Journal of Cosmetic Dermatology, **14**, 260–265

Quality of life assessment in cosmetics: specificity and interest of the international *BeautyQol* instrument

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Summary

The wide use of cosmetics and their perceived benefits upon well-being imply objective descriptions of their effects upon the different dimensions contributing to the quality of life (QoL). Such a goal pleas for using relevant and validated scientific instruments with robust measurement methods. This paper discusses the interest of the new validated questionnaire *BeautyQoL* specifically designed to assess the effect of cosmetic products on physical appearance and QoL. After conducting a review of skin appearance and QoL, three phases of the international codevelopment have been carried out in the following sequence: semi-directed interviews (Phase 1), acceptability study (Phase 2), and validation study (Phase 3). Data collection and validation process have been carried out in 16 languages. This review confirms that QoL instruments developed in dermatology are not suitable to assess cosmetic products, mainly because of their lack of sensitivity. General acceptability of *BeautyQol* was very good. Forty-two questions have been structured in five dimensions that explained 76.7% of the total variance: Social Life, Self-confidence, Mood, Vitality, and Attractiveness. Cronbach's alpha coefficients are between 0.932 and 0.978, confirming the good internal consistency of the results. The *BeautyQol* questionnaire is the first international instrument specific to cosmetic products and physical appearance that has been validated in 16 languages and could be used in a number of clinical trials and descriptive studies to demonstrate the added value of these products on the QoL.

Keywords: quality of life, cosmetic outcome, cosmetic efficacy

Background

Various studies have been published assessing the impact of cosmetic procedures on QoL. As cosmetic products help enhance our appearance, they thus improve our self-perception, the way we relate to

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Accepted for publication April 9, 2015

others, and as such, our quality of life (QoL). Either under normal physiological conditions or in pathological settings, cosmetic care can improve well-being, self-esteem, and social relations.[1] The definition of health proposed by the World Health Organization[2] "*Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*" confirms that social well-being is a key element of health, and thus, cosmetic products contribute to general health. However, data on the effects of nonsurgical cosmetic interventions on well-being are rather scarce.[3] The development of robust QoL assessment methods and validated instruments helps to evidence the health benefits and value of cosmetic care used in nonmedical or medical applications.[1,4]

Quality of life is a broad multidimensional concept comprising healthcare, social, and political aspects as it is affecting the overall well-being of individuals.[5–7] Since 1980, the concept of health-related quality of life (HRQoL) and its determinants has evolved to include several new aspects of health, such as emotional, social, and physical dimensions.[8,9] In medicine, HRQoL measures thus integrate the impact of health status upon the physical, psychological, and social health domains.[6,10] Seeing improvement in QoL is recognized as an increasingly important healthcare topic because of the complex relationship between social cost and individual value. Hence, the emerging and growing field of developing, evaluating, and applying QoL measures within health outcome research becomes paramount. Results of HRQoL studies frequently contribute to inform the decision-making process of regulatory agencies such as the Food and Drug Administration and the European Medicines Agency. Nowadays, QoL has become a significant criterion increasingly included in clinical trials.[4]

