO- AND TRAINING THERAPY: A COMPARISON WITH "PROMIS GLOBAL HEALTH 10" IN MUSCULOSKELETAL CONDITIONS

«ІНДЕКС АКТИВНОСТІ QUALITOUCH» ЯК ПРАКТИЧНИЙ КЛІНІЧНИЙ ІНСТРУМЕНТ ОЦІНКИ ДЛЯ МОНІТОРИНГУ ФІЗІО- ТА ТРЕНУВАЛЬНОЇ ТЕРАПІЇ: ПОРІВНЯННЯ З «PROMIS GLOBAL HEALTH 10» ПРИ М'ЯЗОВО-СКЕЛЕТНИХ РОЗЛАДАХ

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Abstracts

Background. From the patient's perspective, satisfaction with treatment and the achievement of therapeutic goals are key factors in assessing the quality of care. Although there are various instruments that measure these aspects separately, there is no instrument that combines everything in one. That is why the "QUALITOUCH Activity Index" was developed. In addition to these criteria, the "QUALITOUCH Activity Index" records the extent to which pain or discomfort limits individuals in their everyday activities and lives.

Objectives: The aim of this study was to compare the results from the "QUALITOUCH Activity Index" with those from the "Patient-Reported Outcomes Measurement Information System Global Health 10" ("PROMIS GH") in terms of limitations in everyday life and daily activities, as well as quality of life and limitations in quality of life in patients with musculoskeletal disorders in the German-speaking part of Switzerland.

Method: Anonymized data sets from a total of 57 participants were retrospectively evaluated. The "QUALITOUCH Activity Index" was digitally recorded before the first therapy session as part of the treatment-related data collection. The "PROMIS GH" data was collected digitally within the next 24 hours. Data analysis was performed using Spearman's rank correlation coefficients (rho), Cohen's kappa parallel reliability (convergent validity) and Cronbach's alpha (internal consistency).

Results: Anonymized data from 57 volunteer patients (42 females, 15 males; mean age 51.7±12.8 years) recruited in Switzerland and presenting with a wide range of musculoskeletal disorders were available for analysis. The highest Spearman rank-order correlation coefficient (rho = 0.92; $p < 0.05$) was observed between the item scores "health status" ("QUALITOUCH Activity Index") and "health status" ("PROMIS GH"). Strong correlations (rho ≥ 0.50) were identified in eight additional item-score comparisons, all statistically significant, including "health status" ("QUALITOUCH Activity Index") and "quality of life" ("PROMIS GH") (rho = 0.78, $p < 0.001$), as well as "maximum pain" ("QUALITOUCH Activity Index") and "average pain" ("PROMIS GH") (rho = 0.73, $p < 0.001$). Parallel reliability demonstrated excellent agreement between the "health status" item ("QUALITOUCH Activity Index") and the corresponding item ("PROMIS GH") ($\kappa = 0.94$). Three values in the matrix showed squared kappa coefficients above 0.75, while kappa values between 0.40 and 0.75 were observed in six comparisons. Internal consistency of the "QUALITOUCH Activity Index" was acceptable (Cronbach's alpha = 0.73) across seven item scores.

Conclusion: The partial validation of the "QUALITOUCH Activity Index" against the established "PROMIS GH" suggest that the "QUALITOUCH Activity Index" has the potential to be used as an easy-to-apply instrument in physiotherapeutic practice for patient assessment in everyday life, leisure and work activities.

Keywords: QUALITOUCH Activity index Patient Reported Outcome Measures, Quality Management, Health care outcomes, Musculoskeletal disorders, Physical Therapy.

Вступ. З точки зору пацієнта, задоволеність лікуванням та досягнення терапевтичних цілей є ключовими факторами в оцінці якості медичної допомоги. Хоча існують різні інструменти, які вимірюють ці аспекти окремо, не існує інструменту, що поєднує їх усі в одному. Саме тому було розроблено «QUALITOUCH Activity Index». Крім того,

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«QUALITOUCH Activity Index» фіксує ступінь, в якому біль або дискомфорт обмежують людей у їх повсякденній діяльності та житті.

Мета. Порівняти результати «QUALITOUCH Activity Index» із результатами опитувальника «PROMIS GH» за показниками обмежень у повсякденному житті та щоденній діяльності, а також якості життя та її обмежень у пацієнтів із м'язово-скелетними порушеннями в німецькомовній частині Швейцарії.

Методи. Ретроспективно було оцінено анонімні набори даних 57 учасників. «QUALITOUCH Activity Index» було цифровим способом записано перед першою терапевтичною сесією в рамках збору даних, пов'язаних із лікуванням. Дані «PROMIS GH» було зібрано цифровим способом протягом наступних 24 годин. Аналіз даних проводився з використанням коефіцієнтів рангової кореляції Спірмена (rho), паралельної надійності Коена (конвергентна валідність) та альфа-коефіцієнта Кронбаха (внутрішня узгодженість).

