



The Vitiligo Impact Patient Scale (VIPs): Development and Validation of a Vitiligo Burden Assessment Tool

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Vitiligo has a major impact on health-related quality of life. Although a few vitiligo-specific quality of life instruments exist, there is no specific vitiligo burden tool. We developed and validated a specific vitiligo burden tool according to skin phototype. In total, 301 patients completed 35 items of the Vitiligo Impact Patient scale, of whom 235 were of skin phototype I to III and 66 of phototype IV to VI. The dimensionality of the items was evaluated using factor analyses, with results suggesting three factors in fair- and dark-skinned patients (“Psychological effects on daily life,” “Relationships and Sexuality,” and “Economic Constraints, Care & Management of Disease”). Unidimensionality was confirmed by higher order factor analysis. Cronbach’s α were high—and intradimensional coherences all demonstrated good reliability ($\alpha > 0.8$). The final instrument consists of 29 items (19 items common to all patients, 3 specific to fair skin, and 7 to dark skin). The test-retest reliability demonstrated very good reproducibility. The intraclass correlation of each dimension was greater than 0.90 for each population. External validity was confirmed by the correlation coefficients and Bland and Altman plots of the Vitiligo Impact Patient scale-Fair Skin and Vitiligo Impact Patient scale-Dark Skin versus the Short-Form-12, PVC Metra, Body Image States Scale, and Daily Life Quality Index assessment tools.

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INTRODUCTION

Vitiligo is the most common depigmenting disorder, with a prevalence of approximately 1% in the world population (Ezzedine et al., 2015). In some countries, vitiligo is still confused with leprosy with a considerable social stigma, and in India, vitiligo has been referred to as “Sweta Kustha,” which means “white leprosy” (Parsad et al., 2003a). Despite this negative perception by the general population, and even though it is classified by the WHO as a disease (L80), vitiligo is often considered as a benign disorder and most dermatologists do not offer active treatment, being pessimistic about the effect of therapeutic interventions on physical symptoms (Ongenae et al., 2004) whilst ignoring the effect of therapeutic interventions on the psychological and social impact of the disease (Njoo et al., 1999). Indeed, many

studies have documented significant effects of vitiligo on health-related quality of life (QoL), using validated generic and dermatology-specific health-related QoL scales (Firooz et al., 2004; Kent and Al’Abadie, 1996; Kent and al-Abadie, 1996; Kostopoulou et al., 2009; Mattoo et al., 2002; Parsad et al., 2003a; Porter et al., 1978, 1986, 1990; Radtke et al., 2009; Sampogna et al., 2008; Schmid-Ott et al., 2007; Talsania et al., 2010). However, these generic instruments are not specifically designed for vitiligo and are probably not sensitive enough to detect subtle and relevant variations of QoL between individuals. Recently, a few specific vitiligo QoL questionnaires have been developed (Gupta et al., 2014; Lilly et al., 2013; Senol et al., 2013).

The concept of “burden” has played an increasingly important role in evaluating the care of chronic diseases, and more specifically skin diseases (Chren and Weinstock, 2004). The notion of global burden was introduced by the WHO and is useful in quantifying the health of a population and determining priorities of action in the public health domain (WHO, 2010). The notion of burden has recently been extended to individuals and their families, to assess disability in a broad sense (psychological, social, economic, and physical), related to various diseases including psoriasis (Meyer et al., 2010), infantile hemangioma (Boccaro et al., 2015), inherited ichthyosis (Dufresne et al., 2013), and atopic dermatitis (Taieb et al., 2015). Indeed, in a recent paper, Hay et al. (2014) estimated the global burden of 15 skin diseases in 187 countries. This global burden takes into account not only health-related QoL but also social integration, emotional state, everyday-life organization, and the use of medical resources including consultations and medication.

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Abbreviations: QoL, quality of life; VIPs, Vitiligo Impact Patient scale; VIPs-DS, Vitiligo Impact Patient scale-Dark Skin; VIPs-FS, Vitiligo Impact Patient scale-Fair Skin

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To the best of our knowledge, there is no tool available for assessing the burden experienced by individuals affected by vitiligo, although there is a need for developing such a tool that would be beneficial for clinicians and patients alike and which would also allow for an evaluation of the impact of vitiligo treatment. Therefore, the aim of this study was to develop and validate a vitiligo-specific burden questionnaire that we called the Vitiligo Impact Patient scale (VIPs).