To address this growing demand, researchers have developed useful techniques that have helped to conceptualize and measure these multiple domains and the way in which they relate to each other.[7] As a result, HRQoL is now considered a valid indicator for assessing individualized service needs, evaluating health-related interventions and their impact upon QoL, and, possibly, for justifying resource allocations. The skin condition has a major impact upon every person in terms of psychological well-being, social functioning, and everyday activities. For some individuals with altered skin condition, simple aspects of daily living may become more difficult. Social activities (e.g., going out with friends, practicing sports) may become challenging with regard to others' judgment on one's appearance. Pain and itchiness may disturb sleep and reduce concentration. The sexual lives of patients may also be impacted by their skin condition.[11] Studies have shown that patients with skin diseases (acne, atopic dermatitis, vitiligo, psoriasis, etc.) experience financial, psychological, social, and QoL burden much deeper than the general population.[12,13] The effect of these lesions is mediated in part by psychological characteristics related to self-perception and self-presentation.[14] They are prone to inducing serious psychological alterations such as depression, loss of self-esteem, deterioration of QoL, and emotional distress.[15] Other studies observed that elderly persons who preserve a youthful appearance are likely to be more optimistic, more outgoing, and more social. They also tend to give themselves higher scores on psychological dimensions.[3,4,16] The main issue would remain the selection of the most appropriate QoL instrument, sensitive enough to capture potential differences in these dimensions. Most authors use instruments specific in dermatology to assess the impact of skin conditions and physical appearances on QoL. Validated dermatology-specific instruments include the Dermatology Life Quality Index (DLQI), Dermatology Quality of Life Scales (DQOLS), Dermatology-Specific Quality of Life (DSQL), and Skindex (Skindex-29, Skindex-16, Skindex-17). In particular, the DLQI is a widely used dermatology-specific QoL instrument in descriptive/epidemiological studies and clinical trials.[10,11,17] A literature review (1997–2004) shows that the DLQI has been extensively used to assess the impact of 33 different skin conditions in 32 countries.[17] The brevity and simplicity of the use of the DLQI explain its popularity. In 2007, Both *et al.*[6] published a critical review of generic or specific HRQoL instruments commonly used in dermatology. This review highlights the many and complex methodological aspects and the robust scientific conceptual approach that must be deployed when developing new robust HRQoL instruments. Unfortunately, dermatologic QoL instruments are either generic or disease specific and thus not suitable to assess the use cosmetic products or the physical appearance in healthy subjects and their impact on QoL. Some instruments have been proposed in cosmetology but use a limited pool of subjects and a limited validation process in one specific culture,[18] which leads to nonvalidated findings.

Given that preferences toward physical appearance vary across cultures, developing a new QoL measuring instrument would present a special challenge but a significant improvement in cosmetic sciences. The objective was to develop a new internationally validated QoL instrument that specifically assesses cosmetic prod-

ucts using the multistep approach: (1) item generation from the user perspective, (2) acceptability study, and (3) international validation properties study.

Method

After conducting a systematic literature review, the development of the questionnaire followed a classic 3-phase validation process using a codevelopment approach by which surveys were conducted in parallel in all participating countries, leading to an extensive documentation of many parameters including psychometric properties, construct validity, reproducibility, and internal and external consistency. Thirteen target countries have been selected (Brazil, China, France, Germany, India, Italy, Japan, Russia, South Africa, Spain, Sweden, the UK, and the United States), representing 16 languages[4] comprising populations of both genders, aged 18–78 years.

The first validation phase that focused on item generation was derived from face-to-face, semi-structured interviews conducted on 309 subjects simultaneously in 10 countries: France (32), UK (18), Germany (46), Spain (27), Sweden (19), Russia (16), USA (53), Brazil (32), Japan (48), and China (18). Trained clinical psychologists conducted the interviews to assess the effect of cosmetic products or physical appearance on the individuals' QoL. These interviews aimed at identifying recurrent themes and generating individual questions for the purpose of determining the wording and the types and ranges of possible answers. A final semantic content analysis was performed and complemented by a computerized text-mining analysis. The second validation phase consisted of an acceptability study conducted with 874 subjects from participating countries. Subjects were asked to comment on all aspects of the questionnaire (i.e., content, wording, and response choices) that they felt irrelevant or needing improvement. The items that were ambiguous, misunderstood, or rarely answered were excluded or reworded. This acceptability study has ensured content validity and has guaranteed that the questionnaire was a true reflection of the subjects' perspective in the 16 languages represented. An item reduction was performed, using multidimensional analyses to identify and follow potential statistical links between the different questions. The third validation phase consisted of a validation study carried out on 3231 subjects from all participating countries who filled out four self-administered questionnaires: the *BeautyQoL* questionnaire, a clinical checklist for the skin (face and body skin characteristics, e.g., type, tone, elasticity, and wrinkles; and potential minor problems, e.g., spots, scars, broken veins, and being subject to sun reactions or allergies), the generic SF-36 questionnaire, and a socio-demographic questionnaire. Reproducibility was analyzed through test–retest reliability using specific techniques. A retest was performed 8 days later on a subgroup of 652 subjects (about 40 subjects per target language).

Results

From the item generation phase, 61 items were selected leading to 61 questions in the first prototype questionnaire describing major QoL domains, such as well-being, self-esteem, social life, love life, professional life and sexual life.

Results from the second phase confirm that general acceptability was very high due to the very low proportion of missing data (<1%).

