One Operational Definition by Population: 
The Need for Local Evaluations of Frailty

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Abstract Frailty is a health problem that increases the probability of developing adverse health outcomes in the elderly. A frequently used way to operationalize frailty is the construction of a frailty index, which is built from the addition of several health deficits that describe biological aging. However, there is no consensus about the number of health deficits for building a frailty index and about which deficits must be chosen. This lack of a standardized frailty index is assumed to be an obstacle for the advancement of research on frailty. The focus of the present article is to propose a theoretically plausible alternative way of operationalizing frailty by means of frailty indexes composed of deficits selected at a local level. These deficits would therefore be different for each given population. This “anthropological approach” is on the opposite side from current trends in frailty research, which is characterized by the search for a standardized operational definition of frailty. The anthropological approach would generate more reliable data by taking into account the specificity of the population to be studied for selecting frailty deficits. In this approach, emotions, motives, and beliefs are as important to determine individuals’ health vulnerability as chronic diseases and physical function. Physiological anthropologists are well positioned to contribute to research on frailty by carrying out studies on the selection of the best deficits to operationalize frailty in different populations, with different socio-cultural determinants of health, and living in different environmental life spaces. J Physiol Anthropol 30(6): 259–262, 2011 http://www.jstage.jst.go.jp/browse/jpa2 [DOI: 10.2114/jpa2.30.259]

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Introduction

Research on frailty has grown exponentially in the last decade. Progress has been made in both theoretical and experimental aspects of frailty, such as its operational definition and the efficacy of therapeutic interventions (e.g., exercise) for reducing negative effects associated with frailty (e.g., risk of falls). Currently, experts seem to agree that frailty is characterized by physiological declines in several organic systems, which render individuals more vulnerable to stressors and reduce their ability to maintain or regain homeostasis after a destabilizing event (Walston et al., 2006). However, this conceptual definition can also be used for defining biological aging itself. Therefore, although the concept of frailty does not have any value added because frailty would be synonymous with biological aging, research on frailty has proven to be useful in predicting adverse health outcomes among adults of all ages, especially older adults (Rockwood et al., 2011).

An important contribution to studies in this research field is related to the operationalization of frailty. Operationalizing frailty opens up the possibility of promoting people’s health by preventing or delaying the progress of age-related physical and physiological declines, and by treating frailty at an early stage to prevent the development of health problems associated with this condition. The two most frequently used operational criteria of frailty are the phenotypical and the mathematical approaches. The former indicates that the concomitant presence of a few elements, which would represent core clinical presentations of frailty, would identify frailty. The most used phenotype of frailty is that developed by Fried et al. (2001), which operationalizes frailty using the following criteria: shrinking (unintentional weight loss in the last 12 months), weakness (grip strength), poor endurance and energy (self-reported exhaustion), slowness (gait speed), and low physical activity level (self-reported); individuals who meet ≥3 of these criteria are considered “frail,” those who meet 1 or 2 criteria are considered “pre-frail,” and persons who do not meet any of these five criteria are considered “robust.” The mathematical approach describes biological aging by building a frailty index through the addition of age-related deficits (Rockwood et al., 2002). This approach assumes that the more deficits people accumulate, the more likely they are to be frail. Studies comparing these two approaches have shown that the frailty index is a better approach for determining at-risk elderly populations than a frailty phenotype (Kulminski et al., 2008;
Rockwood et al., 2007). However, the deficits used to construct a frailty index largely varied among studies—from 30 (Hubbard et al., 2009) to 70 (Rockwood et al., 2007)—and no standardized index that would better operationalize frailty exists. Although Searle et al. (2008) indicate that an index composed of 30–40 deficits is “sufficiently accurate for predicting adverse outcomes,” no consensus exists about which deficits must be selected.

