










# Perception and Impact of COVID-19 Pandemic in Psoriasis Patients: Data from the German PsoBest and the CoronaBest Registries

María José Valencia López <sup>1,\*</sup>, Brigitte Stephan <sup>1,\*</sup>, Anna Meineke <sup>1</sup>, Sandra Wolf <sup>1</sup>,  
Diamant Thaci <sup>2</sup>, Ulrich Mrowietz <sup>3</sup>, Valerie Andrees <sup>1</sup>, Stephan Jeff Rustenbach <sup>1</sup>,  
Kristian Reich <sup>1</sup>, Linus Thalmann <sup>1</sup>, Henriette Bogena <sup>1</sup>, Petra Staubach <sup>4</sup>,  
Ralph Michael von Kiedrowski <sup>5</sup>, Matthias Augustin <sup>1</sup>

<sup>1</sup>Institute for Health Services Research in Dermatology and Nursing (IVDP), University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany; <sup>2</sup>Institute and Comprehensive Center for Inflammation Medicine, University of Lübeck, Lübeck, Germany; <sup>3</sup>Psoriasis-Center, Department of Dermatology, University Medical Center Schleswig-Holstein, Kiel, Germany; <sup>4</sup>Department of Dermatology and Allergy, University Medical Center Mainz, Mainz, Germany; <sup>5</sup>Dermatological Practice Selters, Selters, Germany

\*These authors contributed equally to this work

Correspondence: Matthias Augustin, Institute for Health Services Research in Dermatology and Nursing (IVDP), University Medical Center Hamburg-Eppendorf (UKE), Martinistraße 52, Hamburg, 20246, Germany, Tel +49 040 7410 55428, Fax +49 040 7410 55348, Email m.augustin@uke.de

**Background:** Limited data are available characterizing the impact of the SARS-CoV-2 pandemic on psoriasis care for patients in Germany.

**Objective:** To analyze patient perception and impact of the pandemic on well-being and psoriasis management of German patients with moderate-to-severe psoriasis or psoriasis arthritis under systemic therapies.

**Methods:** The CoronaBest registry captures events of SARS-CoV-2 infections and analyzes the impact of the pandemic on patients with psoriasis or psoriasis arthritis. In June 2020, and independently in February 2022, patients with psoriasis or psoriasis arthritis received a standardized questionnaire for current treatment, protective measures, well-being, and individual risks for COVID-19, among others.

**Results:** Included were 4,194 patients in 2020 (mean age of 47.7 years and 41.8% women) and 4,818 patients in 2022 (mean age of 56.4 and 42.9% women). Treatment discontinuations were observed in 2.7% and 1.7% of patients in 2020 and 2022, respectively. In the vast majority of the cases (>92%), no additional measures were taken concerning the management of psoriasis treatments in either 2020 or 2022. Those patients with changes reported most frequently: telephone calls instead of face-to-face visits (80.2%, in 2020 vs 40.5% in 2022) or more frequent controls (27.1%, 2020 vs 22.0%, 2022). A majority (66.7%, 2020, and 70.6%, 2022) did not perceive the virus as a considerable threat. The proportion of patients feeling well informed about COVID-19 by physicians increased from 42.6% in 2020 to 51.8% in 2022. About 81.1% of patients in 2020 and 67.5% in 2022 stated that their overall personal condition was not affected due to the pandemic. Physicians attributed no special risk of contracting SARS-CoV-2 in most of the patients.

**Conclusion:** A high rate of systemic treatment persistence and awareness of risks and protective measures indicate that health care for psoriasis largely followed current national and international recommendations during the COVID-19 pandemic.

