



An Integrative Review of Symptom Clusters Based on the Dynamic Symptom Model



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Background

Patients experience a variety of symptoms which are inter-related and may increase the severity or intensity of each symptom. Models of theories regarding symptoms have been introduced and developed over time from Theory of Unpleasant Symptoms as middle range theory (1997) to the Dynamic Symptoms Model (2010). The Dynamic Symptoms Model consists of the symptoms experience, its antecedents and consequences, and how interventions affect symptoms, which could present comprehensive view about symptom clusters. As for the Dynamic Symptoms Model, it could address the complex nature of symptoms, co-occurring symptoms and symptom interactions, and the longitudinal trajectories of symptoms that change over time.

However, it has been limited to comprehensive review for the studies regarding symptom clusters, conducted over the globe. Moreover, there is currently no theory-based intervention for symptom clusters or integrative review of symptom clusters especially in Korea.

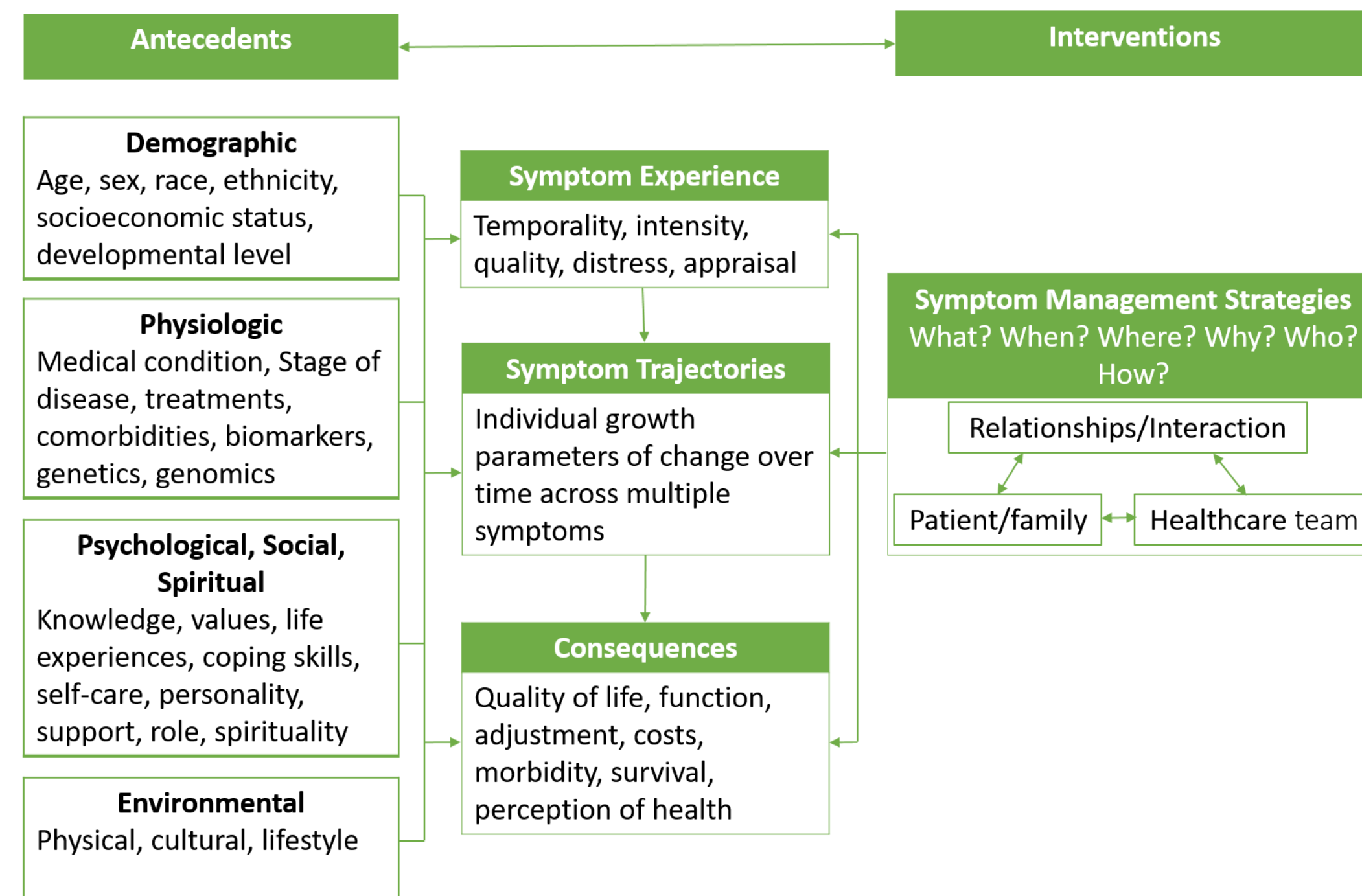


Figure 1. Dynamic Symptom Model (2010)

Purpose

The specific aims of this integrative review is

- 1) To determine what is known about symptom clusters in regard to symptom experience and symptom trajectories
- 2) To summarize the current state of the symptom cluster literature
- 3) To make recommendations for clinical practice and future study of symptom clusters.