The lack of standards with respect to the operationalization of frailty is assumed to be an obstacle to this research field (Crews and Zavotka, 2006) because it renders it difficult to make comparisons among studies. Crews and Zavotka (2006) indicate that developing cross-culturally valid methods for assessing frailty is an important need for future research. But, is a consensus about the operational definition of frailty to be attained? Such a consensus would undoubtedly permit comparisons to be made among different populations, which would contribute to advancement of our understanding on frailty. However, would a standardized operational definition of frailty be exempt of error? Would the comparisons among different populations allowed by such a consensus really be reliable?

Local Evaluations for a Micro-analysis of Frailty: The Anthropological Approach Based on Frailty Indexes

If the operationalization of frailty reflects biological aging to a certain measure, it seems that the best approach for building an operational definition of frailty is to use deficits associated with aging for each given population. These deficits represent a quantification of individuals’ health vulnerability and can thus vary across populations. There will probably be no differences (or just minor differences) between two western countries, such as the United States and Canada, with respect to the deficits used to operationalize frailty; therefore, using the same operational definition of frailty will probably generate reliable data and permit comparisons to be made between these populations. However, when studying frailty in an African country, for example, where people build their lives based on different psychological, environmental, and socio-cultural influences, an operational definition built and used in a western population is probably not applicable, because it does not take into account the specificity of the country to be studied. As indicated by a panel of experts on frailty (Bergman et al., 2007), “varying susceptibility may result from genetic traits and behavioral, environmental, and social risk factors.” If experts on frailty agree that health vulnerability is variable, it is plausible to think that the operationalization of frailty will also vary across different populations. Following this logic, the search for a standardized worldwide operational definition of frailty is not just sterile, but will certainly lead to mistakes when comparing different populations.

If the ultimate objective for operationalizing frailty is to detect at-risk individuals and populations as early as possible, which would allow health practitioners to intervene in an efficacious way and promote individuals’ health, trying to obtain unique worldwide frailty operationalization is an error in both the research and clinical domains. Alternative to a standardized definition of frailty, local evaluations need to be built because they take into account populations’ variability regarding the determinants of aging. To construct local evaluations, an anthropological approach seems to be adequate.

In the anthropological approach, the first step for operationalizing frailty would be to find out variables affecting aging in a given population (not just use the deficits already used in previous studies). For selecting deficits, the standardized methods described by Searle et al. (2008) could be applied. As indicated by those authors, deficits must: (1) be associated with health status, (2) increase with age, (3) not saturate too early, and (4) cover a range of systems. It is plausible to think, for example, that accessibility to water—a variable that has never been used as a component of a frailty index—can constitute a frailty deficit for some populations. This variable was found to influence morbidity among pastoralists in the Tibetan plateau (Foggin et al., 2006). Accessibility to water can meet all the four criteria for a frailty deficit: the time it takes to obtain water is inversely associated with health (Foggin et al., 2006), it can increase with age due to age-related physical declines, not everybody has difficulty obtaining water (it is not saturated too early), and water scarcity can affect different systems in the organism (physical function, cognition). Socioeconomic (Woo et al., 2010) and demographic characteristics can also constitute important deficits associated with frailty. Woo et al. (2010) showed that socioeconomic status influenced self-rated physical health among older adults; thus, this variable could constitute a frailty deficit, especially in countries where no equitable health system exists. A low level of education can probably be a frailty deficit in highly educated populations, as suggested by some authors (Ravaglia et al., 2008).

Moreover, in the anthropological approach, emotions, motives, and beliefs—which are influenced by socio-cultural factors—are as important to determine individuals’ health vulnerability as chronic diseases and physical function (see Fillit and Butler (2009) for a discussion on psychological aspects of frailty). Some experts have already shown that psychological aspects predict the onset of frailty in the elderly (Ostir et al., 2004; Ostir et al. (2004) showed that a high positive affect reduced the risk of the onset of frailty in a 7-year prospective study. In the anthropological approach, fear of falling, for example, can also be a frailty deficit; this variable was already found to be a determinant of health vulnerability even after controlling for falls history and gait performance among older adults (Seematter-Bagnoud et al., 2010).