Результати. Анонімізовані дані 57 пацієнтів - учасників дослідження у Швейцарії (42 жінки, 15 чоловіків; середній вік 51,7±12,8 років) із широким спектром захворювань опорно-рухового апарату були доступні для аналізу. Найвище значення коефіцієнта рангової кореляції Спірмена (rho = 0,92; $p < 0,05$) було виявлено між балами за показником «health status» («QUALITOUCH Activity Index») та «health status» («PROMIS GH»). Сильні кореляції (rho ≥ 0,50) були встановлені ще у восьми додаткових порівняннях балів за показниками, усі статистично значущі, зокрема між «health status» («QUALITOUCH Activity Index») і «quality of life» («PROMIS GH») (rho = 0,78; $p < 0,001$), а також між «maximum pain» («QUALITOUCH Activity Index») і «average pain» («PROMIS GH») (rho = 0,73; $p < 0,001$). Паралельна надійність продемонструвала відмінну узгодженість між показником «health status» («QUALITOUCH Activity Index») і відповідним показником опитувальника («PROMIS GH») (к = 0,94). Три значення в матриці мали квадрат коефіцієнта каппа понад 0,75, тоді як значення каппа в межах 0,40-0,75 було виявлено у шість порівняннях. Внутрішня узгодженість «QUALITOUCH Activity Index» була прийнятною (альфа Кронбаха = 0,73) за сімома показниками.

Висновки. Часткова валідація «QUALITOUCH Activity Index» порівняно з референтним «PROMIS GH» свідчить про те, що «QUALITOUCH Activity Index» має потенціал для використання як простий у застосуванні інструмент у фізіотерапевтичній практиці для оцінки пацієнтів у повсякденному житті, дозвіллі та роботі.

Ключові слова: Індекс активності QUALITOUCH, результати, повідомлені пацієнтами (PROMs), менеджмент якості, результати медичної допомоги, м'язово-скелетні розлади, фізична терапія.

Introduction. In Switzerland, quality assurance of therapeutic interventions is required by law since the beginning of 2022 (KVV Art. 58g) [6]. However, in daily physiotherapy practice, the evaluation of therapy outcome and therapy quality in a systematic and structured way is still not fully established.

Difficulties in implementing compulsory documentation in physiotherapy was already described in the past [36]. Lack of standards, lack of thematic orientation, unwillingness to deal with documentation and lack of reporting restriction or disability of the patient's everyday life activities or occupation are among the reasons given [36]. In addition, there is a lack of a uniformly used (scientific) language among physiotherapists.

Braun, Rieckmann [4] investigated the extent to which measurement instruments are used in physiotherapy in Germany to assess various aspects of quality of life. About 86% of the physiotherapists (n = 522) that volunteered in the survey reported to use measuring instruments. Around 75% of the interviewees were convinced of the clinical benefits of assessment tools and that their potential to improve quality of physiotherapy treatments. Fifty percent mentioned the lack of time, the increased time required by the use of assessment tools and the lack of financial compensation as barriers for their use in daily clinical practice. The reported lack of time may also lead to a lack of clinical documentation. To tackle this problem, Griefahn, Wolf [17] recommended the use of electronic documentation software and legal framework conditions.

Leiner [21] concluded that 80.7% of the surveyed physiotherapists (n = 393) in Austria used assessments tools in the initial treatment and still 14.2% of them in every physiotherapy session. The study concluded that assessments are widely used in everyday clinical practice in physiotherapy in Austria in the last years.

Quality assurance in physiotherapy practice should be based on the "International Classification of Functioning and Disability of the World Health Organization" (ICF) to follow a common terminology [36]. ICF classifies and formulates human functioning. The classification of the state of health is based on the assessment of "bodily functions and structures", "activities and social participation" and "contextual factors" ("environmental factors" and "person-related factors") [13]. In this way, a holistic bio-psycho-social view of the patient is formulated and the complex interrelationships of health and illness in the respective environment are included. The ICF is not an assessment instrument but serves as a basis for the development of new instruments [31].

Up to now, various measurement and evaluation instruments (i.e. "assessments") have been used in physiotherapy. A distinction is made between objective and subjective instruments. Objective outcome variables arise from the measurement of physical parameters, such as blood pressure, body height or joint mobility. Whereas subjective outcome variables (i.e. hidden constructs) arise from the assessment of the examiner or patient, such as the recording of pain intensity [22].

The "Goal Attainment Scale", as an example of a subjective outcome measurement tool, has been used for setting and achieving individually defined goals. With this scale, patients and therapists together can define individual realistic goals based on a defined activity [28]. At fixed points in time during therapy these goals are reviewed and the extent to which these predefined goals have already been achieved is recorded.

The extent to which health and participation are restricting the defined activity and the level of participation can only be determined by the patient himself [36]. This is because the patient knows himself, his body and his "... preferences and expectations ..." best and can thus provide important additional information about therapy effects and health states in a true patient-centered way [22]. This subjective assessment is an important quality indicator in medical care. Therefore, so-called "Patient-Reported Outcomes" (PRO) are used to monitor health status in patients.

The use of PROMs as assessment tools are recommended in the literature [3, 37], because they support the clinical decision-making process and record the course or success of a therapy. Furthermore, they are a complement and necessity in clinical practice [35]. The objectivity of PROMs enables the physiotherapist to develop better treatment plans that allows to focus on the individual needs of the patient [1]. Over time more measurement tools for more clinical outcome variables have been developed [16]. However, physiotherapists need to use them adequately. All measurement instruments ("assessments") and PROMs serve to ascertain the actual health state of a patient and/or to document the course of a treatment [22].

Several questionnaires are often needed to determine the patient's overall condition, pathology-related health status, quality of life and limitations in activities of everyday life and work may be too many dimensions and their use can be time consuming in daily clinical practice.

