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Fatigue and exertion fatigue

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8. Summary, general conclusion and discussion

Lucas J. Tiesinga

8.1 Introduction

In this chapter, a summary is presented and the main conclusions of this thesis, as they relate to the research questions, are reported and discussed. The contribution of this thesis to theory-related and practice-related issues is evaluated. Finally, methodological remarks are made and recommendations for further research are outlined.

This chapter refers back to the general introduction, in particular to the general research questions postulated by this thesis. Recapitulated from chapter one, the questions are shown in Figure 8.1.

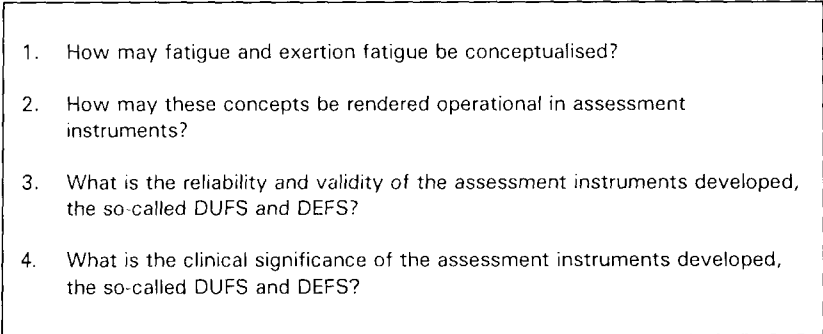
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1. How may fatigue and exertion fatigue be conceptualised?
 2. How may these concepts be rendered operational in assessment instruments?
 3. What is the reliability and validity of the assessment instruments developed, the so-called DUFS and DEFS?
 4. What is the clinical significance of the assessment instruments developed, the so-called DUFS and DEFS?

Figure 8.1 Research questions addressed in this thesis

8.2 Summary of the chapters

In relation to research question one: 'How may fatigue and exertion fatigue be conceptualised?', a concept analysis of fatigue is described in *chapter two* of this thesis. Although the interest in studying fatigue is increasing and some models have now been developed, theory development is in its beginning phase. None of the models are empirically evidence-based.

Because of a fundamental and subsequent lack of theories concerning fatigue, a starting level for theory development is suggested at the basis. Thus the primary building blocks or concepts of a theory need to be clearly defined, so that the nature of the phenomenon is explained. Although definitions of fatigue are described in the literature, there is no consensus concerning its nature. This complicates further study of fatigue and limits comparisons between the studies performed. So again, we need to start with a broadly accepted definition,

supported within the discipline of nursing and other disciplines coterminous with a nursing perspective. These arguments advocate adoption of the working definition of fatigue as identified and formulated by the North American Nursing Diagnosis Association (NANDA).

Although the working-definition of the NANDA may be thus adopted, it can also be criticised. One of the weakest points of NANDA's diagnosis of fatigue is the lack of differentiation in abstraction-level between the label and the defining characteristics. On the other hand, the label and the operability of the concept are logically consistent.

Besides the definition of fatigue, different dimensions to the concept are mentioned in the literature. A general résumé of the dimensions are the physical, psychological and social dimensions of fatigue.

Further, the defining characteristics, as described by NANDA, are usable as indicators of fatigue. These defining characteristics refer to the concept of fatigue. A first step in rendering operational the concept of fatigue – research question two – took place.

Finally, in chapter two, indicators referring to the different types of fatigue mentioned in the literature are described. Knowledge regarding different types of fatigue may make precise the diagnostic process and support any subsequent decision as to which interventions need to be carried out.

The decision to start theory development inductively at basis-level leads to a search of the literature covering fifty-three studies on fatigue, bearing in mind the research question: 'Which sociodemographic, cure-related and care-related factors are significantly related to fatigue?' This background work is presented in *chapter three* of the thesis.

A broad range of cure-related and care-related factors concerning fatigue could be found in this literature search. Furthermore, the correlates between the various (patient) populations showed similar results. This finding supports the idea of the nonspecific character of fatigue. Because of the lack of experimental and fundamental research, no causal relationships could be determined.

In addition, suggestions of interventions aimed at successful outcomes are given. The intervention of primary effectiveness and the one most often suggested within the range of this background study is 'energy management'.