Local Interventions, Better Efficacy against Frailty

If local evaluations of frailty are privileged in the detriment of a universally standardized operational definition of frailty,
local interventions for delaying the onset of frailty and reducing its burden should also be stimulated. Even if some deficits that influence frailty and biological aging ask for interventions at a societal and global level (e.g., socioeconomic inequalities), other deficits could ask for individual interventions adapted to the local level. For example, exercise is considered an important intervention for reducing frailty (Barreto, 2010). If exercise is the intervention to be privileged to frail older adults living in a mountainous life space, for example, increasing trek activities or just physical activities in daily life (e.g., walking outdoors) according to individuals’ physical function seems to be a good approach; this is so even if experts indicate that frail elderly should engage in strength training to reduce the negative effects of biological aging, such as sarcopenia. For this population, trekking and increased daily activities will probably be a more reachable goal than strength training; moreover, the former activities will probably be easier to adhere to than the latter in a long-term perspective.

Contribution of Physiological Anthropology to Frailty

The anthropological approach takes into account different determinants of biological aging for operationalizing frailty in each given population. This comprehensive approach probably informs more precisely about individuals’ health vulnerability than any universally standardized operational definition of frailty. Therefore, physiological anthropologists are well positioned to carry out studies on the selection of the best deficits for operationalizing frailty in different populations. Studies developed to confirm the validity of those operational definitions of frailty (Rockwood, 2005) would also be necessary. Moreover, physiological anthropologists could conduct research to examine the effectiveness of comprehensive local interventions in different environmental life spaces.

Discussion and Conclusions

The anthropological approach based on local evaluations (selection of frailty deficits at a local level) is an alternative way to operationalize frailty. It would probably generate more reliable data regarding individuals’ health vulnerability, and then inform more precisely about local and therefore more feasible and efficacious interventions for preventing the development of negative health outcomes associated with frailty.

However, this approach has a possible practical disadvantage that should not be neglected: it certainly requires more time from health practitioners in daily practice. Owing to this limitation, a question arises: is this approach really feasible in health professionals’ daily practice? Although this question asks for further research to be answered, the anthropological approach seems to be feasible, at least in theory. This is because in the anthropological approach, although objective measures could be used as health deficits (e.g., low gait speed), the assessment of frailty would be based mainly on self-reported information. Self-reported variables give reliable information about individuals’ health status (Stam et al., 2010), and can be quickly collected by health professionals in their daily practice.

To contribute to the feasibility of this approach, physiological anthropologists should collaborate with other health professionals, especially physicians. This collective work would be useful to define the frailty deficits to be selected in a given population. Furthermore, a multidisciplinary work involving different health professionals would facilitate a successful translation of frailty operationalization from research to health practice.

The main objective for operationalizing frailty is to detect vulnerable individuals and populations as precisely as possible, which would allow the establishment of successful interventions for reducing the burden of frailty. Thus, arguments like the following are not acceptable: “It is certainly more helpful to many clinicians to identify frailty on the basis of physical rather than psychosocial factors as these are more tangible, more objectively confirmed and are more likely to be treatable by medical means” (Lally and Crome, 2007). Although this argument is based on a practical matter, assessing frailty exclusively on the basis of physical aspects is probably not comprehensive enough to detect at-risk individuals early; this limited approach can lead to a high number of “false negatives” for frailty in a population (persons who are wrongly classified as “low or no risk” for adverse health outcomes). A more comprehensive approach based on a local evaluation of frailty deficits and on a multidisciplinary work can contribute to a better operationalization of frailty; this, in turn, would help to build a form of healthcare delivery adapted to frail older adults by detecting feasible and efficacious therapeutic interventions. Therefore, the anthropological approach to frailty would ultimately have a positive impact on the health of frail older adults and their families, which could be translated into decreased use of healthcare resources, and then decreased costs.

References

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