

Review Article



Outcomes of Patient Education in Nurse-led Clinics: A Systematic Review

Zohre Pouresmail^{1,2}, Fatemeh Heshmati Nabavi^{3,4*}, Najmeh Valizadeh Zare^{3,5}¹Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran²Student Research Committee, Mashhad University of Medical Sciences, Mashhad, Iran³Nursing and Midwifery Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran⁴Department of Community Health and Psychiatric Nursing, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran⁵Department of Operating Room, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran**Article Info****Article History:**

Received: December 11, 2022

Accepted: July 13, 2023

e-Published: August 8, 2023

Keywords:

Nurse's role, Education, Patients, Standardized nursing terminology

***Corresponding Author:**

Fatemeh Heshmati Nabavi,

Email: heshmatinf@mums.ac.ir**Abstract**

Introduction: Patient education is an independent role of nurses performed in nurse-led clinics (NLCs). The measurement of patient education outcomes validates whether nursing educational interventions have a positive effect on patients, which helps determine whether changes in care are needed. Standardized nursing terminologies facilitate the evaluation of educational outcomes. We aimed to explore the outcomes of patient education in NLCs based on the Nursing Outcome Classification (NOC) system.

Methods: The review was conducted according to PRISMA guidelines. We searched "Medline", "Embase", "Web of Science", and "Scopus" databases for articles published between 2000 and 2022. Based on the search strategy, 1157 articles were retrieved from PubMed, Scopus, Web of Science, and Embase databases. After excluding the duplicates, 978 articles were appraised. 133 articles remained after reading the titles and abstracts of the articles. In the next step, the articles were evaluated regarding methodology, research population, and exclusion criteria, after which 112 articles were omitted, and finally, 21 articles were included in the full-text review. We assessed all included studies using the Quality Assessment of Controlled Intervention Studies checklist.

Results: A total of 21 randomized controlled trials met the inclusion criteria. "Physiologic health", "functional health", "psychosocial health", "health knowledge and behavior", and "perceived health" were the domains of nursing outcomes investigated as Patient Education Outcomes in NLCs.

Conclusion: Most of the outcomes were linked to lifestyle-related chronic diseases and, further studies are needed to determine the effects of patient education provided in NLCs in terms of family/society health outcomes.

Introduction

Nurse-led clinics (NLCs) were developed as a dynamic health care innovation¹ to play an advanced practice role for primary chronic disease management during the 1990s.² The integrated mind-body care provided by these services is accessible, affordable, high-quality, and patient-centered.¹ The aims behind introducing NLCs include cost reduction and better integration of the pathway of care from the acute to rehabilitative phase, particularly for shortening hospital stays.

Patient education is an independent role of nursing performed in NLCs. The measurement of patient education outcomes validates whether nursing

educational interventions have a positive effect on patients, which helps determine whether changes in care are needed.³ Standardized nursing terminologies facilitate the evaluation of educational outcomes. A standard nursing terminology describes the clinical judgments nurses make based upon the assessment and selection of interventions and the outcome of the patient.⁴ A standard nursing terminology allows nurses to diagnose, intervene, and document patient outcomes with specificity,⁵ as well as examine the effectiveness of nursing interventions,⁶ Ensure nursing accountability and continuity of care.⁷ Nursing Outcome Classification (NOC) is one of the standard nursing terminology based on The American

Nurses Association.^{4,5} An NOC was developed in 1991 as a comprehensive, standardized way to classify the outcomes of patients and clients. Specifically, it aims to assess the impact of nursing interventions in health care settings by nursing specialty.⁵ It is the most complete and comprehensive standard language currently designed to measure nursing intervention outcomes in patients.⁸ Despite growing evidence supporting the value of patient education in NLCs, no comprehensive synthesis of the evidence has been conducted. A previous review of NLCs revealed on health care delivery,⁹ care of cancer patients¹⁰ and early discharge,¹¹ and the overall evidence about outcomes of patient education in NLCs is limited. This review aimed to exploring the outcomes of patient education in NLCs based on NOC.

Materials and Methods

Protocol and Registration

Our systematic literature review was conducted according to the PRISMA guidelines.¹² We get the PROSPERO registration code (CRD42022346293).

Eligibility Criteria

The Population, Intervention, Comparison, Outcome, and Timeframe (PICOT) framework guided our literature search in order to ensure a comprehensive search strategy.¹³ In our search, we focused on patient education by nurses in NLCs (P) using patient education interventions (I). The comparison of interest (C) was education performed at the hospital for hospitalized patients. In terms of outcomes (O), it was postulated that reported outcomes could be categorized as the “identification of specific outcomes”. We set a timeframe (T) for research published since 2000, which encompassed the last 22 years.

Information Sources

Two nurse researchers (ZP and FHN) independently searched four electronic databases, including Medline (via PubMed), Embase, Web of Science, and Scopus, to identify eligible publications. A literature search was conducted on January 1, 2022, and a final search was conducted on June 16, 2022.

Search

The search identified original articles. The search keywords were “nurse-led clinic, nursing clinic, public health departments, outpatient clinics, extended care facilities, health maintenance organizations, therapist-owned and -managed centers, wellness center, nurse, education, nursing classification system, and standardized nursing terminology” using AND/OR operators. We searched all combinations of terms from each category to find the target studies. References of the selected articles were also searched. An example of the search strategy was as follows:

(«Nurse-led clinic» OR «nursing clinic» OR «nurse-led

outpatient clinics» OR «public health departments» OR «outpatient clinics» OR «extended care facilities» OR «health maintenance organizations» OR «therapist-owned and -managed centers» OR «wellness center») AND (nurse) AND (education) AND («nursing classification system» OR «standardized nursing terminology»).

Study Selection

Two researchers (ZP and FHN) independently reviewed the titles and abstracts of the retrieved articles to find studies that met the inclusion criteria. The inclusion criteria consisted of (a) randomized controlled trials (RCTs), (b) publications in English (c) articles examining one or more nursing outcomes, (d) using a NLC as the research setting, and (e) performing the educational intervention on adults. The exclusion criteria consisted of (a) letters to editors, (b) non-intervention trials, and (c) studies in physicians’ offices and clinics. We then retrieved the full texts of these studies and evaluated their eligibility. A third reviewer (NVZ) helped resolve disagreements regarding eligibility of studies.

Data Collection Process

Our team developed a sheet for data extraction. The data were extracted by two reviewers (ZP and FHN). There was a consensus reached between the reviewers if there were any disagreements, and data was included only if there was an agreement.