Finally, a multidisciplinary model for further research is explored. Although each discipline has its own perspective on fatigue, in general, fatigue is a non-discipline-related phenomenon. This research model integrates cure-related and care-related perspectives.

Chapter four presents the development, reliability and validity of the Dutch Fatigue Scale (DUFS) and the Dutch Exertion Fatigue Scale (DEFS). This study reports further upon the operability of the concepts concerning fatigue and exertion fatigue in assessment instruments and psychometric testing of the scales, relating to research questions two and three.

The concept of exertion fatigue is described. This concept is related to activities in the fields of household, personal hygiene and social life. On the basis of hypotheses, the defining characteristics of the concepts fatigue (DUFS) and

exertion fatigue (DEFS) are described. Attention is given to the inter-rater criterion-related validity. The DUFS is suitable for the assessment of exertion fatigue. The DEFS may be used as an assessment instrument at the individual-level.

Chapter five continues the psychometric testing of the DUFS and DEFS. The sensitivity, specificity, positive predictive value of the DUFS amongst chronic disease patients is tested. These tests refer to the psychometric properties (reliability and validity) and found to be acceptable. This study shows that the DUFS and DEFS are suitable for diseased persons. Although the DUFS and DEFS were carried out among diseased subjects, the results were compared among healthy persons.

Furthermore, a cut-off point in the DUFS and DEFS was allowed discrimination between diseased and healthy persons. In concurrence with the concept of fatigue, a continuum moving from tiredness to a state of exhaustion - non-fatigue - was found. The sumscores referring to their state of fatigue were compared.

One interesting point of study in *chapter five* is the question of whether or not it is possible to distinguish between a person. This refers to the dichotomy between the intrinsic point of view (intrinsic point of view) and the extrinsic point of view, for instance, significant others. Before this question could be answered, the DUFS and DEFS were validated. It could be concluded that the concepts fatigue and exertion fatigue are distinguishable. Consequently, the next research question is the significance of the DUFS and DEFS. The DUFS and DEFS from the view-points of both the patient and the significant others - extrinsic points of view - are bro-

Chapter six presents a study that addresses the question 'What is the clinical significance of the so-called DUFS and DEFS?'. The DUFS and DEFS are significant others able accurately to assess the different types of fatigue in domiciliary health care. In this study, the results gathered from the DUFS and DEFS are compared at three levels of analysis: the sumscores of the scales, and finally the DUFS and DEFS, the assessment-level.

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exertion fatigue (DEFS) are tested among chronic heart failure patients. Attention is given to the internal consistency, to the construct validity and criterion-related validity. The psychometric testing showed sufficient results. The DUFS is suitable for the assessment of fatigue at group-level and the DEFS may be used as an assessment instrument for exertion fatigue at individual-level.

Chapter five continues the psychometric testing of the DUFS. In this chapter the sensitivity, specificity, positive predictive value and negative predictive value of the DUFS amongst chronic heart failure patients and postnatal women is tested. These tests refer substantially to the research questions three (reliability and validity) and four (clinical significance).

This study shows that the DUFS is useful amongst healthy as well as amongst diseased persons. Although the DUFS was developed as a result of pilot studies carried out among diseased subjects, this does not preclude its usefulness among healthy persons.

Furthermore, a cut-off point in the DUFS-sumscore could be estimated which allowed discrimination between fatigued and non-fatigued patients.

In concurrence with the concept analysis of fatigue – fatigue seen as a continuum moving from tiredness, advancing to fatigue and at last reaching a state of exhaustion - non-fatigued persons showed low average DUFS-sumscores referring to their state of tiredness.

One interesting point of study in *chapters six and seven* is the overall question of whether or not it is possible to assess the subjective feelings of another person. This refers to the dichotomy between self-assessment in a person (intrinsic point of view) and the assessment made by others (extrinsic point of view), for instance, significant others (chapter six) or nurses (chapter seven).

Before this question could be answered, the DUFS and DEFS had to be validated. It could be concluded that the clarification and operability of the concepts fatigue and exertion fatigue fitted with the empirical reality.

Consequently, the next research question involved testing the clinical significance of the DUFS and DEFS in practice. For this purpose, various view-points of both the patient and their significant other - intrinsic and extrinsic points of view - are brought together and compared.