Methods

Study Design & Subjects

This was an integrative review for symptom clusters. The research was conducted to identify relevant articles published by 31 March 2018.

Data Collection & Analysis

The following electronic databases were used: Korean Medical Database (Kmbase), Research Information Sharing Service (RISS) and Korean Studies Information Service System (KISS) database. Key search terms included "symptom" in combination with "cluster", "group", or "cluster analysis". We independently screened publications using the following inclusion criteria: 1) reporting symptom clusters in Korea, 2) peer-reviewed, and 3) published in Korea.

Following screening, we extracted data characteristics from each study: study design, sample characteristics, assessment methods of symptom, analytic methods and main findings. Finally, the symptom dimension concept proposed by the Dynamic Symptom Model was used in framing our first aim in this integrative review.

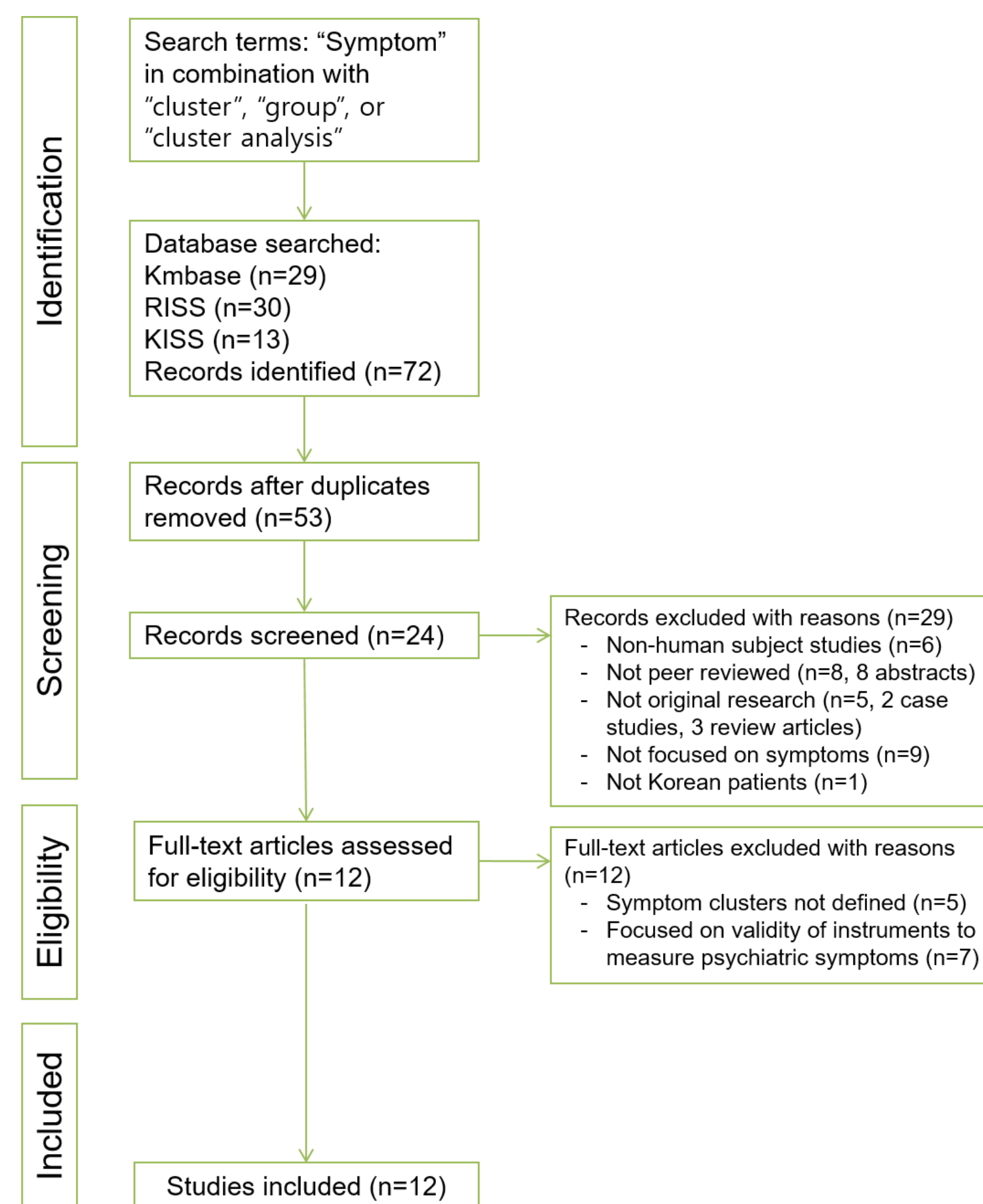


Figure 2. Flow diagram for inclusion and exclusion of selected studies

Results

Study Characteristics

A total of 12 studies fulfilled the inclusion criteria. The primary aim of extracted studies was to identify patients' symptoms, categorize them into specific clusters and determine their relationship with other factors. Nine studies preferred cluster analysis including hierarchical, K-means, or latent class analytic strategies to determine symptom clusters, and among those, factor analysis was used along with cluster analysis in 4 studies.