The database of the third phase was composed of 1622 men and 1609 women and split randomly into two subsamples. For one subsample, the multidimensional structure of the questionnaire was identified studying interitem, item-dimension, and interdimension correlations (Pearson's correlation tests) and principal component analyses.[19] For each potential dimension scale, internal consistency reliability was assessed by Cronbach's alpha coefficient.[20] Within each dimension, the items whose deletion would lead to an increase in alpha of at least 0.02 were candidates for deletion. The unidimensionality of each dimension was assessed using Rasch analyses. For the second subsample, confirmatory factor analysis[21] was used to assess selection by testing the various candidate scale structures according to different potential item selection patterns. The more meaningful and psychometrically sound construct was kept to produce the final version of the *BeautyQol* questionnaire. Five dimensions explaining 76.7% of the total variance were suggested by the multidimensional analyses: Social Life, Self-confidence, Mood, Vitality, and Attractiveness.[4] Figure 1 presents the values of the five dimensions and global index according to the gender. Internal consistency was high (Cronbach's alpha coefficients between 0.932 and 0.978). Reproducibility at 8 days was satisfactory in all dimensions.

External validity testing revealed that *BeautyQol* scores correlated significantly with all SF-36 dimensions except for the dimension "Role-Physical Problems," which was expected because of the poor link between physical function and appearance. The second item reduction analysis led to the final version of the *BeautyQol* questionnaire composed of 42 questions (Table 1).[4]

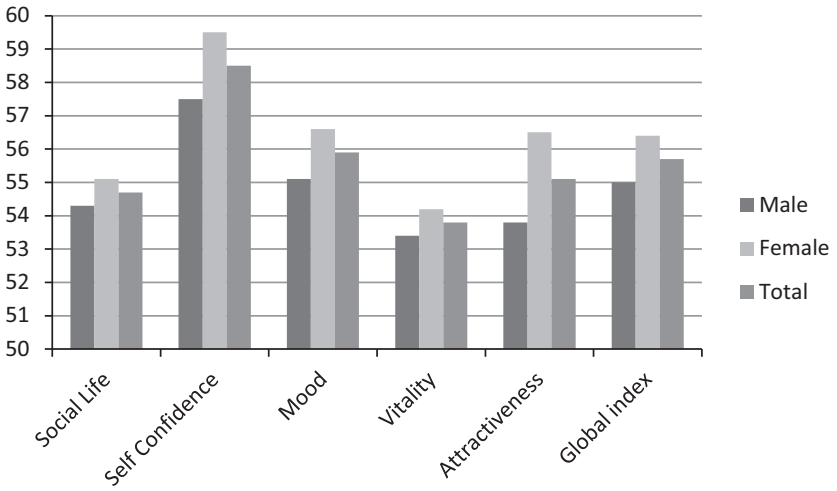

Figure 1 *BeautyQol* five dimensions and global index values according to gender.

Discussion

While a number of specific QoL instruments are available in dermatology, no internationally validated tools have been specifically developed in cosmetology. The *CosmeceutiQoL* instrument has been developed to assess the impact of dermo-cosmetic products on women QoL in France, but has not been fully validated and its cross-cultural validations have not been carried out in other countries.[18] This emphasizes the interest to construct a fully validated instrument that captures the rather high cultural variability among countries and the cultural differences in attitudes within one single country with different nationalities/populations. The multiphase process deployed to generate the responses and to test their validity has contributed to the robustness of the *BeautyQoL* questionnaire. The initial semi-directed interviews helped establishing potentially relevant categories from the subjects' point of view. The acceptability study also guided the development of the categories for a full-scale assessment. Once all the participants (more than 3200 men and women) completed the full-scale validation assessment, the responses were analyzed to capture most of the variability in subjects' *BeautyQoL* attitudes. Another important strong point of the *BeautyQoL* instrument comes from the simultaneous codevelopment in 16 languages. This approach enabled the developers of *BeautyQoL* to create a standard and robust assessment tool much faster and more efficiently than if it was carried out in a sequential approach. When an instrument is developed in one country and later adapted to another using a sequential cross-cultural validation approach, the process becomes extremely time-consuming. A sequential approach may also lead to structural equivalence problems and to reliability issues, which may weaken the validity when performing multiple cross-cultural studies. The simultaneous approach used for the international construction and validation of the *BeautyQoL* questionnaire has avoided such structural problems and has enabled reliable international studies across different cultures. The codevelopment approach does however have some limitations. The international standardization excludes some important aspects of physical appearance specific to some cultures. The 8-day interval for testing and retesting could be considered too short for observing final changes in physical appearance from cosmetic interventions or products used over long-term periods. Sensitivity to change could also vary between cultures.