RESULTS

Conceptual phase

The initial exploratory phase involved 25 patients who discussed their complaints and distresses related to vitiligo, and input from two dermatologists, a patient support group, and an expert in the design of questionnaires. During the course of semistructured interviews and discussions, it became clear that it would be relevant to include skin phototype as a parameter in the questionnaire. After qualitative interviews, the primary fields reported by patients were: (1) the feeling of being discouraged by the condition, (2) the changes in physical appearance, (3) discrimination at work, (4) the difficulty of initiating intimate relationships, (5) the general feeling of unease, and (6) the financial burden related to the disease. At this stage, 56 items were produced, then reorganized and grouped according to their content, and finally reduced to 35.

Development and validation phase

A total of 324 consecutive patients attending the clinic were invited to participate. Of these, 301 agreed to participate. Of these 301 individuals, 62% were females and 38% males. The mean age of participants was 48.9 ± 16.2 years (range, 15–87 years). Individuals were classified as having fair skin (I to III, $n = 235$) or dark skin (IV to VI, $n = 66$) phototype. The majority of patients classified with dark skin were of Middle Eastern, Caribbean, or Indian ethnicity. As the responses to specific items varied significantly between fair (I to III) and dark skin phototypes (IV to VI), we conducted all analyses according to skin phototype.

First of all, exploratory factor analysis was conducted in all participants to test the robustness of the global 35-item questionnaire. Three items were then deleted because of redundancy and/or nondiscrimination. A further exploratory factor analysis was then conducted on the remaining 32 items according to skin phototype that identified a three-group model as the most suitable for fair and dark skin phototypes.

Finally, the unidimensionality of VIPs-Fair Skin (FS) and -Dark Skin (DS) was confirmed by the higher order factor analysis. Hence, although the χ^2 values for both models were statistically significant, which indicates that the models do not perfectly predict all the covariances between the subscales, the practical indices of fit (comparative fit index and non-normed fit index) were acceptable for both models. Indeed, the comparative fit index was 0.9083 and 0.9674, respectively, for VIPs-DS and VIPs-FS (acceptable if greater than 0.9) and the non-normed fit index was 0.9147 and 0.9621, respectively, for VIPs-DS and VIPs-FS (acceptable if greater than 0.9).

For fair skin phototypes, the final version of VIPs-FS, which was used in the psychometric analysis, consisted of 22 items.

Standardized regression coefficients were all greater than 0.5 on their factor (Table 1). According to standardized regression coefficients, each group of questions was assigned a dimension (each consisting of at least three questions): “Psychological effects on daily life” (9 questions), “Relationships and Sexuality” (8 questions), and “Economic Constraints, Care & Management of Disease” (5 questions). Cognitive debriefing resulted in no major changes in the wording of the questions. When conducting psychometric analysis, all dimensions correlated well with the overall VIPs-FS score. Cronbach’s α was 0.92 for the entire VIPs-FS, confirming an excellent internal coherence. Intradimensional coherences all demonstrated excellent reliability ($\alpha > 0.8$).

For dark skin phototypes, the final version of VIPs-DS, which was used in the psychometric analysis, consisted of 26 items. Standardized regression coefficients were all greater than 0.5 on their factor (Table 1). According to standardized regression coefficients, each group of questions was assigned a dimension (each consisting of at least three questions): “Psychological effects on daily life” (17 questions), “Economic Constraints, Care & Management of Disease” (5 questions) and “Relationships and Sexuality” (4 questions). Cognitive debriefing resulted in no major changes in the wording of the questions. When conducting psychometric analysis, all dimensions correlated well with the overall VIPs-FS score. Cronbach’s α was 0.94 for the entire VIPs-FS, confirming an excellent internal coherence. Intradimensional coherences all demonstrated excellent reliability ($\alpha > 0.80$).