The Patient-Reported Outcomes Measurement Information System 10 survey (PROMIS-10 Global Health survey; "PROMIS GH") is a ten-item tool designed by the United States National Institute of Health (NIH) to evaluate general health-related quality of life ("HRQoL") by comparing results to normative values from the U.S. general population [18]. It aligns its scores with U.S. normative benchmarks. The survey measures quality of life, overall health and well-being in patients suffering from a wide range of health conditions and diseases in a standardized way [2, 8, 9, 18]. "PROMIS GH" belongs to the latest generation of "Health Related Quality of Life" ("HRQoL") questionnaires.

According to the legal requirement, therapeutic effectiveness and quality, as well as patient satisfaction should be evaluated. The question arises which tools and instruments can be used in daily clinical practice to measure and evaluate therapy outcome (i.e. therapy effectiveness and quality). To tackle this issue, a new generic PROM, the "QUALITOUCH Activity Index", was developed. The goal is to measure the influence of pain or discomfort on sleep quality, activities of daily life, leisure and occupational activities, and also to evaluate the general health status in patients [34]. In addition, success of the therapy and patients' satisfaction are also surveyed. Thus, the "QUALITOUCH Activity Index" is assumed to offer the possibility for quality assurance of physiotherapeutic interventions. The "QUALITOUCH Activity Index " consists of a total of nine items based on the ICF. These items are considered individually while no sum score has to be calculated.

The "QUALITOUCH Activity Index" as proposed by Theiler [34] has already been used in various studies [20, 23, 24]. A study was conducted to compare results from the "QUALITOUCH Activity Index" with those obtained by the "Short-Form-Health Survey" (SF-12), a survey instrument for the assessment of health-related quality of life, in patients (n = 49) with back pain living in Switzerland [27]. The results showed medium to high correlation coefficients between the two instruments, indicating that the "QUALITOUCH Activity Index" captures similar dimensions as the "SF-12". Roth, Gengenbacher [27] interpreted this finding as an "indirect validation of the "QUALITOUCH Activity Index". Another study compared results from the "QUALITOUCH Activity Index" with those from the "European Quality of Life 5 Dimensions 3 Levels questionnaire" ("EQ-5D-3L") in patients (n = 57) suffering from musculoskeletal complaints in Switzerland [29]. The results from the latter study corroborated the results found in the Roth, Gengenbacher [27] study.

However, construct validation of the results gathered by the "QUALITOUCH Activity Index" in patients living in Switzerland is still lacking. Therefore, the purposes of this present study were:

i. to evaluate the correlation between individual items of the "QUALITOUCH Activity Index" with corresponding items of the "PROMIS GH" in a heterogeneous cohort of persons with musculoskeletal complaints

ii. to evaluate the correlation between values of the items "QUALITOUCH Activity Index" and those of the items "PROMIS GH" for quality of life and for limitation of quality of life in people with musculoskeletal complaints living in the German-speaking part of Switzerland.

Methods. This study was conducted according to the COSMIN guidelines [15] for reporting on studies about the assessment properties of a "PROM" to transparently present study objectives, methods, statistical analyses, presentation of results and discussion.

Figure 1 depicts an overview of the study procedure.

A construct validation was conducted by comparing similar items of the "QUALITOUCH Activity Index" [34] with corresponding items of the "PROMIS GH" in patients with musculoskeletal complaints from the German-speaking part of Switzerland.

In- and exclusion criteria. Included in this present study were patients over age 16 years suffering from musculoskeletal complaints and living in the German speaking part of Switzerland. Knowledge of the German language and digital literacy as well as having access to the internet were inclusion criteria. A more specific diagnosis or patient group was not required, as the "QUALITOUCH Activity Index" is intended to be used broadly and to be pathology independent.

Ethics approval. According to the Swiss Human Research Act, the analysis of anonymized data does not require approval from the Ethics Committee (HFG (Art. 2 para. 2 lit c)) [5].

All participants were orally informed about this study and gave written informed consent prior to their study participation.

