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Validation of the burns itch questionnaire

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ABSTRACT

Itch (pruritus) is a common multidimensional complaint after burn that can persist for months to years. A questionnaire able to investigate itch and its consequences is imperative for clinical and research purposes. The current study investigated the factor structure, internal consistency and construct validity of the Burns Itch Questionnaire (BIQ), a questionnaire particularly focusing on itch in the burns population. The BIQ was completed by 195 respondents at 3 months after burn. An exploratory factor analysis (EFA) was performed to investigate the factor structure. EFA showed the BIQ comprised three latent factors: itch severity, sleep interference and daily life interference. This was re-evaluated in a confirmatory factor analysis that yielded good fit indices after removing two items. The three subscales showed to have high internal consistency (.89) and were able to distinguish between patients with severe and less severe complaints. In conclusion, the BIQ showed to be useful in persons suffering from itch following burns.

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1. Introduction

Itch (pruritus) is a common complaint after burn wounds have healed. Prevalence rates are high, ranging between 93% at discharge and 67–73% 24 months after the burn event [1–4]. For some time, there were no burn specific itch scales available. In the first studies on burn itch the only aspect measured was itch intensity using a visual analogue scale, or a 7-point scale [2,5]. To capture the multidimensionality of itch, scales were developed in various patient populations [6,7], some of which were also validated for patients with burns [8–10]. A broader range of itch-related aspects such as duration of itch, sensations, consequences and effects were incorporated in these questionnaire, contributing to a broader picture of itch complaints in the aftermath of a burn.

The adoption of an itch questionnaire designed to measure itch complaints in other patient groups has the advantage that burn-related itch can be compared to itch in other patients groups. This may yield insight in underlying mechanisms that may be similar or different from other diseases. A disadvantage may be that irrelevant questions have to be filled in by the respondent, needlessly lengthening the scale. Moreover, specific burn-related aspects may not be comprised in the questionnaire. For example, burn severity or depth of the wound has consistently shown to be associated with itch

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severity [2–4], although it should be noted itch can also appear in smaller and superficial burns [11]. Therefore, a new scale was developed that incorporated this aspect to enable this distinction.

The aim of this paper is to present some psychometric properties of the Burns itch questionnaire (BIQ), i.e., internal consistency and construct validity, including structural validity [12]. Concerning the structural validity of the BIQ it was hypothesized that the scale would comprise two or three factors, including itch severity (e.g., intensity and occurrence during different parts of the day) and impact on other activities, either combining or dividing sleep and daily activities interference. Concerning construct validity we hypothesized that respondents qualifying their itch as more severe ranging from annoying to worrisome, score higher on the scale factors and we hypothesized that respondents with more severe burns score higher on the scale factors.

2. Methods

2.1. Participants

Participants were patients admitted to one of the regional burn centres in the Netherlands (Rotterdam, Beverwijk, Groningen) or in Belgium (Antwerpen, Gent, Brussels). Data were collected in two waves: January 2005 – January 2009 and April 2010 – October 2012. Inclusion criteria were 18 years or older, sufficient Dutch proficiency, hospitalized for 48 h or longer. Persons suffering from cognitive disorders were excluded.

2.2. Procedure

As part of two larger prospective studies on psychological problems and pain following burns respectively, respondents received questionnaires in-hospital and follow-ups by mail at several occasions. The 3-month measurement was chosen to examine the structure of the questionnaire presented in this paper. Both studies were approved by ethical boards in the Netherlands and Belgium. Participants were invited to participate during their stay in hospital by a local researcher of the burn centre. Oral and written information was provided and the participant gave written informed consent. Once participants left the burn centre, the local researcher continued the follow-up by regular mail. A prepaid envelop was included.

2.3. Measure

The Burns Itch Questionnaire (BIQ) was designed starting 2005 to measure itch complaints following burns. After reviewing the literature on itch, itch in patients with burns and then existing itch rating scales for other patient populations [6,7], and different aspects of itch assumed to be important for the patient with burns were identified and included in the scale. In the BIQ overall itch intensity during the last seven days was assessed using a 10-point scale ranging from 0 (labelled 'no itch') to 9 (labelled 'most itch you can think of). Four questions inquiring about when the itch occurs and ten statements about the temporal patterns/duration of itch, impact on sleep and daily activities were included.

Additionally, an item was added referring to four qualifications that best describe the itch they experience can be ticked: '*annoying*', '*irritating*', '*unbearable*' or '*worrisome*'. Furthermore, respondents can report itch intensity at the various affected locations allowing the investigation of itch related to burn depth and body location. A personalized picture can be derived when the affected body locations including depth of the burn are marked on the picture. The respondent can report the itch intensity in the marked areas, allowing the follow-up of all body areas. An additional item inquires after itch in other areas than those affected with burns. Finally, three qualitative questions were added to inquire about situations that induce or increase itch complaints, medication use and alternative methods applied to alleviate itch complaints. Results from the qualitative part of the questionnaire and itch across different body locations were earlier published [13]. The translation of the Dutch BIQ was performed by two bilingual (English–Dutch), native English speakers. A consensus version was composed and back-translated to Dutch. The English version of the BIQ is included in Appendix 1. The instrument is available free of charge for clinical and research use.

2.4. Demographic and injury characteristics

Demographic and medical data such as age, gender, length of hospital stay were recorded from the medical file. Injury characteristics were specified by percentage total body surface area burned (TBSA) which is the sum of the estimated percentage of partial and full thickness burns, and the number of surgical procedures during the (sub) acute hospitalization which is considered an indicator of extensive and deep dermal injury.

2.5. Statistical analyses

Means, median, standard deviation, percentage endorsement (% endorsement is the percentage of item response greater than zero) and number of missing values for all items were presented. To study the structural validity of the BIQ, an exploratory factor analysis was performed in SPSS 21 [14] and re-evaluated by performing a confirmatory factor analysis in Mplus 6.1 [15].

First, Bartlett's test of sphericity was carried out to test the null hypothesis that the correlation matrix is an identity matrix. The test should be significant to conclude there are relevant inter-correlations that may be manifestations of underlying latent factors, i.e., clusters of variables that measure the same underlying construct [16]. The number of factors to be retained was based on the Guttman-Kaiser rule that proposes that only eigenvalues larger than 1 should be retained. Factor rotation was applied to improve the interpretation of the factors. Because it was theorized that the factors would be related (a higher score on itch severity is assumed to have a higher impact on daily life), oblique rotation (i.e., promax was used in this study) has to be preferred. Oblique rotation allows inter-correlation between the factors whereas orthogonal rotation does not.

Second, an exploratory factor analysis (EFA) was performed. EFA is a statistical method used to uncover underlying relationships of items included in the questionnaire. It is used

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