Nonetheless, the *BeautyQoL* questionnaire includes the most relevant and cross-culturally valid categories regarding QoL attitudes, relevant to cosmetics and physical appearance, thus providing a robust tool for scientific and market research applications in cosmetology.

Many studies addressing QoL improvement measures with cosmetics have often been limited by the poor sensitivity of nonspecific instruments, suggesting that the use of specific instruments would improve the chance to discriminate potential differences. However, a clear distinction should be made between instruments derived from existing questionnaires or expert opinions such as the *CosmeceutiQoL* questionnaire[18] and instruments fully derived from subjects' point of view such as the *BeautyQol* questionnaire.[4]

The *BeautyQoL* questionnaire is presently the only international existing tool that enables conducting any studies for assessing the impact of cosmetic products

Table 1 *BeautyQol* questionnaire (international English version 3.0) with items correlated with the 5 dimensions presented with Cronbach's alpha coefficients.[4] Specific versions have been developed in the 16 following languages *(UK English, Swedish, Japanese, Italian, Portuguese, Chinese Mandarin, US English, French, German, Indian English, Indian Hindi, Russian, South African English, South African Sotho, South African Zulu,* and *Spanish*)

Dimensions	Cronbach's alpha coefficients	Questions
Social Life	0.978	Have you felt an improvement in your social life? Have you felt less sad? Have you felt an improvement in your family life? Have you felt an improvement of your credibility? Have you felt more secure? Have you felt an improvement in how people respect you? Have you felt an improvement of your social status? Have you felt an improvement of your mood? Have you felt that people are more willing to trust you? Have you felt transformed? Have you felt more fun to be with? Have you felt an improvement in how you express yourself? Have you felt an improvement of your emotional sensitivity? Have you felt an improvement of your ability to stay awake? Have you felt an improvement of your daily quality of life? Have you felt more successful?
Self-confidence	0.966	Have you felt good? Have you felt an improvement in your psychological life? Have you felt an improvement of your self-esteem? Have you felt an improvement in your physical appearance? Have you felt more confident? Have you felt more pleasure? Have you felt more overall satisfaction? Have you felt an improvement of your happiness? Have you felt an improvement of your sensuality?
Mood	0.955	Have you felt more relaxed? Have you felt less stressed? Have you felt more your joy? Have you felt more motivated? Have you felt more calm? Have you felt less depressed? Have you been satisfied with your actions? Have you felt more mobile?
Energy	0.932	Have you felt more healthy? Have you felt more energetic? Have you felt less tired? Have you felt an improvement in your physical activity?
Attractiveness	0.932	Have you felt more seductive? Have you felt invigorated? Have you felt that people pay more attention to you? Have you felt an improvement in your vitality? Have you felt that you look younger?

Answer modalities: "Completely," "A great deal," "Somewhat," "Not much," "Not at all," and "It is worse".

on QoL, used both in nonmedical and medical conditions.

Conclusions

In a society valuing youth, health, aesthetics, and well-being, cosmetic skin or hair care products have gained huge popularity. Recent research confirms that consumers from all countries and cultures also have strong attitudes toward physical appearance and QoL. Considering an extremely competitive and ever-changing cosmetics market environment, establishing the value of innovative cosmetic care products, including their benefits on well-being, has become increasingly relevant. The use of scientifically valid assessment instruments, such as the *BeautyQol* questionnaire, will provide clear advantages for generating robust results, and for differentiating one product over another, or one physical appearance status over another. The development of more specific and validated instruments to assess the effect of cosmetic products and physical appearance on QoL provides the cosmetic industry with a unique opportunity and robust tools to conduct advanced research in this field. Considering that *BeautyQol* is specific to cosmetic products but is much more sensitive compared to other existing instruments, an important recommendation could be made to include one specific instrument and one generic instrument in one study in order to leverage the key features of both instruments (i.e., *BeautyQol* + SF36, or DLQI + *BeautyQol*).

Such research not only establishes the benefits of cosmetic interventions on QoL, but also appears pivotal in the development of future innovations in the field for the benefit of consumers and society.

Funding

The *BeautyQol* international project has been funded by an unrestrictive grant from L'Oréal Research Innovation.

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