Majority of participants in the study were having cancer and each 3 studies included female only participants or participants in acute stage of disease. The sample size varied between 72 and 1442.

Symptom Clusters guided by the Dynamic Symptom Model

Among patients in all studies, commonly experienced symptom clusters were in order: pain, emotional distress (anxiety, depression, or mood fluctuation), and gastrointestinal symptoms.

When it comes to framing in the Dynamic Symptom Model, there was no studies that fully met the concept of model and only one included the concept of time (e.g., symptom trajectory) and 3 studies tried to determine the internal or intra-relationship of symptom clusters.

Most studies investigated which antecedents were related to the symptom clusters and which clusters influenced the consequences. In terms of symptom experience, characteristics were varied in each study. Most studies show the severity, frequency or intensity of symptoms and only one tried to determine the pattern of symptoms as symptom trajectories.

According to studies, demographic (age, gender, education, marital status, income), physiologic, psychological (anxiety, depression), and environmental (exercise) factors had influenced on symptom clusters and symptoms had impact on mortality, quality of life, and physical, social, emotional and cognitive functions as the consequences.

Conclusions

Through this integrative review, no studies regarding symptom clusters could explain comprehensively. Therefore, symptom clusters have great potential to become a crucial field of study.

Additional longitudinal studies are required to assess symptom trajectories, rather than each specific symptom, based on the Dynamic Symptom Model.

Furthermore, theory-based intervention studies are needed to develop specific strategies to manage symptom clusters and to examine the effects of those interventions on symptom clusters.

In turn, a theory or a model would be applied to guide clinical practice for relieving a variety of symptoms and better quality of life.

Table 1. Chronological view of studies reporting symptom clusters guided by the Dynamic Symptom Model

Authors (Year)	Antecedents	Symptom experience	Inter or intra relationships of symptom clusters	Symptom trajectories	Consequences
Na et al. (2017)	- Demographic; age*** - Physiologic; mental status*, temperature**, ESR**, CRP** lactic acid***, underlying disease**	Frequency			Treatment results, KTAS level, final diagnosis
Kim & Kim (2015)	- Demographic; gender* - Physiologic; inpatient/outpatient***, stage of disease***, treatment modality***, duration of diagnosis**, number of chemotherapy** - Environmental; exercise***	Prevalence & Severity	All correlations among 4 clusters***		
Park & Lee (2015)	- Demographic; age***	Intensity & Patterns			Length of stay*, Death rate**
Cha & Yi (2014)	- Demographic; education**, occupation*, monthly family income***	Distress or burden	Gastrointestinal cluster ↔ Basic need cluster* Basic need cluster ↔ Sensory-comfort cluster** Basic need cluster ↔ Mood-vitality cluster**		Mood-vitality cluster*** → Quality of life
Jeong et al. (2014)	- Demographic; age†, marital status†, burden of medical expense† - Physiologic; diagnosis†, treatment period†, stage†	Severity of each symptom cluster			Severe group of Bowel movement problems cluster***, and Dry mouth-taste problems cluster* → Quality of life Severe group of symptom clusters† → physical, role, emotional, and cognitive function†
Kim (2013)	- Demographic; age† - Physiologic; performance status*** - Psychological; anxiety**, depression†	Severity			Neuro-psychological cluster***, Gastrointestinal cluster***, and Pain-fatigue cluster*** → general activity, mood, work, relations with others, walking, enjoyment of life
Hwang et al. (2012)	- Demographic; age***, marital status***, monthly income***, education*** - Physiologic; body mass index**, current smoker*, diabetes mellitus**, ST-elevation myocardial infarction*, CRP***, ejection fraction***, Killip class***, total hospital stay***	Severity			Cluster 3 (atypical symptom cluster)* → Cardiac death†, 1-year mortality†
Kim et al. (2009)	- Physiologic; stage†, metastasis†, current chemotherapy†, current anti-hormone therapy†	Severity & Severity of each symptom cluster			Gastrointestinal-fatigue cluster*** and Pain cluster*** → physical, role, emotional, cognitive, and social functioning, and quality of life Severe group of symptom clusters† → physical, role, emotional, cognitive, and social functioning, and quality of life
Cho et al. (2009)	- Physiologic; Child-Pugh classification†, performance status*** - Psychological; anxiety†, depression†	Frequency & Intensity	All correlations among 4 clusters***		
Lee & Park (2009)	- Physiologic; performance status†	Severity & Severity of each symptom cluster		All 3 symptom clusters† were improved 1 week after Gefitinib administration	Severe group of symptom clusters† → physical, role, emotional, cognitive, and social functioning, and quality of life
Choi (2009)		Frequency & Intensity			
Jeon et al. (2008)		Frequency & Intensity & Distress			

CRP; C-reactive protein, ESR; erythrocyte sedimentation rate, KTAS; Korean triage and acuity scale, ↔; correlation, *; p < 0.05, **; p < 0.01, *** p < 0.001, †; different p-values by symptom clusters ‡; different p-values by consequences

Acknowledgements

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