**Keywords:** psoriasis, COVID-19, SARS-CoV-2, pandemic, patient perception, risk factors

## Introduction

On December 30, 2019, the first case of “pneumonia of unknown etiology” was diagnosed at Wuhan Jinyintan Hospital in China.<sup>1</sup> Symptoms included dry cough, fever, shortness of breath, and gastrointestinal symptoms. In the period from late December 2019 to early January 2020, 44 cases of this infection were reported to the World Health Organization.<sup>2</sup> On March 11, 2020, the WHO officially declared the disease caused by infection with the novel severe acute respiratory

syndrome coronavirus (SARS-CoV-2), the coronavirus disease 2019 or COVID-19, to be a global pandemic. The number of infections rose to 37,369,865 by December 30th 2022 in Germany, including 161,465 deaths.<sup>3</sup>

The SARS-CoV-2 pandemic has fundamentally affected all areas of societal life, including health care. Although skin manifestations have not been the focus of early COVID-19 reports, consecutive research has yielded a large variety of skin and nail manifestations associated with the infection, including single cases of exacerbation of psoriasis.<sup>4–10</sup> However, many patients with skin conditions might have been affected by the pandemic not only due to the emotional stress associated with the situation but particularly as a consequence of shortages in health care provision.<sup>11,12</sup> As a result of the reduced medical care, the adherence of patients under systemic therapy was partially reduced.<sup>13–15</sup> At the beginning of the pandemic there has been discussion about the potential interaction between chronic inflammatory skin conditions and their treatments and the susceptibility to SARS-CoV-2 infection and/or a more severe course of COVID-19.<sup>16</sup> However, several societies recommended to not delay the initiation of necessary systemic therapy and to not discontinue systemic therapies in patients with no symptoms suspicious of COVID-19.<sup>17–21</sup> Furthermore, several publications suggested that patients with psoriasis, similar to patients with other chronic inflammatory skin conditions on systemic treatment, have no clinically relevant increased rate of complications.<sup>22–24</sup>

Few data on the effects of the pandemic on psoriasis patients in Germany have been published, and only few data are available characterizing the impact of the pandemic from the patient's perspective.<sup>25,26</sup>

The current study was conducted based on the German PsoBest and CoronaBest registries to analyse the impact of the pandemic on psoriasis management, patient perception and degree of affectedness in Germany between 2020 and 2022.

## Patients and Methods

This study was based on the principles of the Declaration of Helsinki.<sup>27</sup> Patients gave their informed consent for registry, and approval from the local ethics committee was obtained. In April 2020, an additive patient registry of the German psoriasis registry PsoBest,<sup>28</sup> CoronaBest, was launched, to capture events of SARS-CoV-2 infections and further to analyse the impact of the pandemic on patients with psoriasis.<sup>29</sup> Within the CoronaBest project, a total of 8,621 patients from PsoBest was addressed with a standardized questionnaire sent by postal mail in June 2020. In February 2022, a second survey contacted 9,609 patients from PsoBest with a follow-up questionnaire.

The first questionnaire included 10 items on current treatment, therapy conducted by the dermatologists and the patients themselves, as well as subjective patients' perceptions of risk factors of COVID-19. Furthermore, the level of information and personal well-being before versus during the pandemic were assessed in Likert-scaled items. The second questionnaire was expanded to 11 items to capture vaccinations against SARS-CoV-2 and associated adverse events.

The following variables of the surveys were included in the analysis: receiving systemic therapy at the time of survey, positive SARS-CoV-2 test, feeling well informed by their physician/dermatologist, feeling threatened by the pandemic, taking special protective measures, belonging to a risk group for COVID-19 according to their physician, and well-being in comparison to times before COVID-19 pandemic.

Descriptive analyses were performed using SPSS v. 27.0 (IBM, Armonk, NY) for Windows.