Data Items

To extract and summarize the information from the included studies, the reviewers conducted an in-depth review including the title, author, year, setting, intervention, educational methods, educational materials, outcomes, NOC domain, NOC classes, and how outcomes were measured (Table 1).

Risk of Bias in Individual Studies

All studies were independently reviewed by two reviewers (ZP and FHN). Quality Assessment of Controlled Intervention Studies (QACIS) was applied to the studies as outlined in the Effective Public Health Practice Project (EPHPP). An agreement was reached by referring to a third reviewer (NVZ) if scores differed.

Synthesis of Results

Two reviewers (ZP and FHN) synthesized and analyzed the data. The discrepancy between them was resolved by consensus, and only data that was agreed upon by both reviewers was included. An evidence synthesis with narrative-descriptive summaries and tables was prepared, which included the main outcomes and consistency of findings across studies. The sixth edition of the NOC system was used as the framework for data synthesis. This system consists of seven domains, 35 classes, and 540 outcomes. The seven domains include «functional

Table 1. Extracted data from the selected original studies

Author (year) country	Setting	Intervention	Educational methods	educational materials	Outcomes	NOC domain	NOC classes	How outcomes were measured
Reed et al ¹⁴ (2001) United Arab Emirates	Primary clinics	In clinics, nurse-physician teams developed and provided patient education programs. Its purpose was to motivate patients and provide them with support. Patients were also educated by two nutritionists at the three intervention clinics. The clinic nurse at each site provided diabetic education unrelated to diet as well.	Face to face	Not clear	HbA1c and FBG	Perceived health	Symptom status	The primary health care clinic noted three hba1c results within the relevant time period in its medical records.
					Determinations lipid levels	Health knowledge & behavior	Knowledge health condition	Frequency of blood lipid ordering and total cholesterol levels were the primary measures.
					Blood pressure	Health knowledge & behavior	Risk control	A systolic and diastolic blood pressure was recorded for each of the two study periods
					Patient knowledge of diabetes	Health knowledge and behavior	Knowledge health condition	Diabetes knowledge questionnaire
					Satisfaction with care	Perceived health	Satisfaction with care	4-Item questionnaire evaluating satisfaction with diabetes care
Canga et al ¹⁵ (2000) Spain	Primary care center and hospital	It included three components: a face-to-face interview, NRT, and follow-up support.	Face to face	Not clear	Urinary nicotine test	Physiologic health	Cardiopulmonary	A comparison of patients treated with control subjects in terms of their smoking cessation rates. Validated cessation only (as measured by urine cotinine)
					The number of smoking and cessation	Health knowledge & behavior	Knowledge health condition	According to Prochaska's model, mean number of cigarettes smoked and stage of change
					Urine albumin creatinine ratio, serum HbA1c, cholesterol	Physiologic health	Cardiopulmonary	HbA1c, cholesterol, and creatinine levels were measured in the laboratory, as well as the albumin creatinine ratio in the urine
Bebb et al ¹⁶ (2007) United Kingdom	Primary care	A protocol for treating and monitoring hypertension based on British Hypertension Society (BHS) guidelines (1999). The protocol includes measures, monitoring, and treatment for practice nurses and general practitioners.	Discuss and counsel	Not clear	target BP at the 1-year follow up	Physiologic health	Cardiopulmonary	Physical examination
					The proportion of participants with BP < 140/80 mm Hg	Physiologic health	Cardiopulmonary	Physical examination
					Mean systolic and diastolic BP	Physiologic health	Cardiopulmonary	Physical examination
					Antihypertensive medication use by participants, drug class, and dosage	Physiologic health	Cardiopulmonary	Physical examination
					Overall satisfaction with care	Perceived health	Satisfaction with care	Questionnaire about satisfaction with care

Table 1. Continued.

Author (year) country	Setting	Intervention	Educational methods	educational materials	Outcomes	NOC domain	NOC classes	How outcomes were measured
Dean et al ¹⁷ (2014) London	Nurse-led hypertension clinic	The intervention consisted of five stages, each of which had the potential to influence blood pressure. The nurse discussed the compliance of patients on anti-hypertensive medication when their blood pressure was over target. An in-hospital consultant physician with a special interest in hypertension then consulted with all patients.	Discussion	Not clear	Reduction in systolic blood pressure, reduction in diastolic pressure	Perceived health	Symptom status	Six general practitioners, four practice nurses, and a trained health care assistant independently measured and recorded blood pressure in two audits of computerized records.
Khoshkesht et al ¹⁸ (2015) Iran	Outpatient clinic of Masih-Daneshvari Hospital	A mastery experience is necessary to motivate patients to follow rehabilitation programs and to perform pulmonary rehabilitation successfully. Following up with patients and answering their questions about the program was part of the gradual intensification of the rehabilitation process; verbal persuasion was used to reinforce training and ensure that both patients and researchers complied with the advice.	Face-to-face	Booklets	Self-efficacy	Health knowledge & behavior	Health management	CSES
Efraimsson et al ¹⁹ (2008) Sweden	Primary care setting	Intervention group patients received education on self-care and support based on their unique needs and abilities to cope with disease and treatment during the intervention period. Patients' educational visits were tailored to their severity of illness, age, intellectual capacity, and lifestyle.	Educational visits based on motivational dialogue	Not clear	Quality of life Smoking Knowledge about COPD	Perceived health Health knowledge & behavior Health knowledge & behavior	Health & life quality Health behavior Health behavior	SGRQ Questionnaire specifically developed for this study Questionnaire Specifically developed for this study
Gallefoss & Bakke ²⁰ (2000) Norway	Pulmonary outpatient clinic at the Central Hospital	Provide specially designed brochure, two 2-hour group sessions. Both physiotherapy and nursing provided individual sessions of 40 minutes.	Group sessions (separate Groups for asthma and COPD)	Brochure	Patient satisfaction	Perceived health	Satisfaction with care	Patients answered a questionnaire
Gradwell et al ²¹ (2002) England	Dermatology outpatient department	The dermatology nurse specialist interviewed patients in the nurse follow-up group for 20 minutes in addition to their initial consultation with the dermatologist.	Interview with a dermatology nurse specialist for 20 minutes	Written instructions	Quality of life Patient knowledge	Perceived health Health knowledge & behavior	Health & life quality Knowledge health condition	DLQI Specifically designed questionnaire

Table 1. Continued.