In total 29 items constituted the global VIPs questionnaire, of which 19 were found in both dark and fair skin phototypes, 3 were specific to fair skin, and 7 to dark skin.

Results of the concurrent external validity are detailed in Table 2. The correlation coefficients of the VIPs-FS and VIPs-DS versus the Short-Form-12 (SF12), PVC Metra, Body Image States Scale, and Daily Life Quality Index assessment tools were highly correlated and confirmed the external validity. Similarly, Bland and Altman plots showed that 95% of the normalized differences between the VIPs-DS (Figure 1) and VIP-FS (Figure 2) scores on the one hand and the four other scores on the other hand were comprised between $\pm 2SD$.

Test-retest analysis. The test-retest reliability was obtained in 118 evaluable patients, 80 and 38 respectively for VIPs-FS and VIPs-DS, demonstrating very good reproducibility. The Intra Class Correlation of each dimension was greater than 0.90 for each population and within each domain.

Translation and cross-cultural adaptation. The original French versions of VIPs-FS and VIPs-DS have been translated and have undergone linguistic and cultural validation in English (US).

Scoring. The VIPs can be reported as a total score (range, 0–110 for VIPs-FS and 0–130 for VIPs-DS). In these scores, 0 represents no effect and 110 maximal burden for fair-skinned patients and 130 maximal burden for dark-skinned patients. Finally, to allow a comparison between fair and dark skin phototype, we propose to report scoring as a score out of 100.

Table 1. Standardized regression coefficients from the final rotated factor pattern

Item	Rotated factor pattern (standardized regression coefficients)	Dark skin phototypes			Fair skin phototypes		
		Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
1	I feel discouraged because of my vitiligo	0.57	0.17	0.20	0.68	0.27	0.22
2	I experience my vitiligo as a daily handicap	0.74	0.22	0.26	0.75	0.32	0.19
3	My vitiligo has repercussions on my physical appearance	0.52	0.07	0.38	0.66	0.27	0.04
4	Passing my vitiligo on to my children worries me, makes me anxious				0.50	0.22	0.20
5	I feel a sense of abandonment where medicine (my doctor) is concerned	0.09	0.07	0.70			
6	I have learned to live with my vitiligo	-0.59	0.01	-0.15			
7	My vitiligo has a negative impact on my libido (sexual desire)	0.43	0.20	0.54	0.17	0.72	-0.01
8	The looks I get from people because of my vitiligo are hard to bear	0.73	-0.046	0.37			
9	My vitiligo is an obstacle (a barrier) to my sexuality				0.18	0.81	0.01
10	Questions about my vitiligo bother me, disturb me	0.72	0.21	0.27	0.35	0.66	0.27
11	I make sacrifices to afford my vitiligo treatments	-0.01	0.69	0.05	0.08	0.25	0.77
12	My reflection in the mirror makes me anxious	0.57	0.30	0.18	0.80	0.30	0.22
13	In the evening, once I've applied all the creams, I feel depressed	0.15	0.46	0.55			
15	I dip into my savings to treat my vitiligo	0.03	0.72	-0.06	0.12	0.22	0.80
16	I have had to change my vacations, leisure activities because of my vitiligo	0.21	0.55	0.22			
18	Managing my vitiligo on a daily basis is a burden	0.39	0.58	0.30	0.45	0.13	0.57
19	I tend to withdraw into myself because of my vitiligo	0.77	0.42	-0.01	0.57	0.61	0.18
20	The progression of my vitiligo worries me (makes me anxious)	0.71	0.38	0.13	0.79	0.19	0.19
21	The looks in my loved ones' eyes are difficult to bear	0.59	0.04	-0.04	0.43	0.56	0.22
22	I sometimes feel like giving up				0.23	0.34	0.51
24	I often tell myself that my life would be very different without vitiligo	0.63	0.37	0.33	0.59	0.39	0.32
25	I am ashamed of the consequences of my vitiligo	0.79	0.22	0.04			
27	I worry that my vitiligo will spread	0.58	0.40	0.20	0.67	0.02	0.14
28	I dread nice weather because of my vitiligo	0.63	0.26	0.19	0.77	0.20	0.23
29	I am not comfortable talking about my vitiligo with those around me	0.66	0.11	-0.18	0.29	0.65	0.10
31	I feel that medicine has abandoned me	0.12	0.15	0.73			
33	I dread first meetings because of my vitiligo	0.74	0.08	0.27	0.56	0.59	0.18
34	The looks I get from children because of my vitiligo are hurtful	0.55	-0.07	0.07	0.27	0.59	0.30
35	Applying a treatment every day is a burden	-0.05	0.51	0.39	0.25	0.02	0.57

Regression coefficients shown in bold typeface represent the individual items that were included in each dimension.