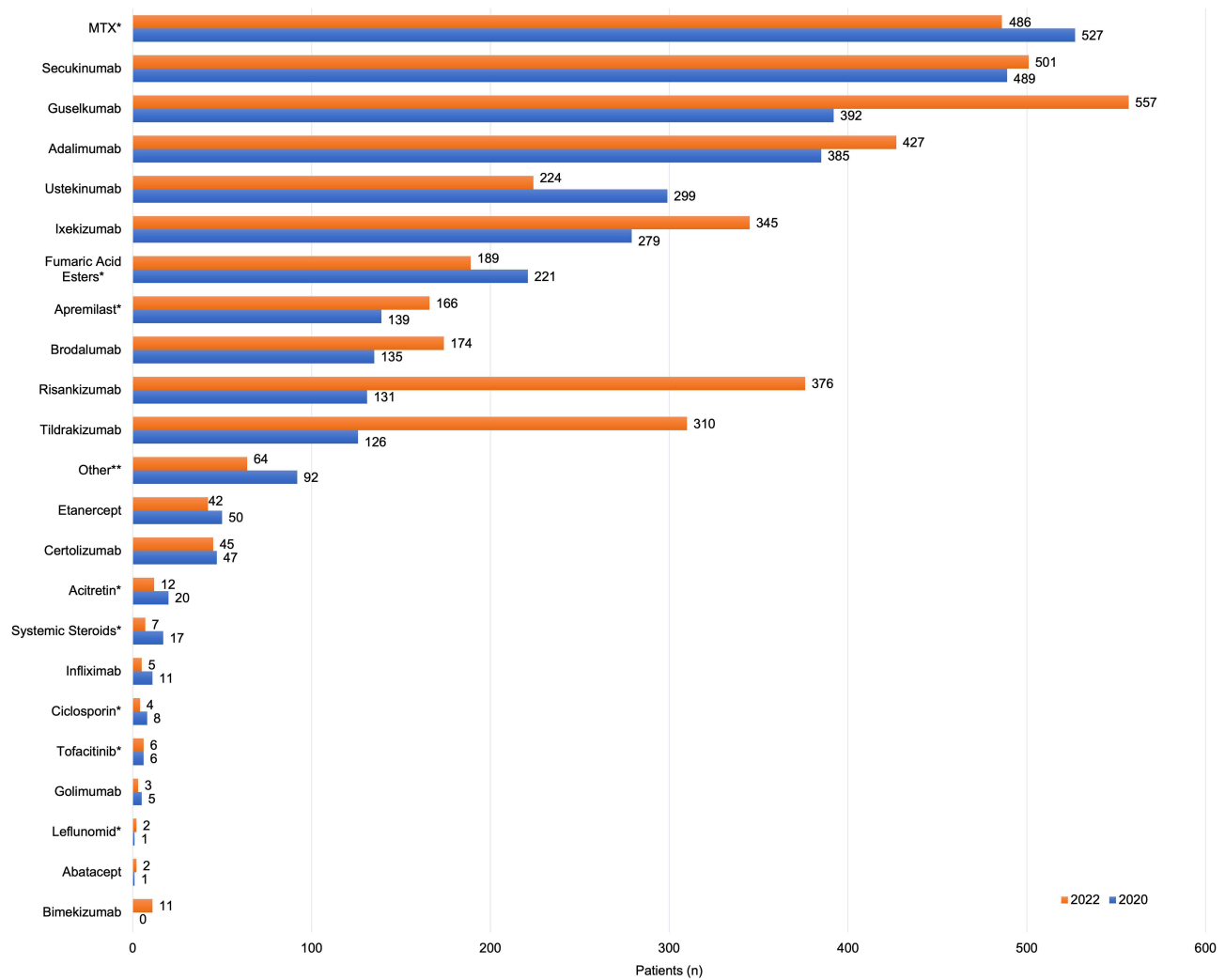
## Results

### Patients

A total of 8,368 patients from PsoBest was recruited for CoronaBest and received questionnaires by postal mail in the year 2020. From these, 4,194 patients returned the questionnaire (50.1%). The mean age was  $47.7 \pm 14.2$  years, and 41.8% were female. In 2022, a new cohort of 9,609 patients from PsoBest and CoronaBest was addressed with an updated questionnaire. The response rate in this case was 50.1% ( $n = 4,818$ ), the mean age of the patients was  $56.4 \pm 13.4$  years, and 42.9% were female.