Author (year) country	Setting	Intervention	Educational methods	educational materials	Outcomes	NOC domain	NOC classes	How outcomes were measured
de la Porte et al ²² (2007) Netherlands	HF Outpatient clinic	The intervention began with a telephone call after discharge from the hospital or referral from an outpatient clinic. The first (week 1) and second (week 3) visits in the HF clinic included patient diaries. Regular follow-up visits were conducted at weeks 5 and 7 and months 3, 6, 9 and 12, as well as a short physical exam.	Verbal Education	Written comprehensive Education	Blood/urine tests, cardiac enzymes, LVEF, chest radiographs	Physiologic health	Cardiopulmonary	Plasma samples for neurohormone tests (NT-probnp) taken
					Health-related quality of life	Perceived health	Health & life quality	Rand Short Form 36 quality-of-life questionnaire
					Disease-specific Quality of life	Perceived health	Health & life quality	Minnesota Living with Heart Failure questionnaire
					Self-care behavior	Functional health	Self-care	European Heart Failure Self-Care Behavior Scale
Driscoll et al ²³ (2014) Australia	Specialist outpatient heart failure clinic	Titration by a nurse (NLT): Patients were reviewed by the nurse in the clinic on a weekly, fortnightly, or monthly basis until they reached the maximum effective dose after six months of treatment.	Not clear	Not clear	By six months, the proportion of patients who have reached their target dose of beta-adrenergic receptor blocker.	Health knowledge & behavior	Health behavior	Consultation between the heart failure nurse and cardiologist
					Changes in general quality of life	Perceived health	Health and life quality	MLHFQ
					Changes in depressed mood	Psychosocial health	Psychological well-being	CDS score
Ortiz-Bautista et al ²⁴ (2019) Spain	Primary care center	Treatment is provided by the respective cardiologists as part of standard care. During the first visit, educational counseling was provided. Nurses reviewed and reinforced educational counseling with patients during follow-up visits, as well as up-titrated HF evidence-based drugs as needed.	Educational counseling	Not clear	Heart failure readmission	Perceived health	Health & life quality	Readmissions to hospitals were collected from medical records or during patient's follow-up visits
					(Quality of life related to health) MLHFQ improvement	Perceived health	Health & life quality	MLHFQ
Corones-Watkins et al ²⁵ (2019) Australia	NLC	Educating and assessing the patient took approximately 45-60 minutes. A psychosocial assessment was also conducted. Post-discharge education.	Visual and verbal methods	Not clear	Cardiac Self-Efficacy	Health knowledge & behavior	Health management	CSE Scale
					Anxiety	Psychosocial health	Psychological well-being	STAI-T
					Depression	Psychosocial health	Psychological well-being	CDS
Hicks et al ²⁶ (2014) United Kingdom	Outpatient rapid access chest pain clinic	Every patient received a pre-test pamphlet from the research nurse and had sufficient time to read it. After that, the research nurse engaged the participants in a short discussion (5–15 minutes). In both the discussion arm and pamphlet arm, patients returned to clinic for testing and assessment following the pamphlet delivery (Discussion arm) and the pamphlet delivery only (Pamphlet arm).	Discussion	Pamphlet	Recruitment rate and process, proportion of patients Attending RACPC randomized	Physiologic health	Cardiopulmonary	Patient-reported 5-item reassurance questionnaire
					Anxiety and Depression	Perceived health	Symptom status	HADS

Table 1. Continued.

Author (year) country	Setting	Intervention	Educational methods	educational materials	Outcomes	NOC domain	NOC classes	How outcomes were measured
Unk & Brasington ²⁷ (2014) United States	Rheumatology Outpatient clinic	A printed copy of the slides and a CD copy of the program were given to participants in Group 1 who viewed the multimedia in the exam room on computers.	Not clear	Multimedia, printed slides, CD copy of program, published literature about RA	Medication adherence	Health knowledge & behavior	Health behavior	Six-item MAQ
					Illness perception	Physiologic health	Therapeutic response	BIPQ
Chan et al ²⁸ (2015) China	Five Hong Kong Hospital Authority West Cluster outpatient clinics	Two components of the health education intervention were conducted based on pragmatic approach: a telephone intervention and a face-to-face intervention.	Telephone briefing and face-to-face intervention	Leaflets, Poster displays, and health education video	Vaccination rate	Health knowledge & behavior	Health behavior	The hospital authority CMS-recorded uptake rate Of PPV
					Self-efficacy to manage disease in general	Health knowledge & behavior	Health management	Questionnaire
Smith et al ²⁹ (2002) United Kingdom	Gastroenterology follow-up clinic	Nurse-led counselling package: Counseling included information provision and psychological treatment. Educational videos and booklets were provided as sources of information. Stress management program 'Challenge of Change' was used as a psychological intervention.	Face to face	Booklets and Educational videos	Generic health status	Perceived Health	Health & Life Quality	Short-Form 36 (SF-36)
					Anxiety and depression	Psychosocial health	Psychological Well-Being	Hospital Anxiety and Depression questionnaire (HAD)
Zhang et al ³⁰ (2018) China	Patient's place of residence or in the NLC	Exercise and cognitive behavioral therapy. As requested, patients received online interventions each week at home or in the NLC. Those who consented to home visits and telephone motivational interviews twice a week were offered this service.	Face-to-face	Brochure timetable	Fatigue	Functional health	Energy maintenance	Mandarin Chinese version of the PFS
					Depression	Psychosocial health	Psychological well-being	The Zung SDS
					Sleep quality	Functional health	Energy maintenance	PSQI questionnaire
Porthouse et al ³¹ (2005) United Kingdom	Practice NLC in primary care	Nursing staff provided participants with general lifestyle advice for reducing fracture risk as well as cholecalciferol (vitamin D3) and 1000 mg of calcium (calcium carbonate) as two tablets daily. Both the intervention and control groups received leaflets.	Face to face	Leaflet	Clinical fractures	Physiologic Health	Tissue Integrity	A questionnaire
					Quality of life	Perceived health	Health & life quality	12 item short-form health survey questionnaire (SF-12)12 and the European quality of life instrument (EuroQol)
					Adherence	Health knowledge & behavior	Health behavior	Self-report
					Falls	Health knowledge & behavior	Risk control	Simple six-point Likert scale
					Fear of falling	Psychosocial health	Fear self-control	Simple six point Likert scale
New et al ³² (2003) United Kingdom	Specialist nurse-led clinics	Nurses provided clinics for participants every 4–6 weeks until targets were achieved. The titration of drug therapies was based on local guidelines for lifestyle advice and drug therapy titration.	Face to face	Not clear	Based on generalized linear model, increased proportion of patients achieving either intervention's targets	Perceived health	Symptom status	Physical examination
					Individual changes in hypertension and cholesterol	Physiologic Health	Metabolic Regulation	Physical examination

Table 1. Continued.