Table 2. Correlation coefficients for VIPs for dark and fair skin phototypes (three subscores for the three factors and the total score) with PVC Metra, BISS, DLQI, and SF12 assessment tools

	Dark skin phototypes				Fair skin phototypes			
	Factor 1	Factor 2	Factor 3	Total score	Factor 1	Factor 2	Factor 3	Total score
STRESS (PVC Metra)	0.41	0.26	0.25	0.41	0.45	0.48	0.32	0.49
P-value	<0.01	0.03	0.04	<0.01	<0.01	<0.01	<0.01	<0.01
BISS	-0.34	-0.34	-0.19	-0.37	0.29	-0.39	0.23	-0.36
P-value	<0.01	<0.01	0.13*	<0.01	<0.01	<0.01	<0.01	<0.01
DLQI	0.77	0.62	0.57	0.84	0.76	0.74	0.60	0.82
P-value	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SF12_MCS	-0.55	-0.36	-0.27	-0.54	0.52	-0.49	0.38	-0.55
P-value	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
SF12_PCS	0.12	0.04	0.13	0.12	0.01	-0.09	0.10	-0.07
P-value	0.36*	0.72*	0.32*	0.33*	0.84*	0.19*	0.15*	0.33*

Abbreviations: BISS, Body Image States Scale; DLQI, Daily Life Quality Index; PVC Metra, Prévention Cardio-Vasculaire en Médecine du Travail; MCS, Mental Component Summary; PCS, Physical Component Summary; SF12, Short-Form-12; VIPs, Vitiligo Impact Patient scale.

*Nonsignificant.

DISCUSSION

To the best of our knowledge, VIPs is the first specific assessment tool related to the burden of vitiligo. The notion of “burden” is increasingly being reported in the medical field in evaluating the care of chronic diseases, and more

specifically skin diseases (WHO, 2010). The notion of global burden was introduced by the WHO. Besides, different health authorities (NICE in the United Kingdom, HMO in the United States, and HAS in France) take into account the individual burden of the disease to prioritize and determine the

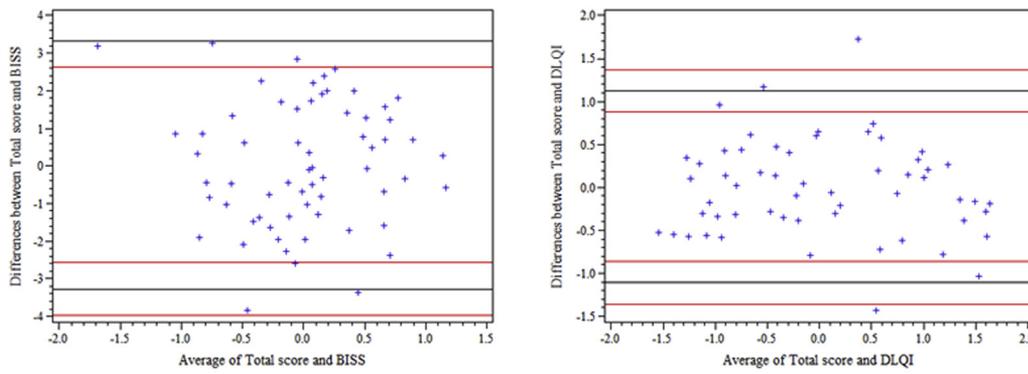


Figure 1. Bland and Altman plots between the total VIPs-DS score and BISS, DLQI, SF12_PCS, and SF12_MCS, respectively. BISS, Body Image States Scale; DLQI, Daily Life Quality Index; MCS, Mental Component Summary; PCS, Physical Component Summary; SF12, Short-Form-12; VIPs-DS, Vitiligo Impact Patient scale-Dark Skin.