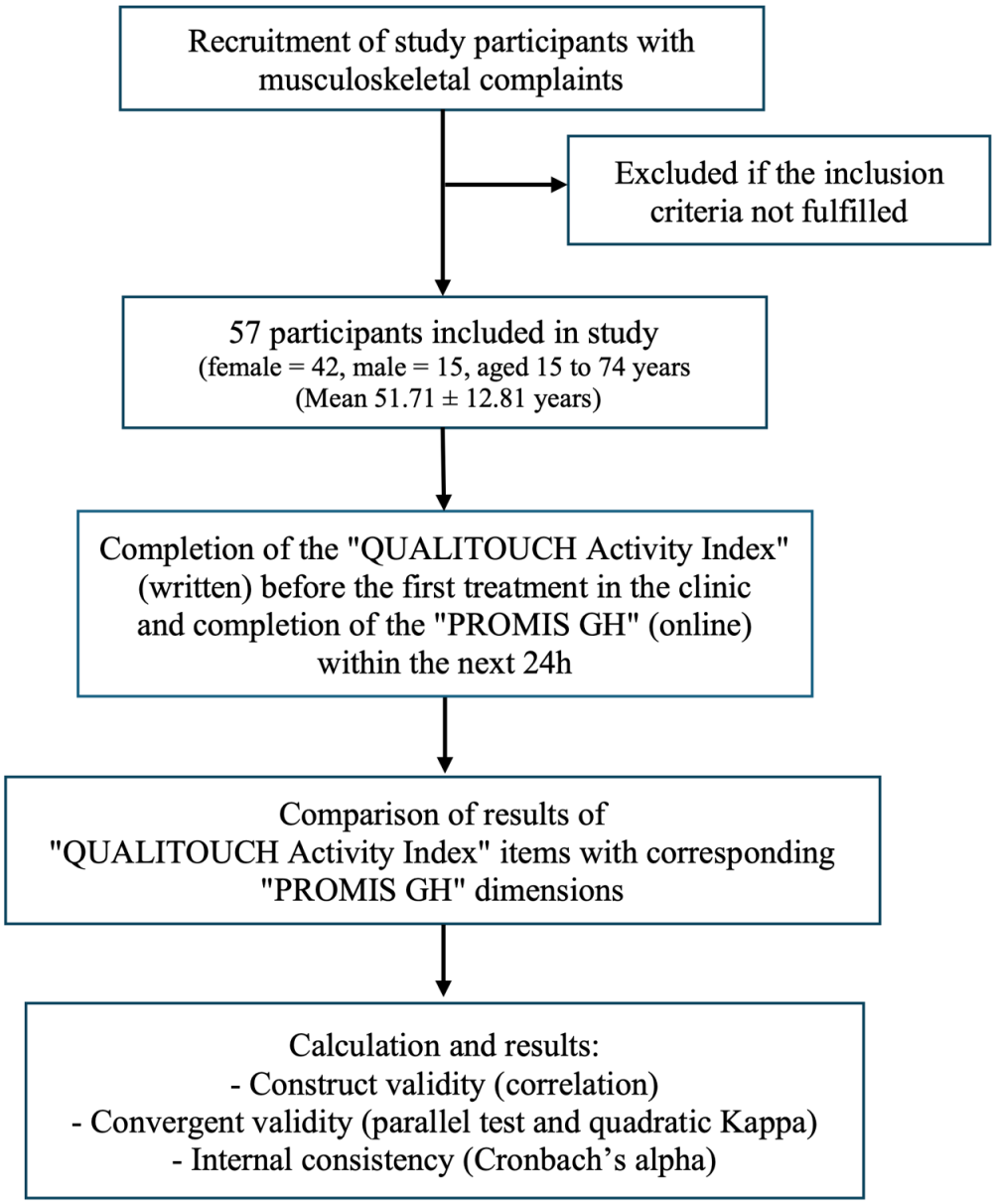

Figure 1. Study flow-chart with patient pathway and chronological sequence of data collection

The "QUALITOUCH Activity Index" as a new generic "PROM".

The "QUALITOUCH Activity Index" surveys pain intensity and is intended to represent acute or chronic pain-related impairment or discomfort in activities of everyday life, leisure time and work including the level of restriction of participation in these activities. In addition, the patient's assessment of general health status and overall therapy satisfaction are recorded [23, 24, 34, 38]. By asking about therapy satisfaction, the QUALITOUCH Activity Index could potentially be used as a generic PROM in Swiss physiotherapy practices to fulfil the legally required quality control.

The data collection of the "QUALITOUCH Activity Index" was carried out in a simple, comprehensible written way by the patient within a time frame of about 15 minutes and it was applied independent of the involved pathology or body region.

Table 1 depicts the nine items included in the "QUALITOUCH Activity Index" of Theiler [34].

Items one and two on pain or complaints are offered on a scale of 0 to 10 (NRS - Numeric Rating Scale) with zero (0) representing no pain while ten (10) means unbearable pain. The answer options for items three to six are on a bipolar Likert scale (ordinally scaled) with equidistance: not at all, slightly, moderate, strong, extreme. For item six about participant's work activities, the answer option: "I do not work", is added. For the answer about the general health status, item seven, can be answered with: bad, moderate, good, very good. For items eight (achieving therapy goal) and nine (satisfaction with received therapy) a distinction can be made between: full satisfaction, moderate satisfaction, little satisfaction, not satisfied.

Table 1

The generic PROM "QUALITOUCH Activity Index" consists of nine items

1.How strong were your maximum pain or complaints over the past 24 hours?	Scale 0 - 10 (Numeric Rating Scale or NRS)
2.How strong were your average pain levels or complaints over the past 24 hours?	Scale 0 - 10 (NRS)
3.How strongly did pain or complaints affect quality of sleep?	not at all, slightly, moderate, strong, extreme
4.How strongly did pain or complaints affect your household activities?	not at all, slightly, moderate, strong, extreme
5.How strongly did pain or complaints affect your leisure activities?	not at all, slightly, moderate, strong, extreme
6.How strongly did pain or complaints affect your work activities?	not at all, slightly, moderate, strong, extreme, I do not work
7.Please rate your state of health in general?	bad, moderate, good, very good
8.How well did you achieve the therapy goal?	full satisfaction, moderate satisfaction, little satisfaction, not satisfied
9.Are you satisfied with the therapy you have received?	full satisfaction, moderate satisfaction, little satisfaction, not satisfied

Table 2

Ten items included in the "PROMIS GH" questionnaire

1.In general, would you say your health is: ...	Excellent (5), Very good (4), Good (3), Fair (2), Poor (1)
2.In general, would you say your quality of life is: …	Excellent (5), Very good (4), Good (3), Fair (2), Poor (1)
3.In general, how would you rate your physical health? ...	Excellent (5), Very good (4), Good (3), Fair (2), Poor (1)
4.In general, how would you rate your mental health, including your mood and your ability to think? ...	Excellent (5), Very good (4), Good (3), Fair (2), Poor (1)
5.In general, how would you rate your satisfaction with your social activities and relationships? ...	Excellent (5), Very good (4), Good (3), Fair (2), Poor (1)
6.In general, please rate how well you carry out your usual social activities and roles. (This includes activities at home, at work and in your community, and responsibilities as a parent, child, spouse, employee, friend, etc.) ...	Excellent (5), Very good (4), Good (3), Fair (2), Poor (1)
7.To what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair? ...	Excellent (5), Very good (4), Good (3), Fair (2), Poor (1)
In the past 7 days …	
8.How often have you been bothered by emotional problems such as feeling anxious, depressed or irritable? ...	Completely (5), Mostly (4), Moderately (3), A little (2), Not at all (1)
9.How would you rate your fatigue on average? ...	Never (5), Rarely (4), Sometimes (3), Often (2), Always (1)
10.How would you rate your pain on average? ...	No pain (0), Worst pain imaginable (10)