### Treatment

In the year 2020, the most frequently used drugs for the treatment of psoriasis or psoriasis arthritis (PsA) in the studied cohort ( $n = 4,194$ ) were methotrexate ( $n = 527$ ; 12.6%), the IL-17 inhibitor secukinumab ( $n = 489$ ; 11.7%), the IL-23 inhibitor guselkumab ( $n = 392$ ; 9.4%), and the TNF- $\alpha$  inhibitor adalimumab ( $n = 385$ ; 9.2%) (Figure 1). Furthermore,



**Figure 1** Comparison of drugs used in the cohorts of patients with psoriasis between 2020 and 2022, patients could indicate more than one drug (2020: n = 4,194; 2022: n = 4,818) \*non-biologicals \*\*includes biological and non-biologicals.

782 patients (18.7%) did not undergo systemic treatment and 41 (1%) did not specify if they were or not under systemic treatment at the time of the survey. In contrast, in the year 2022, the most frequent used drug in the analyzed population (n = 4,818) was the IL-23 inhibitor guselkumab (n = 557; 11.6%). This was followed by the IL-17 inhibitor secukinumab (n = 501; 10.4%), methotrexate (n = 486; 10.1%), and the TNF- $\alpha$  inhibitor adalimumab (n = 427; 8.7%). Two drugs that were used more frequently in the year 2022 in comparison to 2020 were the IL-23 inhibitors risankizumab (7.8% vs 3.1%) and tildrakizumab (6.4% vs 3.0%). At follow-up, 705 patients (14.6%) did not undergo systemic treatment and 5.4% did not answer this question.

## Treatment Adjustment

In both 2020 and 2022, the majority of patients (identical rate of reply of 92.9% in both years) continued systemic therapy despite the pandemic. In 4.8% (2020) and 5.8% (2022) of patients a change in drug management was implemented related to the pandemic. For the year 2020, 235 changes were reported. Of them, 57.0% (n = 114) were discontinuations of the drug, 15.0% (n = 30) were a delay in the onset of systemic therapy, and 11.0% (n = 22) were dose reductions. Similarly, in the year 2022, with 278 reported changes, the most frequent changes in treatment were drug discontinuations represented with 29.1% (n = 81), a delay in the onset of systemic therapy with 13.7% (n = 38), and dose reductions with 10.1% (n = 28).

Of all patients who reported a positive SARS-CoV-2 test result (19 vs 737 patients in 2020 and 2022, respectively), the following drugs were used:

2020 (immediately after the first wave of SARS-CoV-2 infections in Germany without existing vaccinations worldwide): methotrexate (21.1%, n = 4), guselkumab (10.5%, n = 2), secukinumab (10.5%, n = 2), fumaric acid esters (5.3%, n = 1), adalimumab (5.3%, n = 1), golimumab (5.3%, n = 1), and risankizumab (5.3%, n = 1).<sup>30</sup>

2022: guselkumab (12.2%, n = 90), secukinumab (10.3%, n = 76), adalimumab (9.2%, n = 68), ixekizumab and risankizumab (7.5%, each n = 55), methotrexate (7.2%, n = 53), tildrakizumab (6.1%, n = 45), brodalumab (5.3%, n = 39), ustekinumab (4.9%, n = 36), fumaric acid (4.6%, n = 34), apremilast (2.2%, n = 16), certolizumab pegol (1.4%, n = 10), and acitretin (0.4%, n = 3), among others single ones.

