Development of a General Health Tracking Instrument for the Brazilian Population

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Abstract

The already ample employment of online tools and apps for initiatives aiming at health assessment and health-associated interventions has boosted in the recent past, owing to the COVI-19 pandemic. Most of these tools lack, however, scientific background and validation. We present a novel instrument for general health assessment conceived as a combination of 5 clusters (general health, nutrition adequacy, emotional balance, physical activity and sleep quality) to screen general health and lifestyle habits. The questions (maximum of 5 per cluster) have been obtained from validated, published studies retrieved from indexed publications. As the instrument dedicated to the Brazilian population, with its particularities (mixed ethnicity, etc) the chosen tools were those with previous endorsement of Brazilian culture and language. The scoring will obey that described in each of the already validated and published instruments, and will provide information to the user about which clusters deserve more attention in the road for improved health and wellbeing.

Key words: Global health assessment, questionnaires, survey methods, mobile health

1. Introduction

In the last years a considerable number of apps and online tools has been developed and applied to different populational clusters as to 1) retrieve, identify and assess communities health-related and quality of life aspects; 2) retrieve individual records and information aiming at: chronic disease control; physical activity level assessment, nutritional status assessment; 3) providing feedback to users about adequacy of habits (activity, nutrition, tabagism, alcohol consumption); 4) providing means to assess progress of health and wellbeing targeting strategies; and many other objectives. The COVID-19 pandemic induced a further boost in the number of health-related apps and online tools, given the consequent limitations of in-person assessment. Thus, an entire revolution in the relationship between healthcare professionals and the public emerged, bringing forth options for remote health assessment and disease treatment.The magnitude of this phenomenon can be exemplified by the reported usage by 21% of the United States population of smart watches and fitness trackers (Vogels 2020).

Apps which can assess general health and wellbeing, as to track potential health risks and inadequate lifestyle choices, may assist health professionals in (at individual and population levels) guiding, correcting and directing towards improved health and improved quality of life. Lifestyle may be a fundamental determinant of overall health and wellness (Tafforeau et al., 2015) and one such aspect is considered in several tools. Nevertheless, regardless of aim and design, few instruments employed in the available apps have been the focus of actual proper scientific evaluation of validity, either when intending assessment of physical fitness (Muntaner-Mas et al., 2019), or contemplating medical and other health-oriented purposes (Grundy, 2022), including those focusing on the control of body composition and obesity (Sobti et al., 2021). Regarding the latter, a review (Patel et al., 2021) points to the success of individual weight control, when adherence (daily self monitoring) to the tool is higher than 75%. A study including 26 systematic reviews, covering a total of 338 original studies (published between 2018 and 2023) suggests that eHealth interventions can be of value in delivering care to obese patients, reaching a broader population, within a cost-effective perspective.

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A recent review reports eHealth interventions to be more effective than control interventions or absence of intervention, and to provide results that are comparable to face-to-face intervention (Kupila et al., 2023).

A main field of application of virtual tools is the monitoring of mental health and psychological wellbeing. By evaluating user reports of tools aimed at such ends, Polhemus et al. (2023) communicated the success of those instruments that take in consideration the specific needs and goals of users. Yet, available tools very often lack clear information on limitations and purpose. While making the purpose and limitations of the tool clear for all users should be mandatory, many of the available options do not present any reliable scientific background allowing precise communication of these aspects.

Another major challenge when addressing global health assessment and tracking is the designing of instruments which combine the major components contributing to the end result, e.g. health and wellbeing. One such tool should comprise elements as different as lifestyle and habits (addiction, sedentarism, nutrition, etc) and presence of actual disease or alert symptoms. Not many questionnaires meeting the requirement of scientific validation and applicability to the general public can be retrieved from the literature. Indeed, a PubMed search targeting global health assessment instruments show the results to be highly variable. By using the terms (global health assessment, global heath tool, global health app, global health questionnaire, global health instrument) it is possible to retrieve a few reliable apps and online tools designed and validated within sound scientific standards. Nevertheless, more than 350 thousand health-related apps were available in 2022 (Marvel et al., 2022). This poses a major risk for the population, as the vast majority of the tools have not been designed and/or tested according to scientific methods. Considering all the aspects mentioned above, we herein propose a general health assessing tool (with online use suitability), aimed at providing a means for individuals to assess the quality of their health, and the adequacy of lifestyle choices, entirely based on scientifically validated questionnaires, and directed towards the Brazilian population. This last aspect is of note, since most popular apps widely used by Brazilians were conceived for the North American or European publics. To that purpose, the tool employs validated question clusters in Portuguese.