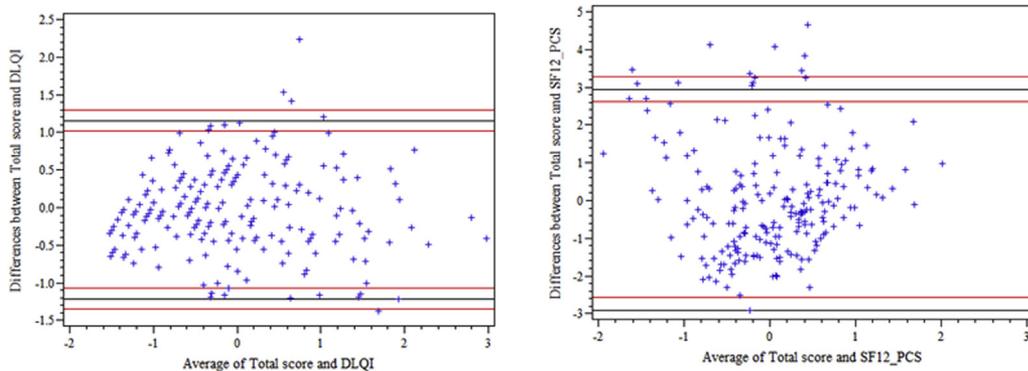
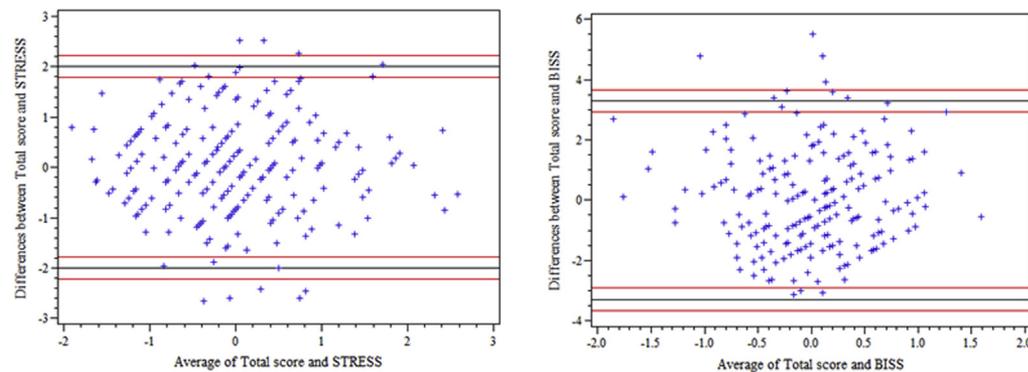
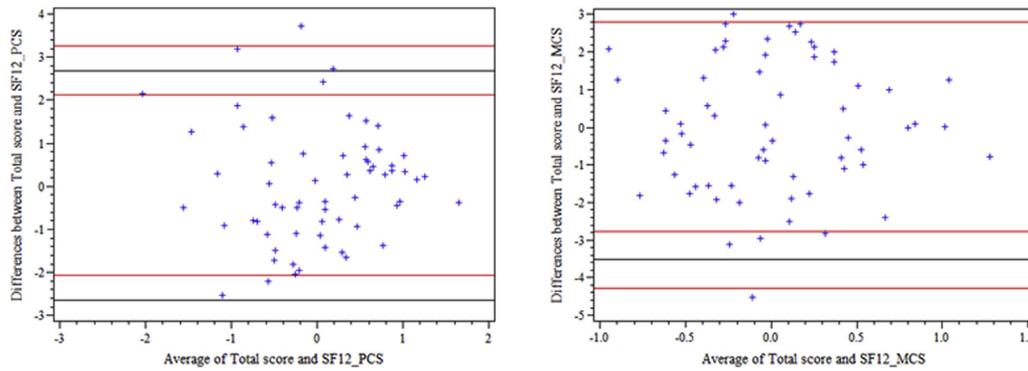