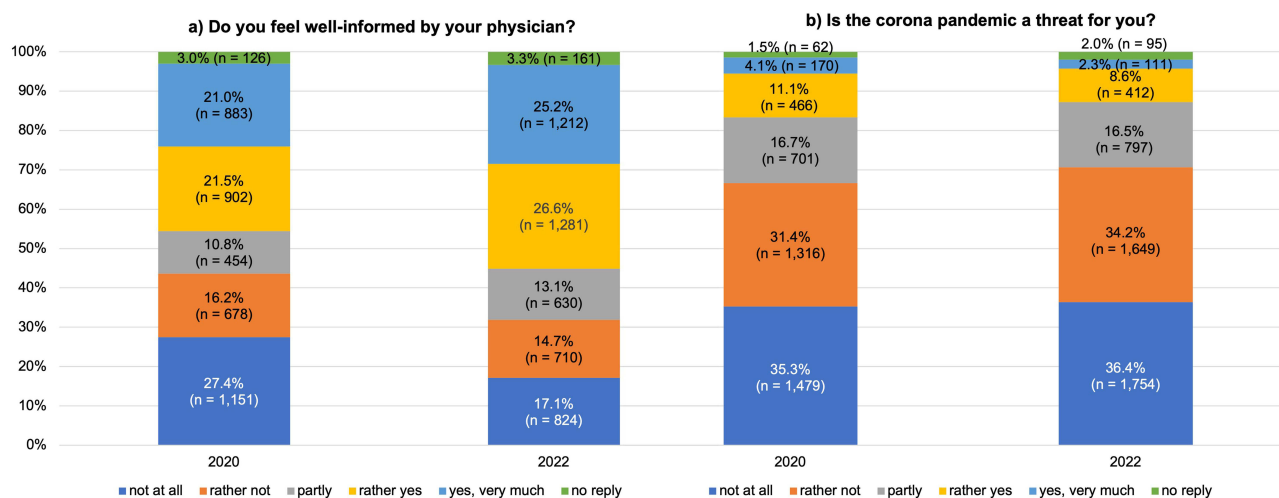
## Measures Implemented in Response to Corona

In both 2020 and 2022, the majority of patients took no specific measures regarding the managing of their psoriasis treatment in response to the pandemic (92.8% vs 94.5%, respectively) and continued visits in the dermatologist's office. In total, 207 patients in 2020 and 200 patients in 2022 reported specific measures. Most frequently reported action from the dermatologists in year 2020 in comparison to 2022 were phone calls instead of face-to-face visits (80.2%, n = 166 vs 40.4%, n = 81), more frequent controls (27.1%, n = 56 vs 22.0%, n = 44), discontinuations of co-medication (7.7%, n = 16 vs 8.5%, n = 17), and digital visits (eg, video conference; 4.8%, n = 10 vs 9.5%, n = 19) instead of face-to-face meetings.