Author (year) country	Setting	Intervention	Educational methods	educational materials	Outcomes	NOC domain	NOC classes	How outcomes were measured
					Patient Satisfaction	Perceived health	Satisfaction with care	A scale of 1 (not satisfied at all) to 5 (very satisfied) was used to rate satisfaction with the education
Visser et al ³³ (2015) Netherlands	Outpatient clinic	CNS-led education and the information Leaflet.	Verbal information	Leaflets	Frequency of BSE	Functional health	Self-care	a question was asked about self-examination frequency at that time. ('Never,' 'sometimes', once every three months or less), 'regularly' (once a month), and 'often' (more than once a month).
		Motivational interviewing or Standard counseling: Motivational interviewing consisted of three 15-minute visits in 3 months by a motivational interviewing trained nurse practitioner. Patients in the standard counselling group received standard consultation after 1 and 3 months by a nurse practitioner.	Educational counseling	Not clear	Lifestyle behavior change		Health behavior	IPAQ-S questionnaire/short FFF [†]
Brouwer-Goossensen et al ³⁴ (2022) Netherland	Outpatient clinic				Self-efficacy	Health knowledge & behavior	Health management	Self-efficacy scale

Note: HbA1c, glycated hemoglobin; FBG, fasting blood glucose NRT, nicotine replacement therapy; BP, blood pressure; CSES COPD Self efficacy Scale; SGRQ, St. George’s Respiratory Questionnaire; MLHFQ Minnesota Living with Heart Failure Questionnaire; CDS, Cardiac Depression Scale; NLC, Nurse-led clinic; CSE, Cardiac Self-Efficacy; STAI-T, State Trait Anxiety Inventory; HADS, Hospital Anxiety and Depression Scale; MAQ, Medication Self-Assessment Questionnaire; BIPQ, Brief Illness Perception Questionnaire; CMS, clinical management system; PFS, Piper Fatigue Scale; SDS, Self-Rating Depression Scale; PSQI, Pittsburgh Sleep Quality Index; IPAQ-S, International Physical Activity Questionnaire short; FFF, Food Frequency Questionnaire; LVEF, left ventricular ejection fraction; DLQI, Dermatology Life Quality Index.

health», «physiologic health», «psychosocial health», «health knowledge and behavior», «perceived health», «family health», and «community health». ⁸The outcomes were classified based on the domains and classes of NOC. For example, anxiety was assigned to the psychological well-being class and the psychosocial health domain.

Results

Study Selection

Based on the search strategy, 1157 articles were retrieved from Pubmed, Scopus, Web of Science, and Embase databases. After excluding the duplicates, 978 articles were appraised. With the further exclusion of 845 articles, 133 articles remained after reading the titles and abstracts of the articles. In the next step, the articles were evaluated regarding methodology, research population, and exclusion criteria, after which 112 articles were omitted, and finally, 21 articles were included in the full-text review (Table 1). No relevant articles were found in the references of the studies by a manual search. Finally, this review included 21 RCTs that met the inclusion and exclusion criteria after conducting a study-relevant

analysis. PRISMA flowchart shows the search strategy and selection process (Figure 1). ³⁵

Risk of Bias within Studies

Table 2 presents the results of the quality assessment. A study that examined the quality assessment components and ratings of the EPHPP instrument. ³⁶ Quality ratings were generally acceptable for the study reports used.

Characteristics of patient

Finally, 21 articles were reviewed. The target groups included patients with diabetes,¹⁴⁻¹⁷ patients with chronic lung diseases including asthma and COPD,¹⁸⁻²⁰ patients with skin diseases,²¹ patients with cardiovascular diseases,^{17,22-25} patients with chest pain,²⁶ patients with arthritis,²⁷ the elderly with chronic diseases,²⁸ patients with irritable bowel disease (IBD) (ulcerative colitis, Crohn’s disease),²⁹ adults with ovarian cancer,³⁰ Hip fracture risk factors in women over 70,³¹ patients with raised blood pressure or raised total cholesterol,³² patients at risk of breast cancer,³³ and patients with stroke.³⁴

Outcomes Examined in Nurse-led Clinic

The domain of NOC that examined in NLC were “functional health”, “Physiologic health”, “Psychosocial health”, “Health knowledge & behavior” and “Perceived health” (Figure 2).

The functional health domain describes outcomes relating to the performance of basic life activities and the capacity to perform them, functional health has 4 classes (Energy maintenance, growth and development, mobility and self-care). The outcomes investigated in the “energy maintenance” class included fatigue and sleep quality.³⁰

The frequencies of Breast Self-Examination (BSE)³³ and self-care behavior²² were the outcomes examined in the “self-care” class.

Physiologic health domain explains outcomes that describe organic functioning and consist of 10 classes (cardiopulmonary, digestion & nutrition, elimination, fluid & electrolyte, immune response, metabolic regulation, neurocognitive, sensory function, therapeutic response and tissue integrity). In the “cardiopulmonary” class, the examined outcomes were cardiac enzymes,²² left ventricular ejection fraction (LVEF),²² lipid levels,^{14,16}

Table 2. Effective Public Health Practice Project (EPHPP) quality assessment tool for included studies

Authors/ Year	Selection bias	Study design	Confounders	Blinding	Data collection methods	Withdrawals and drop-outs
Reed et al ¹⁴ 2001	3	2	2	3	2	3
Canga et al ¹⁵ 2000	2	1	1	2	2	3
Bebb et al ¹⁶ 2007	1	2	1	2	2	1
Dean et al ¹⁷ 2014	2	1	2	2	2	3
Khoshkesht et al ¹⁸ 2015	2	3	1	3	1	3
Efrainsson et al ¹⁹ 2008	1	2	1	3	1	1
Gallefoss & Bakke 2000 ²⁰	2	2	2	2	3	2
Gradwell et al ²¹ 2002	2	1	2	2	2	2
de la Porte et al ²² 2007	2	1	2	3	3	2
Driscoll et al ²³ 2014	1	1	1	3	2	1
Ortiz-Bautista et al ²⁴ 2019	2	1	1	2	3	3
Corones-Watkins et al ²⁵ 2019	2	1	2	2	1	3
Hicks et al ²⁶ 2014	2	1	2	2	1	3
Unk & Brasington et al ²⁷ 2014	2	3	1	3	1	1
Chan et al 2015 ²⁸	2	1	1	2	3	3
Smith et al ²⁹ 2002	2	3	3	3	2	3
Zhang et al ³⁰ 2018	2	1	1	1	1	1
Porthouse et al ³¹ 2005	2	2	1	3	2	3
NEW et al ³² 2003	2	2	1	2	3	2
Visser et al ³³ 2015	2	2	1	3	3	2
Brouwer-Goossensen et al ³⁴ 2022	2	2	1	2	3	3