Figure 2. Bland and Altman plots between the total VIPs-FS score and BISS, DLQI, SF12_PCS, and SF12_MCS, respectively. BISS, Body Image States Scale; DLQI, Daily Life Quality Index; MCS, Mental Component Summary; PCS, Physical Component Summary; SF12, Short-Form-12; VIPs-FS, Vitiligo Impact Patient scale-Fair Skin.

level of reimbursement of medical products. Individual burden accounts for the broadest aspects of disease-related disability, including psychological, physical, social, and economic factors (Dufresne et al., 2013; Leidy et al., 1999; Rannou et al., 2014; Seidenberg et al., 1994; Taieb et al.,

2015), and may help to monitor specific disease before and after therapy.

Based on this study, the preliminary validation of the VIPs has been established. VIPs subscales were found to be psychometrically robust, with excellent internal consistency and

good item-scale, convergent, and construct validity. The VIPs also correlated significantly with both components of the SF12 and with the Daily Life Quality Index, confirming its concurrent validity. The factor “Psychological” that was found in fair and dark skin phototypes encompasses an array of disturbances in social life and includes almost half of the selected items. The factor “Relationships and Sexuality” in VIPs-FS and -DS assesses the impact of vitiligo on sexuality and shows that psychological disturbances experienced by vitiligo patients include irritability, anxiety, and depressive symptoms. Given the potential severity of such symptoms, their assessment in patients with vitiligo should not be neglected by dermatologists. Finally, the last factors “Psychological effects on daily life” and “Economic Constraints, Care & Management of Disease” in both fair and dark skin phototypes assess actual concerns that might significantly disturb a patient’s well-being; treatment outcome in particular.

Vitiligo is often perceived as a cosmetic disorder, whereas it has a major impact on patients’ QoL, and patients often face discrimination and stigmatization from others (Kruger and Schallreuter, 2015; Porter et al., 1987; Sukan and Maner, 2007). Moreover, studies conducted in several countries have shown that vitiligo has a major negative impact on patients’ sexuality (Parsad et al., 2003a; Porter et al., 1979; Sukan and Maner, 2007). Disappointingly, in a survey conducted by the Vitiligo Society UK, a majority of participants admit to obtaining information on vitiligo from nonmedical sources (Talsania et al., 2010). Vitiligo has also been associated with pessimistic emotions such as fear of spreading of vitiliginous lesions, shame, insecurity, and sadness (Nogueira et al., 2009). More generally, it is common knowledge that a significant number of patients with vitiligo feel stressed by their condition and experience shame, depression, and anxiety leading to low self-esteem and social isolation (Porter et al., 1978).

In a recent study, 55% of patients reported that emotional stress has triggered their vitiligo (Vrijman et al., 2013). Interestingly, in another study, psychological stress was found to increase the level of neuroendocrine hormones with an impact on the immune system (Al’Abadie et al., 1994). Therefore, one plausible hypothesis is that this increase in neuroendocrine hormones might be the initiating event in the pathogenesis of vitiligo. In addition, previous studies have shown that patients with decreased QoL at treatment initiation have a lower response rate to a given treatment (Parsad et al., 2003b). Despite this, there is limited research to investigate the efficacy of psychological interventions in patients with vitiligo although some authors provide insights into the interest possibility of cognitive behavior and other psychological therapies in limiting disease progression (Papadopoulos et al., 1999).

A few vitiligo-specific QoL instruments have been recently developed (Gupta et al., 2014; Lilly et al., 2013; Senol et al., 2013), but these are not completely satisfactory scales because they do not address some aspects of the global burden of the disease that remain unexplored. Our VIPs questionnaire, when used in conjunction with vitiligo-specific QoL measures, has the advantage of covering all aspects of the burden of vitiligo in daily life. In addition, in a recent review (Ezzedine et al., 2015) and in the latest

Cochrane Skin Group review (Whitton et al., 2015), the need for a specific burden questionnaire and psychological interventions in vitiligo has been highlighted. The VIPs questionnaire may be a strategic tool for screening patients who might benefit from psychological intervention. Moreover, the VIPs questionnaire may also be an efficient method of assessing the efficacy of these interventions. Another striking characteristic of the VIPs questionnaire is its ability to weight the burden of vitiligo according to skin phototype. In that sense, the availability of a unique questionnaire with a common denominator of 19 questions and 10 additional items related to skin phototype will encourage the widespread distribution of the questionnaire. We therefore suggest the use of a single questionnaire whatever the phototype and leave it up to the physician to use the skin phototype for the interpretation of the scoring.