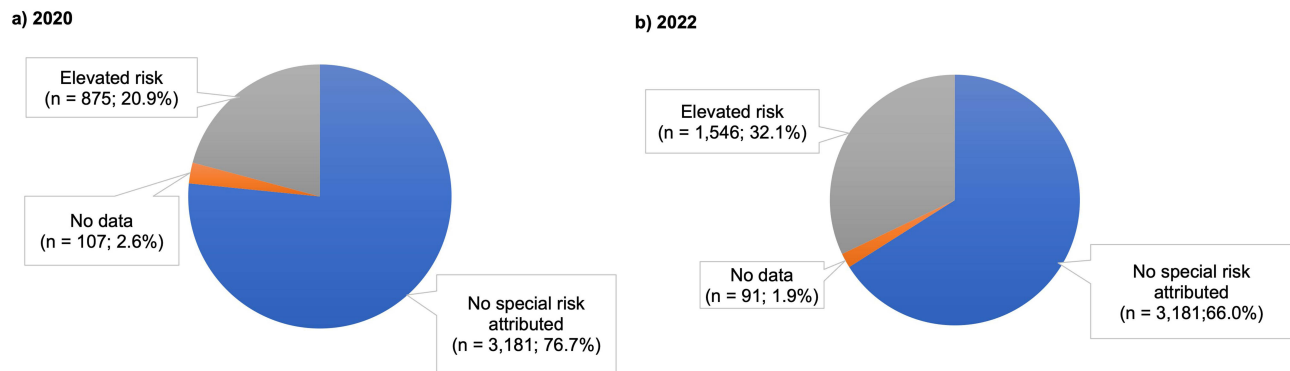
## Risk Perception and Information

Patients reported similar threat perceptions in both survey years of the surveys. A majority of patients with psoriasis or PsA (2020: 66.7% vs 2022: 70.6%) perceived no or little threat by the COVID-19 pandemic, whereas 15.2% vs 10.9% responded "rather yes" or "yes, very much" to this question for 2020 and 2022, respectively. Regarding information received about the COVID-19 pandemic from their physicians, 42.6% patients felt informed or well informed in the year 2020 in comparison to 51.7% in the year 2022. On the other hand, the percentage of patients who felt not well informed by their dermatologist decreased from 43.6% in 2020 to 31.8% in 2022 (Figure 2).

Among all patients with psoriasis or PsA (2020: n = 4,194; 2022: 4,818), the proportion of patients who, referring to information from their respective physician in charge of the patient, belonged to a risk group concerning SARS-CoV-2 increased from 20.9% (n = 875) to 32.1% (1,546) between 2020 and 2022 (Figure 3). Table 1 depicts a list of the reported risks of acquiring a SARS-CoV-2 infection.



**Figure 2** Comparison of perception of the pandemic (a) and level of information by the dermatologists (b) in patients with psoriasis between 2020 and 2022 (2020: n = 4,194; 2022: n = 4,818).



**Figure 3** Proportion of patients belonging to a group of elevated risk of acquiring SARS-CoV-2 or suffering a worse course of COVID-19 in the pandemic according to their physician (a) 2020: n = 4,194; (b) 2022: n = 4,818.

In 2020, n = 308 (7.3%) patients reported to have taken additional protective measures beyond the general recommendations in Germany. This number increased to n = 525 (10.9%) in 2022.

## Personal Situation in the Pandemic

Trends in the perception of individual well-being have not changed dramatically between the two study time points. However, important differences were observed in individual well-being categories. In 2020, 81.1% of the patients with psoriasis or PsA stated that their overall personal well-being was not affected due to the pandemic, in comparison to

**Table 1** Reported Risks for SARS-CoV-2 Infection Among Patients with Psoriasis or Psoriasis Arthritis in the Years 2020 and 2022

Risk	2020		2022	
	n	%	n	%
Acute infection	5	0.6	2	0.1
Age	115	13.1	133	8.6
Arthritis	1	0.1	4	0.3
Asthma	39	4.5	84	5.4
Autoimmune disease	6	0.7	55	3.6
Chronic intestinal disease	6	0.7	10	0.6
Currently in surgery	9	1.0	15	1.0
Diabetes	78	8.9	152	9.8
Heart disease	64	7.3	112	7.2
Hypertension	3	0.3	112	7.2
Immunodeficiency	106	12.1	143	9.2
Lung disease	65	7.4	103	6.7
Malignoma	11	1.3	37	2.4
Overweight, obesity	6	0.7	55	3.6

(Continued)