Measuring instrument "PROMIS GH". "PROMIS GH" is a combination of ten items allowing to calculate two different scores on General Physical Health (GPH) and General Mental Health (GMH). The physical and mental health status of adult patients is assessed independent of the individual medical situation. The items relate to the assessment of subjective health, quality of life and social aspects of patients' lives. HRQoL depends on how a person's physical and mental health affect general health. A person who is physically and mentally healthy will generally have better general health than a person who is impaired in one or both of these areas. This interaction and also the quality of life (QoL, including GPH and GMH) depends on many factors such as age, sex, cultural background, and individual health needs.

Patients rate the individual items (item one to nine) included in the "PROMIS GH" questionnaire on a five-point scale (1 to 5 points, with 1 = poor/not at all and 5 = maximum/excellent). The evaluation yields a global physical health score (GPH) and global mental health score (GMH) both ranging from 0 to 20. Zero points represent the patient's most severe physical impairment, while 20 points represent the best possible state of health [26].

The "PROMIS GH" items are written in very simple English and the translation into the German language was straightforward. Therefore, a cultural validation of the German version was omitted in this present work.

All study participants received a link by email to complete the questionnaire online within 24 hours after the written "QUALITOUCH Activity Index " survey was filled out during the first visit with the physiotherapists in the clinic.

Table 2 shows the ten items included in the "PROMIS GH" questionnaire [18].

Study procedure and data collection. Patients visiting a private physiotherapeutic clinic in the German-speaking part of Switzerland because of musculoskeletal disorders were invited to volunteer in this validation study. For anonymization purposes, after giving their verbal and written consent to participate in this quality control study, they were automatically assigned a personal ID. The "QUALITOUCH Activity Index" was presented to all study participants in written form to be filled out independently in the physiotherapy clinic prior to the start of the initial treatment. Within 24 hours after the initial written survey, they also received an electronic link to complete the "PROMIS GH" questionnaire online. Because of this very short time delay between administering both surveys, no important changes on the constructs under evaluation were expected over such a short time period. It was considered that the assessment of both instruments represents the same point in time referring to the same overall condition of the individual. Results of these two surveys ("QUALITOUCH Activity Index" and "PROMIS GH") were then used for the subsequent comparisons of the scores from these two instruments.

For the item "work activity" the " QUALITOUCH Activity Index " includes an answer option "I do not work". This answer will be excluded from the analyze is, as it cannot be compared with a corresponding answer of the "PROMIS GH". Both instruments have been administered digitally by an electronic platform to minimize incorrect data entries. A plausibility check with descriptive analysis of the histograms as well as range checks secured plausibility of the data set before analysis.

Statistics. Since each participant evaluated their respective health status in both instruments, a univariate dependent sample served as the basis for analysis.

Scores from all items of the "QUALITOUCH Activity Index" were analyzed in comparison with the respective congruent item of the "PROMIS GH". Scores were compared to evaluate statement similarity amongst items.

Not all items of the two assessment tools can be considered fully congruent to cover comparable dimensions or constructs. The items included in both "QUALITOUCH Activity Index" and the "PROMIS GH" each offer five answer options. To enable a direct comparison the response levels of the "QUALITOUCH Activity Index" were transformed to those of the "PROMIS GH" as follows: For the items "quality of sleep", "activities of daily living", "leisure" and "occupational activities", the level 0 was converted to 5, 25 to 4, 50 to 3, 75 to 2 and 100 to 1, respectively. The item "general health" was transformed from 0 to 1, 25 to 2, 50 to 3, 75 to 4 and 100 to 5, respectively.

To assess construct validity, a correlation analysis of the individual items of both instruments was carried out. Since the data were ordinally scaled (Likert scale), Spearman rank order correlation coefficients were calculated to capture possible correlations [7, 33]. The following bench marking values were specified for the interpretation of the observed correlations: *rho* around 0.10 (weak), *rho* around 0.30 (medium) and *rho* around 0.50 or higher (strong) [10, 11].

To evaluate convergent validity, the parallel test [30] was performed and reported in terms of the quadratic-weighted Kappa value [11, 32]. According to Fleiss, Levin [14] the cut-off values for the interpretation of Kappa (κ) are determined as follows: $\kappa < 0.40$ as "low", $0.40 < \kappa < 0.75$ as "medium to good" and $\kappa > 0.75$ as "excellent" respectively.

Internal consistency of the "QUALITOUCH Activity Index" was expressed by Cronbach's alpha. A value of 0.70 to 0.90 is considered as "well accepted" [12].

The dependent variable is the result of a single item of the "new" test "QUALITOUCH Activity Index" and the independent variable is the content-corresponding item of the "reference" test "PROMIS GH".

Drop-out or missing values were treated as missing values. IBM SPSS software (version 27.0.0.0) [19] was used for statistical analysis.

For all calculations, significance level was set a priori at 5% level of alpha-error.