Given the increasing importance that regulatory authorities have placed on patient-reported outcomes (Committee for Medicinal Products for Human Use, 2005; FDA, 2009) and the fact that vitiligo is still considered as an orphan-drug disease, the VIPs questionnaire aligns with the patient-reported outcomes concept and provides supplementary information by taking into account the burden of vitiligo in adults in the broadest sense. It may also facilitate negotiations between patient groups and health authorities for the reimbursements of the cost of vitiligo treatments. Indeed it is evident that in the field of dermatology there is a pressing need for accurate tools to measure the burden of skin disease. The VIPs questionnaire is an easy to use tool for evaluating the vitiligo burden in adults and may also be useful in the evaluation of the individual burden of vitiligo before and after treatment.

Limitations associated with this study include that the current cross-sectional analysis is limited by the classification of vitiligo patients according to dermatologist-determined skin phototype into two categories, rather than by individual ethnicity. However, French health authorities do not allow ethnic background data to be recorded, thus limiting any possible correlation between the burden of vitiligo and ethnicity. Larger confirmatory studies using the VIPs questionnaire are warranted to further explore some of the other stages of Classical Test Theory, including confirmatory factorial analysis and/or rash analysis. In addition, these studies should ensure a larger population of individuals with skin phototypes IV–VI, thus unearthing the potential intragroup differences between individuals with these skin phototypes.

In conclusion, physicians should recognize the individual burden of patients with vitiligo because treating only according to disease severity may only be a partial acknowledgment of patients’ suffering. The VIPs questionnaire may increase awareness of the burden of vitiligo and therefore ensure that vitiligo is no longer a “drug-orphan” and underfunded disease.

METHODS

The VIPs questionnaire was developed using standardized QoL questionnaire development and validation methodology (Seidenberg et al., 1994). It consisted of three phases: conceptual, development, and validation. A multidisciplinary working group of experts was formed, including experts in questionnaire design and development

(public health physician and psychologists), experts in the management and care of patients with vitiligo (dermatologists), representatives of patients' association, and patient-reported outcomes experts.

Conceptual phase

The initial exploratory step involved the creation of a verbatim report based on qualitative face-to-face interviews between dermatologist, psychologist, and patients with vitiligo ($n = 25$). These patients were randomly selected from the list of adherents of the French support group, "Association Française du vitiligo." On the basis of this report, the working group created a list of items that were converted into questions. A semistructured questionnaire was designed, containing specific themes in a question-answer format, and "free speech" via open-ended questions. A first assessment, simplifying the questionnaire and avoiding repetition, was conducted. This questionnaire was then distributed to patients recruited from the vitiligo clinic of the Department of Dermatology of Saint-André Hospital and patients belonging to the patient support group "Association Française du Vitiligo," between 1 February 2013 and 15 May 2013. All patients attending the clinic for the first time who were given a confirmed diagnosis of vitiligo were asked to participate in the study, and the questionnaire was delivered once they had given their oral consent. Patients were examined by a senior dermatologist. Eligible patients were diagnosed with vitiligo of variable severity and were aged more than 18 years; their mother tongue was French, so were, therefore, able to read and understand the questionnaire in French.

Development phase

During the initial development phase, the working group made a textual analysis of the preliminary questionnaire: the wording of possible questions/answers was reviewed to group similar items, remove indiscriminate questions (where greater than 90% of participants, regardless of gender or age, responded similarly), and limit redundancy. The choice of questions in the pilot questionnaire was based on content and pertinence. The VIPs was produced in a question/answer format. Responses were also determined by consensus among the experts, using a 6-point Likert scale: "never" (rated 0), "rarely" (1), "sometimes" (2), "often" (3), "very often" (4), "constantly" (5). Another response "Not applicable" was included to limit missing data and was rated 0. To avoid any confusion with QoL impairment related to other symptoms of comorbidities, each question included the word "vitiligo."