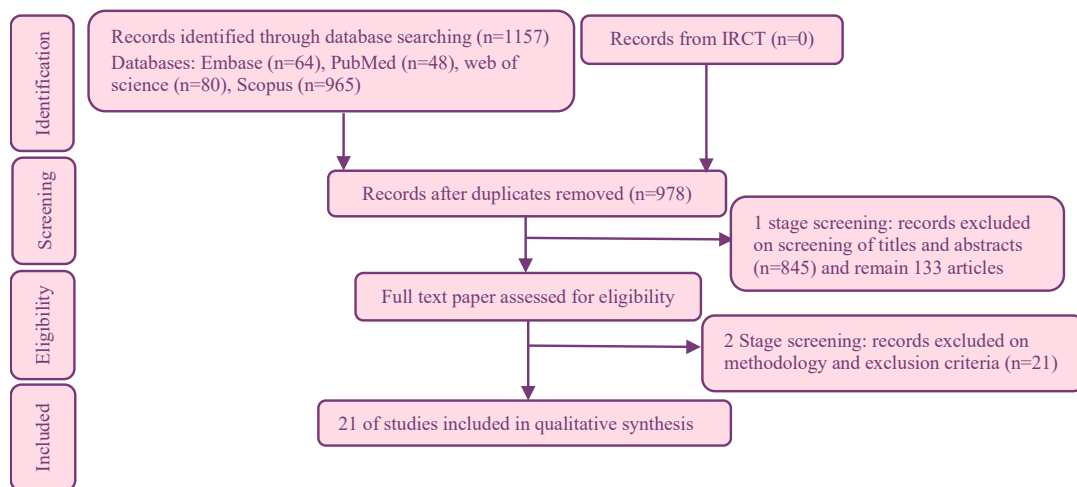


Figure 1. PRISMA flow diagram of study selection

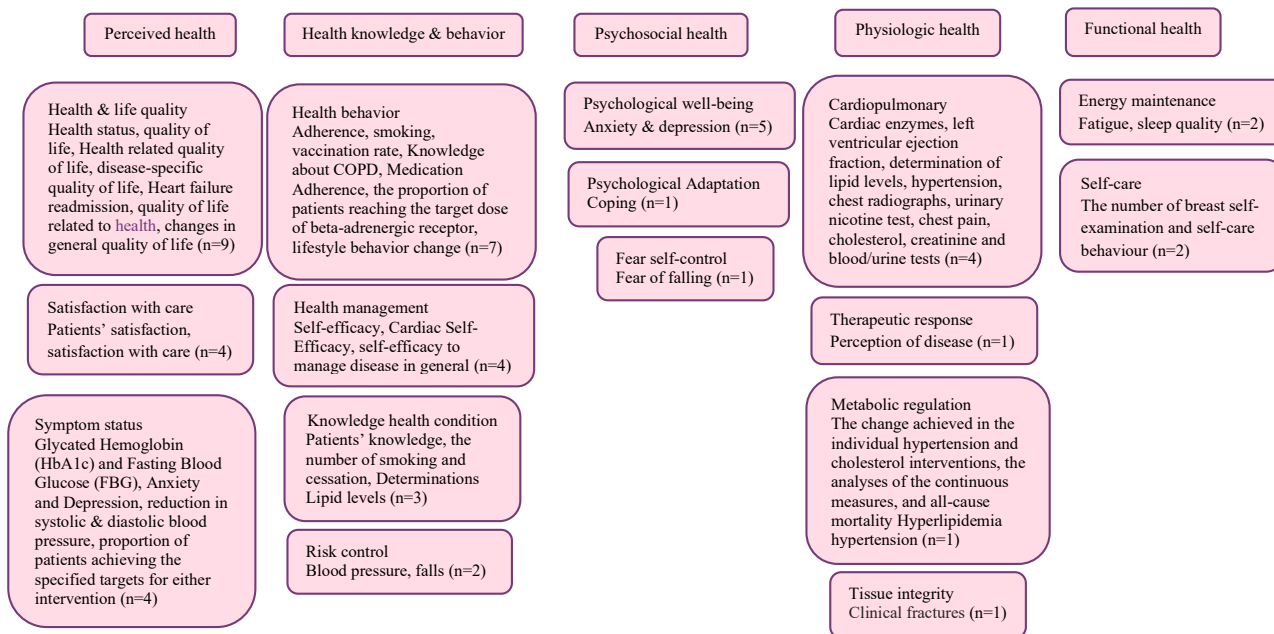


Figure 2. Outcomes of patient education in nurse-led clinics based on NOC

hypertension,¹⁴ chest radiographs,²² urinary nicotine test results,¹⁵ chest pain²⁶ and blood/urine test results.^{16,22} The perception of disease²⁷ was considered the studied outcomes in the “therapeutic response” class. The change achieved in the individual hypertension and cholesterol interventions, the analyses of the continuous measures, and all-cause mortality Hyperlipidemia hypertension³² was examined outcomes in metabolic regulation classes and clinical fracture³¹ was outcome in the tissue integrity.

Psychosocial health domain explains outcomes that describe psychological and social functioning and consist of 4 Classes (psychological well-being, psychological adaptation, self-control and social interaction). The outcomes investigated in the “psychological well-being” class included anxiety^{25,26} and depression.^{25,26,29,30} In the “psychological adaptation” class, the outcome was the coping strategies²⁹ and fear of falling³¹ was the outcome in the fear self-control classes.