**Table 1** (Continued).

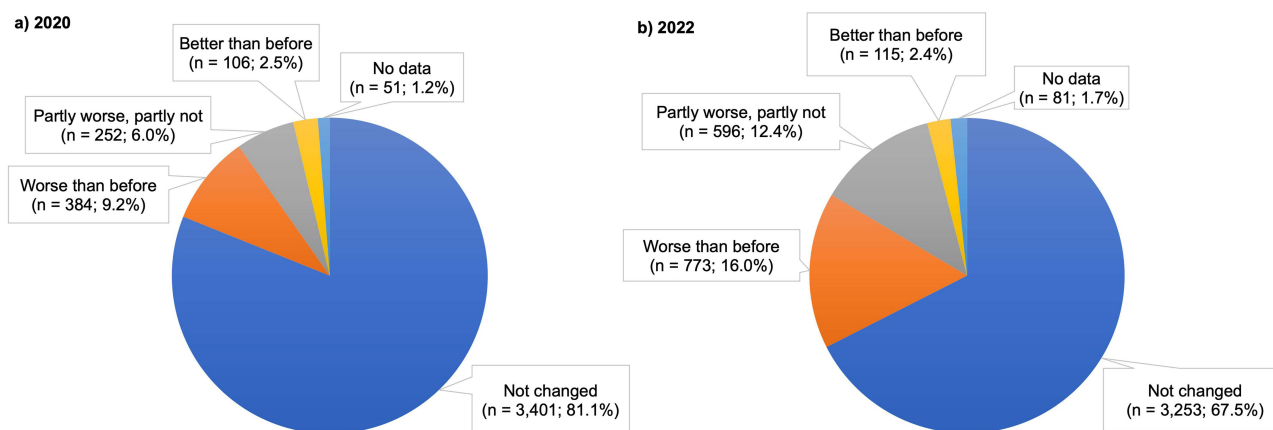
Risk	2020		2022	
	n	%	n	%
Pregnancy	3	0.3	0	0.0
Psoriasis	63	7.2	180	11.6
Psoriasis arthritis	22	2.5	64	4.1
Psoriasis Treatment	223	25.5	328	21.2
Rheumatism	8	0.9	28	1.8
Smoking	4	0.5	3	0.2
Varia	175	20.0	195	12.6

67.5% in 2022. Furthermore, the proportion of patients who felt worse compared to the time before 2020 increased from 9.2% to 16.0% between 2020 and 2022 (Figure 4).

## Discussion

The current study was conducted with the aim to generate data on the perception of the COVID-19 pandemic and psoriasis management of patients with psoriasis or PsA from the German registries PsoBest and CoronaBest with systemic treatment. The project CoronaBest was initiated as an easy-to-use database for dermatologists to register patients, with chronic skin conditions receiving systemic treatment and infected with SARS-CoV-2. CoronaBest also surveys patients enrolled in the German psoriasis registry PsoBest. Current active patients of the register PsoBest were approached by mail at two different time points (2020 and 2022) with a standardized questionnaire. In both cases, the return rate was above 50%. Therefore, our analyzes reflect the situation of a significant, although not necessarily representative, number of patients with psoriasis or PsA.

At the beginning of the pandemic, there have been concerns in regard to the management of chronic inflammatory conditions, like psoriasis, with immunomodulatory drugs. The present study shows that a high proportion of patients (92.9%, in both 2020 and 2022) has not undergone any changes in their psoriasis treatments throughout and despite the pandemic, complying with the established recommendations by dermatological societies.<sup>31–33</sup> These results are consistent with similar observations from Japan, Canada, and some European countries, where a reduced number of patients (between 1.2% and 6.0%) discontinued systemic treatment.<sup>26,34–40</sup> Our survey revealed a quite relaxed and unworried



**Figure 4** Comparison of the impact of the pandemic on the individual well-being of patients with psoriasis between 2020 and 2022 (a) 2020: n = 4,194; b) 2022: n = 4,818).



perception of patients with psoriasis, mostly unaffected by the pandemics regarding conduct of medication which is in line with national and international recommendations of the Medical Societies.<sup>31–33</sup> Only a reduced number of patients discontinued their systemic therapies (2.7% and 1.7% of the total cohorts in the years 2020 and 2022, respectively). Systematic reviews regarding worsening of an existing disease or new onset of psoriasis show a preferable continuation of a stable medication instead of interrupting the antiinflammatory treatments.<sup>41–43</sup> However, this seems to be different in other regions of the world, as some reports from France, Turkey and Greece have shown higher numbers of patients (>16.9%) who discontinued their systemic therapy during the pandemic.<sup>15,44–47</sup> Furthermore, Gisoni et al reported at the beginning of the pandemic no cases of deaths from COVID-related disease in an Italian population of patients with chronic plaque psoriasis undergoing biological therapy in comparison with the high number of deaths (IR1.6) in the general Italian population.<sup>48</sup>