2. Materials and Methods

The strategy aimed to address 5 different clusters, which together are informative of relevant aspects of general health and lifestyle choices (Figure 1).
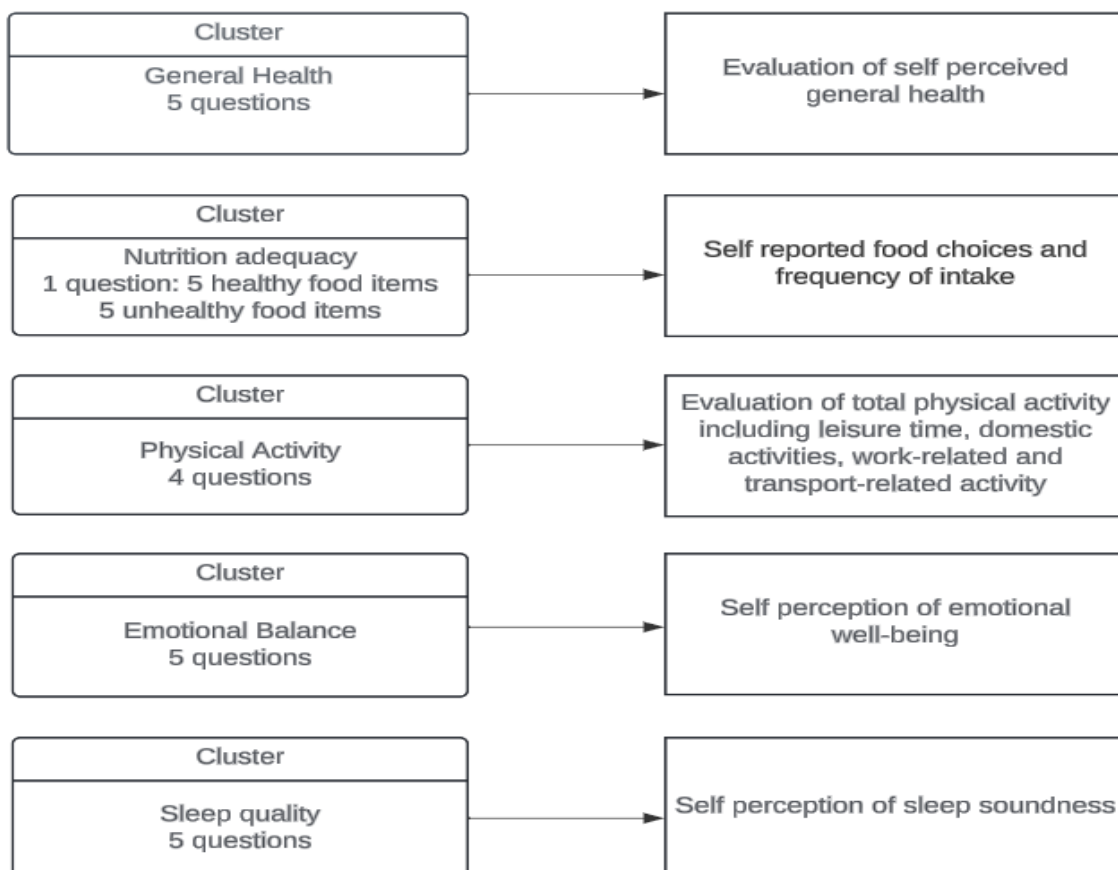

Fig. 1. Clusters of the instrument and objectives

Strategy: search for questionnaires and instruments that would comply with the following criteria:
1) assessing main parameters impacting general health and wellbeing;
 2) presenting clear, non double-labelling questions;
3) providing non-repetitive, redundant content;
4) design and validation in publications available on PuBMed and Google Scholar;
5) adoption of Portuguese in the validated form;
5) number of questions compatible with means (app usage, self-reporting);
6) requiring fewer than 15 to 20 minutes for answering;
7) allowing easy and direct scoring of responses;
4) allowing self perception of health, employing validated questions;
5) allowing comparison of results along time and adoption of lifestyle correction

The following validated instruments were included:
1- General Health- Self-rated Health: 5 questions assessing self perception of health, current chronic disease status, previous 24month health professional requirement, smoking and drinking status; The questions were extracted from a total of 6 questions of the original instrument, aimed at a specific working population in Brazil. The questions pertaining only to the specificity of work conditions characteristic to this population were omitted, as the aim is to address the general Brazilian population (Höfelmann et al., 2006);

2-Nutrition-Revised version of a dietary frequency questionnaire for Brazilian Population: 1 question on the consumption frequency of 10 different food categories, falling into "healthy" and "unhealthy" categories (Höfelmann et al., 2006);

3- Physical Activity- IPAQ (the International Physical Activity Questionnaire)-SHORT FORM: 4 questions assessing weekly vigorous and moderate physical activity, activity related with daily life and, daily sitting time (Craig et al., 2003);

4-Emotional balance- The PORTUGUESE VERSION OF THE PERSONAL HEALTH SCALE: 5 questions (extracted from a total of 10 questions of the original instrument) assessing fear, agitation and self-perception of uneasiness; difficulty in relating with family and friends and self-perception of diminished stamina and requirement for professional help (Zubaran et al., 2006);

5 Sleep- Brazilian Portuguese version of the Mini-Sleep Questionnaire: 5 questions (extracted from a total of 10 questions of the original instrument) assessing insomnia, unrestful sleep, requirement for sleeping aids, narcolepsy and daily perception of tiredness (Falavigna et al., 2011).