Outcomes that describe attitudes, comprehensions, and actions related to health and illness are described by the Health Knowledge & Behavior domain. This domain Consist of 7 classes (Health Behavior, Health Beliefs, Health Management, Knowledge Health Condition, Knowledge Health Promotion, Risk Control and Safety). The outcomes of the “health knowledge and behavior” domain were investigated in four classes of “health behavior”, “health management”, “knowledge health condition” and “risk control”. Besides, the “health behavior” outcomes included drug consumption and pharmaceutical compliance,^{23,26,27} lifestyle behavior change³⁴ and vaccination rate.²⁸ The outcome investigated in the “health management” class was self-efficacy,^{18,25,34} cardiac self-efficacy²⁵ and self-efficacy to manage disease in general.²⁸ The outcome examined in the “knowledge

health condition” class were patients’ knowledge,^{14,19,21} the number of smoking and cessation times,^{15,19} determinations lipid levels.¹⁴ The outcome examined in the “risk control” class were blood pressure¹⁴ and falls.³¹

The Perceived Health domain consists of three classes (Health & Life Quality, Satisfaction with Care, and Symptom Status) describing the health and health care experiences of individuals. Outcome of health and quality of life class consist of the life quality,^{19,21,22,24,31} generic health status,²⁹ and heart failure readmission.²⁴ patients’ satisfaction,^{14,16,20,33} in satisfaction with care classes. Glycated hemoglobin (HbA1c) and fasting blood glucose (FBG),¹⁴ anxiety and depression,²⁶ reduction in systolic & diastolic blood pressure,¹⁷ the proportion of patients who achieve the specified goals for either intervention³² were outcome in symptom status classes (Figure 2).

Discussion

The purpose of our systematic review was to determine the nursing outcomes related to patient education in NLCs based on the NOC. The “physiologic health”, “functional health”, “psychosocial health”, “health knowledge and behavior”, and “perceived health” were the domains of nursing outcomes investigated as patient education outcomes in NLCs. Besides, “self-care”, “energy maintenance”, “mobility”, “cardiopulmonary”, “therapeutic responses”, “psychological well-being”, “psychological adaptation”, “health behaviors”, “health management”, “knowledge health condition”, “health and life quality”, “satisfaction with care”, and “symptom status” were the classes of nursing outcomes investigated as patient education outcomes in NLCs.

According to the findings of our review study, most of the outcomes investigated in the studies conducted

in NLCs were associated with the outcomes of lifestyle-related chronic diseases. The nursing profession is in direct contact with society; therefore, it provides services for the community and can gain public trust by providing safe, effective, and accessible services. Nursing as a developing profession needs to document the effectiveness of its services.³⁷

As a result of the present study and access to outcomes such as smoking cessation, self-care, cardiac diseases and diabetes, and patient's quality of life by the nurses of NLCs demonstrate that the nursing profession contributes to providing effective and accessible services for critical health problems of society.^{38,39} In this regard, a systematic review revealed that the outcomes relevant to hypertension, quality of life, and patient satisfaction in nurse-led primary care centers were better than the outcomes in centers managed by physicians.⁴⁰

According to the findings of our systematic review, in addition to the physical outcomes examined as educational outcomes in NLCs, some outcomes such as anxiety, depression, and coping strategies were investigated in the psychological health domain. However, most patients, especially cancer patients,⁴¹ hemodialysis patients,⁴² patients needing surgery,⁴³ and other groups of patients may experience psychological problems, along with physical illnesses. Accordingly, the examination of and attention to the psychological health domain and development of its variables by the nurses of outpatient centers can contribute to the comprehensiveness and specificity of the nursing outcomes measured in patient education. Therefore, the limitation in outcomes measured in the psychological health domain is considered one of the gaps in investigations conducted on nursing outcomes in NLCs.

According to the findings of our review, less publication about outcomes of the family and society health domain is considered one of the existing gaps in investigations performed on the outcomes of NLCs. The non-evaluated outcomes in the reviewed investigations include caregiver role endurance, caregiver stressors, caregiver emotional health, family coping, parenting performance, community disaster readiness, and community health screening effectiveness. However, nowadays, family and society play a crucial role in home-care due to the population aging and the spread of lifestyle-related chronic diseases^{44,45} so that the contemporary society requires human resources for health⁴⁶ and medical and nursing services to provide home-care services.^{47,48} Thus, it requires further study to best understand what it is the nurse may be teaching in these domains.

Satisfaction was one of the outcomes evaluated in the reviewed studies, which was expressed as general satisfaction, care satisfaction, and educational satisfaction. General satisfaction is a complex set encompassing various factors and requiring the examination of several aspects of services. As this outcome is affected by a complex set of factors, it produces a bias in answering and interpreting.

However, satisfaction is considered an important indicator of healthcare quality.^{49,50} Therefore, patients' satisfaction with services is also investigated in relation to the type of service.⁵¹ One of the dimensions of evaluating satisfaction is to determine patients' satisfaction with the education provided by nurses. Only one of the studies on nursing outcomes in NLCs evaluated the patients' satisfaction with education. The study reported that patients' satisfaction with the education provided by nurses was related to BSE.⁵² To improve patient satisfaction, healthcare providers need to be responsive to patients' concerns.^{53,54} Therefore, patients' satisfaction with the provided care or education may serve as a specific indicator to determine service efficacy at the initial stages of evaluation.

One of the interesting points among studies on the nursing outcomes of patient education in NLCs was the implementation of patient education as teamwork in most outpatient nursing clinics. A nurse's care is unique among health professions, and patient education has long been viewed as a priority. In the mid-1800s, nurses were recognized as caregivers who had responsibility for patient education. In early 1993, The Joint Commission (TJC) developed nursing standards for patient education. Later, patient education activities were recommended to other care providers,⁵⁵ and as part of TJC's patient education efforts, an interdisciplinary team approach was taken, meaning that patient education is an interdisciplinary team process.⁵⁶ Thus, it is expected that educational services provided by nurses at nursing clinics follow an interdisciplinary approach.

The reviewed investigations indicated that in-person education methods (individually or in groups) were most commonly used at outpatient NLCs, and non-attendance education was only limited to telephone contacts with patients. Due to modern technological developments, educational methods used in clinics change based on the needs of societies so that non-attendance education can employ eBook,⁵⁷ computer and tablet-based education at home,⁵⁸ software-based education,⁵⁵ game-based⁵⁹ and simulation based education,⁶⁰ which can effectively promote patients' knowledge.^{55,56}

Despite the exhaustive electronic search, our study had several limitations. First, the limited number of the studies selected by the reviewers did not include grey literature. Second, the retrieved studies were limited to those published in English journals.

Third, lack of specificity of actual material taught and how outcomes of teaching were measured in some of the studies. Fourth, time frame in which outcomes were measured was variable. Fifth, only evaluated teaching/patient education conducted in English.

Conclusion

According to the conducted search, the increasing diversity of recent investigations in the context of patient education and in the areas of educational methods, media,

and patient groups is helpful in the development of patient education; thus, it is necessary to consider the evaluation of education, especially concerning patient outcomes. According to our findings, further studies are needed to determine the effects of patient education provided in NLCs in terms of family/society health outcomes.