Hypotheses. It is hypothesized that the comparable items (e.g. "pain", "health status", "quality of life", "daily physical activities") of the two instruments ("QUALITOUCH Activity Index" and "PROMIS GH") will be positively correlated. It is assumed that the limitation in conducting daily activities due to musculoskeletal complaints or pain can be adequately recorded with the "QUALITOUCH Activity Index". The following hypotheses are therefore formulated:

H_1 (construct validity): $rho \geq 0.50$ will be yielded for the correlations of the item scores of the "QUALITOUCH Activity Index" with the corresponding item scores of the "PROMIS GH" for items on "pain", "health status", "quality of life" and "daily activities".

H2 (convergent validity): In the parallel test and the quadratic Kappa, $\kappa \geq 0.40$ will be achieved.

H3 (internal consistency): Chronbach's $\alpha > 0.7$ will be observed.

Results.

Study participants. Anonymized data from 57 volunteering patients (42 female, 15 male) with mean age 51.7 ± 12.8 years were available for analyzes.

Diagnoses. The musculoskeletal complaints of the participants concerned all areas of the body: lower extremity (hallux valgus, metatarsalgia, bent foot, achillodynia, patellar instability, meniscus lesion, knee joint arthrosis, trochanteric pain, etc.), trunk (ISG complaints, acute disc prolapse, facet joint syndrome, spondylarthritis, etc.), upper extremity (scapula alata, shoulder luxation, shoulder impingement, tennis/golfers elbow, carpal tunnel syndrome, wrist arthrosis, rhizarthrosis, etc.), neck/head (migraine, bruxism, tension headache, cervical spine arthrosis, etc.).

Table 3

Correlation matrix showing the Spearman rank order correlation coefficients between item scores of the item scores of the "QUALITOUCH Activity Index" and those of the "PROMIS GH"

			QUALITOUCH Activity Index						
	Spearman correlations		**maximum pain**	**average pain**	**quality of sleep**	**household activities**	**leisure activities**	**work activities**	**health status**
PROMIS GH	**health status**	*rho*	0.21	0.35**	0.32*	0.45**	0.10	0.38**	0.92**
		p	0.118	0.007	0.015	0.000	0.459	0.009	0.000
		n	57	57	57	57	57	48	57
	quality of life	*rho*	0.32*	0.40**	0.16	0.42**	0.15	0.42**	0.78**
		p	0.018	0.002	0.245	0.001	0.281	0.004	0.000
		n	55	55	55	55	55	48	55
	physical health	*rho*	0.29*	0.34**	0.45**	0.43**	0.08	0.40**	0.69**
		p	0.027	0.010	0.001	0.001	0.572	0.006	0.000
		n	57	57	57	57	57	48	57
	mental health	*rho*	0.05	0.11	0.27*	0.20	-0.02	0.22	0.45**
		p	0.688	0.436	0.046	0.138	0.888	0.138	0.000
		n	57	57	57	57	57	48	57
	social activities	*rho*	-0.08	-0.06	0.18	0.06	0.03	0.20	0.26
		p	0.530	0.656	0.180	0.641	0.812	0.165	0.054
		n	57	57	57	57	57	48	57
	social roles	*rho*	-0.16	-0.06	0.17	0.10	0.04	0.12	0.30*
		p	0.228	0.673	0.197	0.469	0.773	0.399	0.024
		n	57	57	57	57	57	48	57
	daily physical activities	*rho*	0.42**	0.44**	0.25	0.56**	0.40**	0.56**	0.44**
		p	0.001	0.001	0.065	0.000	0.002	0.000	0.001
		n	57	57	57	57	57	48	57
	emotional problems	*rho*	0.12	0.17	0.15	0.16	0.02	0.17	0.17
		p	0.376	0.216	0.280	0.241	0.885	0.243	0.214
		n	57	57	57	57	57	48	57
	fatigue	*rho*	0.15	0.29	0.38**	0.48**	0.40**	0.25	0.26*
		p	0.252	0.031	0.004	0.000	0.002	0.088	0.049
		n	57	57	57	57	57	48	57
	average pain	*rho*	0.73**	0.66**	0.35**	0.52**	0.33*	0.59**	0.29*
		p	0.000	0.000	0.008	0.000	0.012	0.000	0.033
		n	56	56	56	56	56	48	56

**. The correlation is significant at the 0.01 level (two-sided).

*. The correlation is significant at the 0.05 level (two-sided).

Table 4

Parallel reliability (Kappa values) between the items of the "QUALITOUCH Activity Index" and the "PROMIS GH"

		QUALITOUCH Activity Index						
		maximum pain	**average pain**	**quality of sleep**	**household activities**	**leisure activities**	**work activities**	**health status**
PROMIS GH	**health status**	0.15	0.28	0.31	0.47	0.11	0.36	0.94
	quality of life	0.19	0.32	0.19	0.46	0.16	0.32	0.78
	physical health	0.21	0.26	0.43	0.48	0.11	0.38	0.70
	mental health	0.04	0.09	0.23	0.22	-0.04	0.22	0.42
	social activities	-0.04	-0.02	0.12	0.05	-0.01	0.23	0.19
	social roles	-0.08	-0.03	0.15	0.21	0.16	0.19	0.28
	daily physical activities	0.26	0.35	0.22	0.54	0.38	0.49	0.39
	emotional problems	0.10	0.14	0.13	0.18	0.03	0.21	0.15
	fatigue	0.07	0.19	0.34	0.44	0.41	0.20	0.23
	average pain	0.75	0.65	0.29	0.38	0.28	0.49	0.20