Scoring of all clusters will respect the validated instruments system and be provided independently to the user, as to facilitate understanding of aspects needing improvement in the direction of better health and wellbeing.

The scores will provide means for comparison between time-points. Continuous re-assessment of clusters and total scores will be possible, rendering the adoption of health-aimed strategies subject to constant evaluation of progress.

Non-individualized, pooled data will be retrieved, as to afford information about the specific health needs of the Brazilian population. This will, nevertheless, solely happen after validation of the tool, to be carried out in another step, after all the ethical requirements are met.

3. Discussion

The employment of apps and online tools for a plethora of aims is an international reality and an irreversible trend. Nevertheless, few of the available tools have been scientifically validated and provide reliable means for assessing and scoring parameters. Gordon (2020) reported that over 300 thousand health-associated tools already existed, almost 4 years ago. The author mentions the enormous variety of virtual tools, including nonregulated apps, a category in which many fitness trackers appear, and regulated instruments, which are the minority.

The US Food and Drug Administration (FDA) defines "Mobile Application," as "software applications that may run on a variety of mobile platforms or be web-based but optimised for mobile devices". (FDA, 2019). There is great effort aiming at app development, emphasising the need of developing apps and evidence-based resources deriving from the validation of the tools and, at setting criteria and evaluation policies (Van Velthoven, et al., 2018; Mathews, et al., 2019; Henson, et al., 2019). Gordon (2020) reiterates the importance of actual validation, and of providing evidence on the value of the apps, since some of the tools may be even considered harmful (Singh, et al., 2016; Food and Drug Administration, 2019).

We propose the development of a questionnaire to be employed by online tools/apps comprising five major clusters of health and wellbeing for the general population, and targeting the Brazilian public. Brazil has particular population profile in regard to ethnicity (Brazilian-ethnic-groups-racial-demographics-population.html), with a high proportion of mixed ethnicity (43%), and white, black, indigenous and Asian ancestries contributing with (48, 7.5, 0.5 and 1.1 per cent, respectively, IBGE, 2023). More recently (IBGE, 2023), the number of Pardo Brazilians (mixed ethnicity) has been described as predominant (45.3%). Therefore, tools aimed at specific northern Hemisphere populations (the most commonly available) may not be translatable or accurately capable of assessing/measuring health and lifestyle parameters of the Brazilian people. Hence, specific instruments applicable in apps,designed bearing in mind the particular aspects of Brazil must be conceived and validated.

Digital health, and "apps" in particular, hold tremendous potential for improving health outcomes. But while hundreds of thousands of apps have been developed, most of them to date are rarely used, not clinically validated, and have not been integrated into practice on a broad scale (Gordon, 2020).

By adopting pre-validated questionnaires (in Portuguese), published in indexed journals and aimed at each different domains of health and wellbeing, we have developed a prompt-use, easy to score tool, with scientific basis and immediate applicability in eHealth.

The first instrument (Höfelmann, et al2007) shows internal consistency, discriminant validity, criterion validity, concurrent validity, and test-retest reliability to evaluate quality of life in Brazil, according to Fleck et al. (2000), who also point out to the adequacy of the instrument in regard to self-reporting. Questions from the same questionnaire are employed for the assessment of nutrition suitableness, having also met validation for the Brazilian population. For the physical activity cluster, we adopted the short version of the IPAQ, tested in many countries, including Brazil and targeting leisure and daily activities (Craig et al., 2003). For emotional balance and sleep quality, the 2 instruments chosen (Zubaran et al., 2006 and Falavigna et al., 2011) were likewise validated in Brazil. The selected questions provide screening on how life quality and wellbeing are self- perceived. The user will thus be able to assess the specific clusters requiring improvement, and act, adopting strategies leading to gains in health and wellbeing.The tool, with easy self-reporting and scoring also entertains the possibility of reassessment, as to verify whether the adopted strategies resulted in benefits.

4. Conclusion

Given the widespread use of eHealth tools devoid of validation and scientific value/background, we herein propose an instrument with immediate applicability in virtual health and lifestyle choices self-assessment. By employing questionnaires already validated for the Brazilian population, with well described scoring systems, the designed instrument will potentially contribute to diminish the risk imposed by the widespread use of inaccurate and dubious tools.

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