Acknowledgements

This study is part of a larger study and extracted from a doctoral dissertation. Authors appreciate research vice-chancellor of Mashhad University of Medical Sciences (Number: 980401).

Authors' Contribution

Conceptualization: Zohre Pouresmail, Fatemeh Heshmati Nabavi.

Data curation: Zohre Pouresmail, Najmeh Valizadeh Zare.

Formal analysis: Zohre Pouresmail, Fatemeh Heshmati Nabavi, Najmeh Valizadeh Zare.

Funding acquisition: Zohre Pouresmail, Fatemeh Heshmati Nabavi, Najmeh Valizadeh Zare.

Investigation: Fatemeh Heshmati Nabavi, Najmeh Valizadeh Zare.

Methodology: Zohre Pouresmail, Fatemeh Heshmati Nabavi, Najmeh Valizadeh Zare.

Project administration: Fatemeh Heshmati Nabavi.

Supervision: Fatemeh Heshmati Nabavi, Najmeh Valizadeh Zare.

Writing—original draft: Zohre Pouresmail, Fatemeh Heshmati Nabavi.

Competing Interests

The authors declare no conflict of interest in this study.

Ethical Approval

The Ethics Committee of Mashhad University of Medical Science, Mashhad, Iran, approved this project and assigned it the number "IR.MUMS.NURSE.REC.1398.057".

Funding

This research receive grant from Mashhad university of Medical Science with grant number 980401.

References

- Hansen-Turton T, Sherman S, King ES. Nurse-Led Health Clinics: Operations, Policy, and Opportunities. 1st ed. New York: Springer Publishing Company; 2015.

- Chan RJ, Marx W, Bradford N, Gordon L, Bonner A, Douglas C, et al. Clinical and economic outcomes of nurse-led services in the ambulatory care setting: a systematic review. *Int J Nurs Stud.* 2018; 81: 61-80. doi: [10.1016/j.ijnurstu.2018.02.002](https://doi.org/10.1016/j.ijnurstu.2018.02.002)
- Hatchett R. *Nurse-Led Clinics: Practical Issues*. 1st ed. New York: Routledge; 2013.
- Zhang T, Wu X, Peng G, Zhang Q, Chen L, Cai Z, et al. Effectiveness of standardized nursing terminologies for nursing practice and healthcare outcomes: a systematic review. *Int J Nurs Knowl.* 2021; 32(4): 220-8. doi: [10.1111/2047-3095.12315](https://doi.org/10.1111/2047-3095.12315)
- Moorhead S, Swanson E, Johnson M, Mass M. *Nursing Outcomes Classification (NOC), Measurement of Health Outcomes*. 6th ed. United States: Elsevier Health Sciences; 2018.
- Chae S, Oh H, Moorhead S. Effectiveness of nursing interventions using standardized nursing terminologies: an integrative review. *West J Nurs Res.* 2020; 42(11): 963-73. doi: [10.1177/0193945919900488](https://doi.org/10.1177/0193945919900488)
- Westra BL, Delaney CW, Konicek D, Keenan G. Nursing standards to support the electronic health record. *Nurs Outlook.* 2008; 56(5): 258-66.e1. doi: [10.1016/j.outlook.2008.06.005](https://doi.org/10.1016/j.outlook.2008.06.005)
- Iannicelli AM, De Matteo P, Vito D, Pellicchia E, Dodaro C, Giallauria F, et al. Use of the North American nursing diagnosis association taxonomies, nursing intervention classification, nursing outcomes classification and NANDA-NIC-NOC linkage in cardiac rehabilitation. *Monaldi Arch Chest Dis.* 2019; 89(2): 137-46. doi: [10.4081/monaldi.2019.1060](https://doi.org/10.4081/monaldi.2019.1060)
- Connolly C, Cotter P. Effectiveness of nurse-led clinics on healthcare delivery: an umbrella review. *J Clin Nurs.* 2023; 32(9-10): 1760-7. doi: [10.1111/jocn.16186](https://doi.org/10.1111/jocn.16186)
- Molassiotis A, Liu XL, Kwok SW. Impact of advanced nursing practice through nurse-led clinics in the care of cancer patients: a scoping review. *Eur J Cancer Care (Engl).* 2021; 30(1): e13358. doi: [10.1111/ecc.13358](https://doi.org/10.1111/ecc.13358)
- Corones-Watkins K, Cooke M, Theobald K, White K, Thompson DR, Ski CF, et al. Effectiveness of nurse-led clinics in the early discharge period after percutaneous coronary intervention: a systematic review. *Aust Crit Care.* 2021; 34(5): 510-7. doi: [10.1016/j.aucc.2020.10.012](https://doi.org/10.1016/j.aucc.2020.10.012)
- Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ.* 2021; 372: n71. doi: [10.1136/bmj.n71](https://doi.org/10.1136/bmj.n71)
- Riva JJ, Malik KM, Burnie SJ, Endicott AR, Busse JW. What is your research question? An introduction to the PICOT format for clinicians. *J Can Chiropr Assoc.* 2012; 56(3): 167-71.
- Reed RL, Revel AO, Carter A, Saadi HF, Dunn EV. A clinical trial of chronic care diabetic clinics in general practice in the United Arab Emirates: a preliminary analysis. *Arch Physiol Biochem.* 2001; 109(3): 272-80. doi: [10.1076/apab.109.3.272.11591](https://doi.org/10.1076/apab.109.3.272.11591)
- Canga N, De Irala J, Vara E, Duaso MJ, Ferrer A, Martínez-González MA. Intervention study for smoking cessation in diabetic patients: a randomized controlled trial in both clinical and primary care settings. *Diabetes Care.* 2000; 23(10): 1455-60. doi: [10.2337/diacare.23.10.1455](https://doi.org/10.2337/diacare.23.10.1455)
- Bebb C, Kendrick D, Coupland C, Madeley R, Stewart J, Brown K, et al. A cluster randomised controlled trial of the effect of a treatment algorithm for hypertension in patients with type 2 diabetes. *Br J Gen Pract.* 2007; 57(535): 136-43.
- Dean SC, Kerry SM, Khong TK, Kerry SR, Oakeshott P. Evaluation of a specialist nurse-led hypertension clinic with consultant backup in two inner city general practices: randomized controlled trial. *Fam Pract.* 2014; 31(2): 172-9. doi: [10.1093/fampra/cmt074](https://doi.org/10.1093/fampra/cmt074)
- Khoshkesht S, Zakerimoghdam M, Ghiyasvandian S,

Research Highlights

What is the current knowledge?