An exploratory factor analysis was then performed to highlight the underlying constructs and to determine the domain of each item. To assess whether the hypothetical constructs pertaining to burden were interrelated, an orthogonal (varimax) rotation was performed. Items were considered for deletion if they loaded on two or more factors or did not load on any factors. The questionnaire was then distributed to patients recruited in the vitiligo clinic of the University Dermatology Department of Bordeaux, following the same eligibility criteria as for the preliminary questionnaire.

To examine the unidimensionality of the VIPs, a higher order factor confirmatory analysis was conducted on the VIP-FS and VIP-DS subscale scores (PROC CALIS, SAS 9.4). Model fit was assessed by multiple criteria: comparative fit index and non-normed fit index for overall fit. The criteria for good model fit were defined as comparative fit index greater than 0.90, and non-normed fit index greater than 0.90 (Bentler, 1980).

Dimension scores were calculated by summing up individual item scores and are reported as a score out of 100. A global score, the sum of all individual item scores reported as a score out of 100,

was expressed in percentage. A higher VIPs score reflects a higher vitiligo burden.

Validation phase

All patients were asked to provide demographic and clinical information (skin phototype, area of involvement, body surface area affected) that were collected by the physician. In addition, all patients were asked to complete four validated self-administered questionnaires: the Daily Life Quality Index questionnaire, the SF12 questionnaire, the Prévention Cardio-Vasculaire en Médecine du TRAVail (PCV Metra) questionnaire, Rosenberg's Self-Esteem Scale.

The SF12,²⁹ the short version of the SF-36, is a generic instrument used to measure population health. A physical composite score and a mental composite score can be calculated based on 12 questions. There is no global SF12 score. The Daily Life Quality Index is a health-related QoL scale specific for dermatological disorders scored in percentages (0–100%) (Lewis and Finlay, 2004). Self-perceived stress was evaluated with the PCV Metra, a self-administered stress questionnaire quoted 0–27 (the higher the score, the higher the stress) (Consoli et al., 1997; Misery et al., 2008). The six-item Body Image States Scale was used to provide a measure of individuals' evaluative and/or affective body image states (Cash et al., 2002).

Psychometric analysis—validation

Psychometric properties were evaluated by assessing the internal consistency, the concurrent validity, and the discriminant validity of VIPs.

For internal consistency reliability, the homogeneity of items in each domain was evaluated using Cronbach's α coefficient. This coefficient including 0–1 corresponds to a degree of homogeneity. A coefficient greater than 0.7 generally indicates good internal reliability (Cronbach and Warrington, 1951).

Concurrent validity was determined by calculating the Spearman coefficient (r) and Bland and Altman plots between VIPs-FS/VIPs-DS and the four other distributed questionnaires. Discriminant (known-group) validity was analyzed according to age, gender, and vitiligo severity and location, using the Wilcoxon and Mann-Whitney test (as parameters were not distributed normally).

Data were analyzed using SAS software version 9.4 (SAS Institute, Cary, NC) for Windows. A significance level of 0.05 was fixed for all tests.

Test-retest analysis

To assess reproducibility, a test-retest analysis was conducted. Participants were retested after at least 2 weeks to allow for daily variations.

Translation, cross-cultural adaptation, and debriefing cognitive

Although the original VIPs questionnaire was developed in French, the following methodology (based on the Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes Measures 21) was applied to generate versions in other languages, and to account for cross-cultural validation. For each language, it was necessary to conduct linguistic and cross-cultural validation following a rigorous process. This process aims to refine the translation, taking into account the nuances of the original version. Several changes can be implemented throughout the validation process, without modifying the content. The aim is to allow an improvement on the first idiomatic rendering. In addition, the scales can be changed afterward based on cognitive debriefing, to be consistent with the wording of the same question in the other available languages.

Ethical considerations

This study was approved by the local ethics committee of the University Hospital of Bordeaux and by the CNIL (Commission Nationale Informatique et Libertés), a French national authority that allows the development of databases.

CONFLICT OF INTEREST

The authors state no conflict of interest.

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