Chapter six presents a study that refers particularly to research question four – 'What is the clinical significance of the assessment instruments developed, the so-called DUFS and DEFS?'. The question posed in this chapter is: 'Are significant others able accurately to assess fatigue, exertion fatigue and other types of fatigue in domiciliary heart patients?'

In this study, the results gathered from patients and their significant others are compared at three levels of measurement: item-level of the scales, the sumscores of the scales, and finally, based on the cut-off points of DUFS and DEFS, the assessment-level.

A good measure of agreement emerges in this study between the patients and their significant others and this degree of consensus increases from item-level

(DUFSS & DEFS: moderate), scale-level (DUFSS & DEFS: substantial), to assessment-level (DUFSS: substantial; DEFS: almost perfect).

The main conclusion of this study is that significant others are able accurately to assess patients' fatigue, exertion fatigue and types of fatigue. The patient and the significant other came to the same conclusion independently of one another. Thus the question as to whether or not someone is able to assess the subjective feelings of another person can be answered positively.

Chapter seven reports on the question involving whether or not nurses are able accurately to assess fatigue, exertion fatigue and other types of fatigue in residential home patients. Using the same methods described in chapter six - the ability to assess fatigue and exertion fatigue from an extrinsic point of view - the measures of agreement between the nurses and residential home patients are compared.

It may be seen in this chapter that, in contrast to the significant others in the previous chapter, nurses are unable to assess accurately patients' fatigue, exertion fatigue and types of fatigue. The measures between the patients and the nurses showed slight and fair agreements. It must consequently be concluded that the DUFSS and DEFS are not appropriate for use by nurses only. A second conclusion of this study is that nurses cannot blindly follow their extrinsic assessment of patients' subjective feelings. Nurses must always compare their extrinsic assessment with the intrinsic assessment of the patients. But above all, nurses have to be aware that, in checking the extrinsic with the intrinsic assessment, their behaviour is appropriate in terms of their professional attitude.

8.3 Main conclusions

Going back to the general research questions which form the subject matter of this thesis, the following main conclusions emerge.

1. How may fatigue and exertion fatigue be conceptualised?

- Fatigue may be defined as 'an overwhelming, sustained sense of exhaustion and decreased capacity for physical and mental work' (NANDA, 1993). Although this definition demonstrates that the level of fatigue and the capacity for work are connected, nothing is said about a possible and necessary coincidence of causality between both aspects.
- Exertion fatigue is defined as 'fatigue that is directly related to activity'. The intensity of fatigue may be caused by the level of activity and the level of activity may be caused by the intensity of fatigue. Although the direction of the relationship between fatigue and activity may alter, they are directly related.
- Different types of fatigue are conceptualised using the indicators of duration, intensity, predominance, pattern, specificity and explicability. The following types could be identified: acute and chronic fatigue, intense and non-

intense fatigue; predominant constant fatigue; specific and fatigue.

2. How may these concepts be measured by instruments?

- Different dimensions of fatigue and classification of the most frequent types of fatigue from a psychological and social dimension are useful in assessment.
- A wide range of defining fatigue from differing perspectives, are developed for validation and application of the DUFSS (DUFSS), the defining characteristics were used as a basis for the DEFS. The characteristics were used as a basis for the DEFS.
- Psychometric testing of the DUFSS reduced the number to nine items. The scale with five response alternatives (Appendix I, up to and including item 9) is to be recoded dichotomously to a range from 0-9.
- For the development of the DEFS (DEFS), different questionnaires in the fields of household, personal and professional checklist of activities represent a starting point.
- From the 62 selected activities the DEFS is a scale with four response values (4) (see Appendix V, up to and including item 4). The item-values need to be recoded to a range from 0-9.

3. What is the reliability and validity of the so-called DUFSS and DEFS?

- Psychometric testing of the DUFSS and DEFS showed internal consistency, validity and reliability. Statistical analyses of both scales showed that the DUFSS and DEFS are used reliably and validly for measurement of fatigue.
- The DUFSS (scale coefficient 0.85) is used reliably and validly for measurement of fatigue.
- The DEFS (scale coefficient 0.85) is used reliably and validly for measurement of fatigue.