Table 5

Weighted quadratic Kappa between the item scores of the "QUALITOUCH Activity Index" and those of the "PROMIS GH"

		QUALITOUCH Activity Index						
		maximum pain	**average pain**	**quality of sleep**	**household activities**	**leisure activities**	**work activities**	**health status**
PROMIS GH	**health status**	0.08	0.27	0.28	0.47	0.10	0.35	0.94
	quality of life	0.10	0.30	0.17	0.46	0.15	0.38	0.77
	physical health	0.12	0.26	0.35	0.48	0.11	0.35	0.69
	mental health	0.02	0.08	0.22	0.21	-0.03	0.22	0.41
	social activities	-0.02	-0.02	0.12	0.05	-0.01	0.23	0.18
	social roles	-0.04	-0.02	0.14	0.19	0.12	0.18	0.26
	daily physical activities	0.09	0.23	0.19	0.33	0.18	0.37	0.24
	emotional problems	0.04	0.10	0.13	0.13	0.02	0.19	0.11
	fatigue	0.03	0.17	0.34	0.39	0.31	0.20	0.21
	average pain	0.75	0.43	0.11	0.18	0.15	0.23	0.09

Table 6

Cronbach's alpha between the item scores of the "QUALITOUCH Activity Index" and the "PROMIS GH"

Reliability statistics		**Reliability statistics**	
Cron-bach Alpha	**Number of items**	**Cron-bach Alpha**	**Number of items**
.73	7	.84	6

		Item Scale Statistics				**Item Scale Statistics**			
		Scale mean if item omitted	Scale variance if item omitted	Corrected item scale correlation	Cronbach alpha if item omitted	Scale mean if item omitted	Scale variance if item omitted	Corrected item scale correlation	Cronbach alpha if item omitted
QUALITOUCH Activity Index	**maximum pain**	266	8412	.65	.64	213	9232	.67	.80
	average pain	286	9134	.69	.65	233	9867	.74	.80
	quality of sleep	284	9387	.34	.72	232	10125	.37	.86
	household activities	270	8168	.73	.62	218	8751	.81	.77
	leisure activities	264	8942	.59	.66	212	10050	54	.83
	work activities	279	7728	.61	.64	226	8276	.68	.80
	health status	267	13091	-.29	.84				

Construct validity. Table 3 shows the Spearman rank order correlation coefficients between the item scores of the "QUALITOUCH Activity Index" and those of the "PROMIS GH". The highest correlation value (*rho* = 0.92; $p < 0.05$) was found between the item scores "Health status" of the "QUALITOUCH Activity Index" and the item scores "Health status" of the "PROMIS GH". Strong correlations (*rho* ≥ 0.50) were found in eight other item score correlations, all statistically significant. For the item "work activity" the number of cases vary (n = 48, instead of n = 57), because responders that answered "do not work" were excluded from this analysis.

Convergent validity. Table 4 depicts the results of the parallel reliability analysis between the item scores of the "QUALITOUCH Activity Index" and those of the "PROMIS GH". Three values are higher than Kappa 0.75. The highest value (κ = 0.94) was found for the association between the item scores "health status" of the "QUALITOUCH Activity Index" and the item scores "health status" of the "PROMIS GH" questionnaire. Kappa values between 0.40 and 0.75 occurred in 12 correlations.

Table 5 shows the weighted quadratic Kappa values between the item scores of the "QUALITOUCH Activity Index" and those of the "PROMIS GH". Three values from the matrix had a squared Kappa value higher than 0.75. Kappa values between 0.40 and 0.75 were found in six comparisons.

The highest value (κ = 0.94) was observed between the item scores "health status" of the "QUALITOUCH Activity Index" and item scores "health status" of the "PROMIS GH" questionnaire.

Internal consistency. Table 6 shows the results of the internal consistency calculations. Cronbach's alpha was 0.73 for seven item scores of the "QUALITOUCH Activity Index" (without "therapy goal" and "satisfaction").

Discussion. The first aim of this study was to compare the individual items of the "QUALITOUCH Activity Index" with those of the "PROMIS GH" in a heterogeneous cohort of persons with musculoskeletal complaints living in the German speaking part of Switzerland. Overall, the results of this study showed that the item scores measured with the "QUALITOUCH Activity Index" were similar to those measured with the "PROMIS GH".

Furthermore, the "QUALITOUCH Activity Index" showed high correlation with the "PROMIS GH" in terms of quality of life and for limitation of quality of life in people with musculoskeletal complaints living in the German-speaking part of Switzerland (*rho* = 0.92; parallel reliability and weighted Kappa each κ = 0.94).

These results suggest that the "QUALITOUCH Activity Index" has the potential to be used as an easy-to-administer

tool for the assessment of the patient's limitations in everyday life activity, leisure and work and for general health status.

These findings corroborate a previous study from Roth, Gengenbacher [27], who found moderate to high correlations between the item scores of the "QUALITOUCH Activity Index" and those of the "SF-12" in a Swiss study including 66 patients with lumbar back pain.

In a study of patients (n = 100) with rheumatoid arthritis in China, Ren, Yu [25] found high correlations ($r = 0.73$; $p < 0.001$) between the item scores of the "QUALITOUCH Activity Index" and corresponding item scores of the "Health Assessment Questionnaire" (HAQ) [24]. Therefore, these authors concluded that the "QUALITOUCH Activity Index" provides reliable results and is easy for therapists to use in their clinical practice to document aspects of subjective impairment over longer periods of time as a progression parameter.

