

Supplementary File 1. Development of literature search strategy

This literature review aims to identify approaches to improving symptom appraisal in the literature. We first performed preliminary searches in Medline using free-text terms for the two key concepts: symptom and appraisal, based on which we developed definitions of symptom and symptom appraisal and refined our search concepts and terms.

Various definitions of the term “symptom” have been proposed and adopted in the literature. Common features in different definitions are that a symptom is an indicator of bodily change/deviation from normality and that a symptom is a subjective perception of an individual(1-3). Based on these common features, we defined symptom as a subjective health state that departs from bodily normality, which may or may not be attributed as a manifestation of illness by an individual. This is based on the consideration that our focus starts from the onset of a bodily change/somatic information, regardless of whether it is detected, perceived or acted on by an individual.

Several concepts pertaining to symptom appraisal exist in the literature including illness representation(4, 5), symptom response(6), symptom attribution(7), symptom experience(3, 8-11), symptom interpretation(1), and symptom perception(2, 12, 13). In the synthesis of relevant concepts by Posey et al, symptom perception was defined as the belief about what a symptom means (cognitively and emotionally), appraisal of the symptom based on past and present knowledge and experience, and response or action based upon the meaning and appraisal of the symptom(14). In a more recent work synthesizing various symptom appraisal theories and models by Whitaker et al, symptom appraisal was defined as encompassing three main constructs: detection of a bodily change, interpretation of the bodily change and response to interpretation(15), the latter two coincide with the definition of symptom perception by Posey et al. We adopted the definition of symptom appraisal proposed by Whitaker et al for two reasons: first, it has a relatively broader meaning and second, it fits well with our study focus, namely the process starting before the detection of a bodily change to the point of decision making on whether or not to take action on the bodily change. We included the three main constructs (detection, interpretation and response) as well as other relevant concepts of symptom appraisal in the search terms (Table 1).

Our final search strategy contains three concepts: 1) symptom, 2) appraisal and 3) patient education. The concept of patient education was added in the search based on the consideration that our focus was approaches that had been developed to improve symptom appraisal among symptomatic patients instead of other populations such as healthcare professionals. Since there are no appropriate MeSH terms for the concept of appraisal, we adopted the MeSH terms for the combined concept of symptom appraisal, in consultation with a senior librarian with experience in medical literature search strategies. After Mesh Terms were selected, their corresponding controlled vocabularies in PsycInfo, Embase and Cumulative Index to Nursing and Allied Health Literature (CINAHL) were identified. We combined controlled vocabulary search in all fields and free-text search with proximity operators in title and abstract fields in Medline, PsycInfo and CINAHL. We performed a free-text search with proximity operators in title and abstract fields in Web of Science and Scopus where controlled vocabularies are not available.

Table 1. Literature search strategy

	Free-text terms	Controlled vocabularies					
		Medline	PsycInfo†	Embase‡	CINAHL	Web of Science	Scopus
Concept: symptom	symptom* OR somatic OR illness*	Diagnostic Self Evaluation OR Self Care	Self-Evaluation OR Self-Care	self evaluation OR self care agency OR self help	Self Assessment OR Self Care Agency OR Self-Management	-	-
Concept: appraisal	apprais* OR detect* OR recogni* OR						

	perce* OR interpret* OR attribut* OR respon* OR behav* OR experienc * OR report*						
Concept: patient education	educat* OR teach* OR instruct* OR train* OR learn*	Health Education	Health Education	health education	Health Education	-	-
Searching fields	Title and abstract	-	-	-	-	-	-
Proximity operators	-	adj5	adj5	NEAR/5	N5	NEAR/5	W/5

References

1. Teel CS, Meek P, McNamara AM, Watson L. Perspectives unifying symptom interpretation. *Image J Nurs Sch.* 1997;29(2):175-81.
2. van Wijk CM, Kolk AM. Sex differences in physical symptoms: the contribution of symptom perception theory. *Soc Sci Med.* 1997;45(2):231-46.
3. Dodd M, Janson S, Facione N, Faucett J, Froelicher ES, Humphreys J, et al. Advancing the science of symptom management. *J Adv Nurs.* 2001;33(5):668-76.
4. Leventhal H, Meyer D, Nerenz D. The common sense representation of illness danger. In: Rachman S, editor. *Contributions to Medical Psychology*: Pergamon Press; 1980. p. 7-30.
5. Leventhal H, Benyamini Y, Brownlee S, Diefenbach M, Leventhal EA, Patrick-Miller L, et al. *Illness Representations: Theoretical Foundations*. In: Petrie KJ, Weinman J, editors. *Perceptions of Health and Illness: Current Research and Applications*: Harwood Academic Publishers; 1997.
6. Sorofman B, Tripp-Reimer T, Lauer GM, Martin ME. Symptom self-care. *Holist Nurs Pract.* 1990;4(2):45-55.
7. Robbins JM, Kirmayer LJ. Attributions of common somatic symptoms. *Psychol Med.* 1991;21(4):1029-45.
8. The University of California San Francisco School of Nursing Symptom Management Faculty Group. A model for symptom management. *Image J Nurs Sch.* 1994;26(4):272-6.
9. Lenz ER, Pugh LC, Milligan RA, Gift A, Suppe F. The middle-range theory of unpleasant symptoms: an update. *ANS Adv Nurs Sci.* 1997;19(3):14-27.
10. Armstrong TS. Symptoms experience: a concept analysis. *Oncol Nurs Forum.* 2003;30(4):601-6.
11. Henly SJ, Kallas KD, Klatt CM, Swenson KK. The notion of time in symptom experiences. *Nurs Res.* 2003;52(6):410-7.
12. Kolk AM, Hanewald GJ, Schagen S, Gijsbers van Wijk CM. A symptom perception approach to common physical symptoms. *Soc Sci Med.* 2003;57(12):2343-54.
13. Petersen S, van den Berg RA, Janssens T, Van den Bergh O. Illness and symptom perception: a theoretical approach towards an integrative measurement model. *Clin Psychol Rev.* 2011;31(3):428-39.
14. Posey AD. Symptom Perception: A Concept Exploration. *Nursing Forum.* 2006;41(3):113-24.
15. Whitaker KL, Scott SE, Wardle J. Applying symptom appraisal models to understand sociodemographic differences in responses to possible cancer symptoms: a research agenda. *British Journal of Cancer.* 2015;112(1):S27-S34.