This observational study also revealed a rather low level of concern and a relatively high level of awareness about risks among the majority of patients with psoriasis or PsA during the first two years of the COVID-19 pandemic. Particularly, the proportion of patients who felt threatened by the pandemic decreased from 15.2% (2020) to 10.9% (2022). Interestingly and in contrast to the previous result, the proportion of patients who implemented specific protective measures beyond those publicly recommended (social distancing, hand hygiene, mouth and nose mask) against a SARS-CoV-2 infection increased from 2020 (7.3%) to 2022 (10.9%), which might suggest an increase in patients' awareness towards the risks imposed by the pandemic in this cohort. Furthermore, a relevant proportion of patients did not report themselves as belonging to a specific risk group according to their physicians.

At the onset of the COVID-19 pandemic in 2020, human-to-human contact was vastly reduced worldwide through different measures aimed at reducing SARS-CoV-2 transmission. Germany has been no exception to this situation, and most of the country's population went through various lockdowns and special measures intended to reduce social contact. Therefore, we explored the consequences of social restrictions during the COVID-19 on the well-being of psoriasis patients, who already suffer from an intrinsically negative impact on well-being due to their dermatological condition and the various comorbidities associated with it. We observed that the percentage of patients who reported a worsened well-being in comparison to pre-pandemic times increased from 9.2% in 2020 to 16.0% in 2022, and the proportion of patients who perceived their well-being as unchanged was reduced from 81.1% in 2020 to 67.5% in 2022. These results reflect an obvious negative psychological impact of the pandemic on this cohort of patients.

Another important finding was the apparent improvement in communication between patients and physicians regarding psoriasis and the possible risks from SARS-CoV-2 for these patients, as 42.5% of patients felt well informed in 2020 in comparison to 51.8% in 2022. Since in a period of several weeks between March and April 2020 many dermatologists reduced their office hours, due to the lack of personal contacts may have contributed to the early perception of not being well informed by their treating physician in the year 2020. It would seem correct to conclude that the lack of in-person contact could not be counterbalanced by the high numbers of additional phone contacts in this period.<sup>49</sup> Digital patients' visits such as teledermatology and online videoconferences were only used in a very low proportion of patients in both time points, and these technologies could potentially be used to better inform patients on a larger scale.

Limitations of this study result from the fact that only patient-reported data were obtained which may be subject to information bias and possible misunderstanding of the questions. Furthermore, study participation was voluntary which may have induced selection bias. Nevertheless, the participation rate of more than 50% in these large cohorts is considerable and reflects a substantial part of the patients with psoriasis in health care analysis. Last but not least, the cohorts have limited comparability because they did not necessarily match at the two time points.

In total, the perception of the COVID-19 pandemic related to the personal situation of patients, with psoriasis receiving systemic treatment in Germany may be described as rather positive. In the majority of patients, systemic treatments remained largely unaffected in line with specific national recommendations.<sup>16</sup> A special emphasis should be focused on improving the education about the real risks of psoriasis and its therapy since a significant proportion of patients still feels sub-optimally informed and perceives systemic treatments as an additional risk for complications in case of COVID-19.

## Abbreviations

SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; WHO: World Health Organization; COVID-19, coronavirus disease 2019; PsA, psoriasis arthritis.

## Ethics Approval and Informed Consent

Patients provided written informed consent for registration and participation. Approval from the local ethics committee was obtained to conduct the PsoBest registry (approved by the Ethics Committee of the Ärztekammer Hamburg with approval number 2805) and the present study (approved by the Local Psychological Ethics Commission of the Center for Psychosocial Medicine at the University Medical Center Hamburg-Eppendorf with approval number LPEK-0355).

## Consent for Publication

The authors have given their written consent.

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