Zaugg, Baur [38] examined the use of the "QUALITOUCH Activity Index" as a follow-up instrument when treating patients (n = 11948) suffering from four musculoskeletal diagnoses (chronic lower back pain, tibia posterior syndrome, knee joint osteoarthritis and shoulder impingement) for the characteristics "maximum pain", "limitation in daily life activity" and “limitation during leisure time activity". The researchers concluded that the instrument under evaluation can be used to assess therapy progression and symptom improvement after a physiotherapy intervention in such patients.

The differences in the items included in the two questionnaires (i.e. items on the limitations in daily life due to complaints and/or pain ("QUALITOUCH Activity Index") versus items on limitation in daily life ("PROMIS GH")), may at least partially explain the observed low to moderate correlations ($rho < 0.5$). Likewise, different item dimensions and different formulations are administered in both questionnaires. For example, in the "QUALITOUCH Activity Index" the domains referring to sleep quality, daily activities, leisure time activity and occupational activity are differently formulated compared to the "PROMIS GH". The “PROMIS GH” evaluates the domains quality of life, physical health, mental health, social activities, social roles, daily physical activities, emotional problems and fatigue. These domains could be seen as similar and interpreted similarly although different in wording.

Both questionnaires ("QUALITOUCH Activity Index" and “PROMIS GH") were filled out by the study volunteers within a timeframe of 24 hours. It was assumed that no major changes may have occurred in such a short time, this delay was omitted in the present study. However, from the patients’ perspective, such delay maybe meaningful, potentially leading to a difference in the evaluation of their current condition. This might then explain the observed but moderate correlations between similar constructs (such as "average pain" ($rho = 0.66$; $p < .001$); daily activity ($rho = 0.56$; $p < .001$)).

Due to the observed strong correlations ($\kappa > 0.7$) between the item scores of the "QUALITOUCH Activity Index" with those of the "PROMIS GH", (item scores "health status" of the "QUALITOUCH Activity Index" and the item scores "health status" of the "PROMIS GH" questionnaire (κ 0.92) ; "health status" of the "QUALITOUCH Activity Index" and the item scores "quality of life" of the "PROMIS GH" questionnaire (κ 0.78); "maximum pain" of the "QUALITOUCH Activity Index" and the item scores "average pain" of the "PROMIS GH" questionnaire (κ 0.73)), it can be assumed that both instruments measure similar constructs and, hence construct validity may be given. Parallel test results observed in this present study corroborated this observation. Thus, the "QUALITOUCH Activity Index" seems to be a good instrument for assessing the patient's condition at the time of the survey.

Schenk, Taeymans [29] obtained similar results when comparing the “QUALITOUCH Activity Index” with the "European Quality of Life Qol-5D-3L" ("EQ-5D-3L") questionnaire in a cohort (n = 57) suffering from musculoskeletal disorders in Switzerland. The results of the “QUALITOUCH Activity Index” showed strong correlations with those from the “EQ-5D-3L" questionnaire. Nine item scores were higher than Kappa 0.40. The highest value (κ = 0.64) was found between the item "General health" of the "QUALITOUCH Activity Index" and the item "Health status" of the "EQ-5D-3L" questionnaire. The latter finding suggests its validity for use as an initial assessment in daily physiotherapy practice.

The strengths of this study were that similar characteristic are evaluated in both questionnaires ("QUALITOUCH Activity Index" and "PROMIS GH") and that the five answer options were on the same scale level (ordinal) in both instruments. Thus, there was no need to recalculate, transform or summarize retrieved scores.

The "QUALITOUCH Activity Index" not only evaluates pain, but also patient's discomfort. This enables a broader use of the "QUALITOUCH Activity Index" both in patients suffering from pain and in patients with functional and/or movement restrictions. Furthermore, the inclusion of volunteers with a variety of disorders in this present study supports the broader use of the instrument under evaluation.

Further reflections on the "QUALITOUCH Activity Index" could consider if a sum score with a resulting single number for the overall assessment might be useful compared to the single item analysis in the current version. Moreover, a graphical representation of the “QUALITOUCH Activity Index” items might be beneficial (e.g., spider diagram) for a fast qualitative analysis. Further research is needed to elaborate these ideas for further advancements of this PROM. Research should the also address the use of the "QUALITOUCH Activity Index" as an instrument to evaluate the effectiveness of physiotherapeutic interventions over time establishing further psychometric properties.

Conclusions. The partial validation of the "QUALITOUCH Activity Index" against the established "PROMIS GH" suggest that the "QUALITOUCH Activity Index" has the potential to be used as an easy-to-apply instrument in physiotherapeutic practice for patient assessment in everyday life, leisure and work activities. This is currently limited to the application in a Swiss sample of patients with a variety of musculoskeletal disorders.

The additional questions about the achievement of therapy goals and patient satisfaction have the potential to fulfill the legally prescribed quality assurance guidelines but future intervention studies using the "QUALITOUCH Activity Index" should validate this potential.

Conflict of Interest. R.T., Board of Trustees for Science and Research of the "QUALITOUCH-Healthcare Foundation" (QUALITOUCH-HC). The "QUALITOUCH-Healthcare Foundation" developed and validated the "QUALITOUCH Activity index". The "QUALITOUCH-HC Foundation" operates the electronic database for data acquisition of the Activity Index. The brand (QUALITOUCH-HC) is owned by Medcap GmbH. Data for this study was provided anonymously to the study group. They had no influence on the research question, methodology or data interpretation.

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