In NLCs, patient education is a distinct role of nursing. Care changes are determined by outcome measurement. NLCs have been found to be effective in the delivery of health care, particularly in the context of cancer patient care and early discharges. There is a scarcity of empirical information about the impact of NLCs on patient outcomes.

What is new here?

Most of the outcomes investigated in NLCs were linked to lifestyle-related chronic diseases.

The psychological health domain also examined as educational outcomes in NLCs.

Further research is needed to determine how NLCs influence family/society health outcomes.

- Kazemnejad A, Hashemian M. The effect of home-based pulmonary rehabilitation on self-efficacy in chronic obstructive pulmonary disease patients. *J Pak Med Assoc.* 2015; 65(10): 1041-6.
19. Efrainsson EO, Hillervik C, Ehrenberg A. Effects of COPD self-care management education at a nurse-led primary health care clinic. *Scand J Caring Sci.* 2008; 22(2): 178-85. doi: [10.1111/j.1471-6712.2007.00510.x](https://doi.org/10.1111/j.1471-6712.2007.00510.x)
 20. Gallefoss F, Bakke PS. Patient satisfaction with healthcare in asthmatics and patients with COPD before and after patient education. *Respir Med.* 2000; 94(11): 1057-64. doi: [10.1053/rmed.2000.0886](https://doi.org/10.1053/rmed.2000.0886)
 21. Gradwell C, Thomas KS, English JS, Williams HC. A randomized controlled trial of nurse follow-up clinics: do they help patients and do they free up consultants' time? *Br J Dermatol.* 2002; 147(3): 513-7. doi: [10.1046/j.1365-2133.2002.04901.x](https://doi.org/10.1046/j.1365-2133.2002.04901.x)
 22. de la Porte PW, Lok DJ, van Veldhuisen DJ, van Wijngaarden J, Cornel JH, Zuithoff NP, et al. Added value of a physician-and-nurse-directed heart failure clinic: results from the Deventer-Alkmaar heart failure study. *Heart.* 2007; 93(7): 819-25. doi: [10.1136/hrt.2006.095810](https://doi.org/10.1136/hrt.2006.095810)
 23. Driscoll A, Srivastava P, Toia D, Gibcus J, Hare DL. A nurse-led up-titration clinic improves chronic heart failure optimization of beta-adrenergic receptor blocking therapy--a randomized controlled trial. *BMC Res Notes.* 2014; 7: 668. doi: [10.1186/1756-0500-7-668](https://doi.org/10.1186/1756-0500-7-668)
 24. Ortiz-Bautista C, Morán-Fernández L, Díaz-García M, Delgado-Nicolás M, Ponz-de Antonio I, Rodríguez-Chaverri A, et al. Evaluation of a nurse-led intervention program in heart failure: a randomized trial. *Med Clin (Barc).* 2019; 152(11): 431-7. doi: [10.1016/j.medcli.2018.08.005](https://doi.org/10.1016/j.medcli.2018.08.005)
 25. Coronas-Watkins KM, Theobald KA, White KM. Outcomes of a randomised pilot trial of a nurse-led clinic for patients after percutaneous coronary intervention. *Aust Crit Care.* 2019; 32(4): 285-92. doi: [10.1016/j.aucc.2018.06.009](https://doi.org/10.1016/j.aucc.2018.06.009)
 26. Hicks K, Cocks K, Corbacho Martin B, Elton P, MacNab A, Colecliff W, et al. An intervention to reassure patients about test results in rapid access chest pain clinic: a pilot randomised controlled trial. *BMC Cardiovasc Disord.* 2014; 14: 138. doi: [10.1186/1471-2261-14-138](https://doi.org/10.1186/1471-2261-14-138)
 27. Unk JA, Brasington R. Efficacy study of multimedia rheumatoid arthritis patient education program. *J Am Assoc Nurse Pract.* 2014; 26(7): 370-7. doi: [10.1002/2327-6924.12064](https://doi.org/10.1002/2327-6924.12064)
 28. Chan SS, Leung DY, Leung AY, Lam C, Hung I, Chu D, et al. A nurse-delivered brief health education intervention to improve pneumococcal vaccination rate among older patients with chronic diseases: a cluster randomized controlled trial. *Int J Nurs Stud.* 2015; 52(1): 317-24. doi: [10.1016/j.ijnurstu.2014.06.008](https://doi.org/10.1016/j.ijnurstu.2014.06.008)
 29. Smith GD, Watson R, Roger D, McRorie E, Hurst N, Luman W, et al. Impact of a nurse-led counselling service on quality of life in patients with inflammatory bowel disease. *J Adv Nurs.* 2002; 38(2): 152-60. doi: [10.1046/j.1365-2648.2002.02159.x](https://doi.org/10.1046/j.1365-2648.2002.02159.x)
 30. Zhang Q, Li F, Zhang H, Yu X, Cong Y. Effects of nurse-led home-based exercise & cognitive behavioral therapy on reducing cancer-related fatigue in patients with ovarian cancer during and after chemotherapy: a randomized controlled trial. *Int J Nurs Stud.* 2018; 78: 52-60. doi: [10.1016/j.ijnurstu.2017.08.010](https://doi.org/10.1016/j.ijnurstu.2017.08.010)
 31. Porthouse J, Cockayne S, King C, Saxon L, Steele E, Aspray T, et al. Randomised controlled trial of calcium and supplementation with cholecalciferol (vitamin D3) for prevention of fractures in primary care. *BMJ.* 2005; 330(7498): 1003. doi: [10.1136/bmj.330.7498.1003](https://doi.org/10.1136/bmj.330.7498.1003)
 32. New JP, Mason JM, Freemantle N, Teasdale S, Wong LM, Bruce NJ, et al. Specialist nurse-led intervention to treat and control hypertension and hyperlipidemia in diabetes (SPLINT): a randomized controlled trial. *Diabetes Care.* 2003; 26(8): 2250-5. doi: [10.2337/diacare.26.8.2250](https://doi.org/10.2337/diacare.26.8.2250)
 33. Visser A, Bos WC, Prins JB, Hoogerbrugge N, van Laarhoven HW. Breast self-examination education for BRCA mutation carriers by clinical nurse specialists. *Clin Nurse Spec.* 2015; 29(3): E1-7. doi: [10.1097/nur.0000000000000118](https://doi.org/10.1097/nur.0000000000000118)
 34. Brouwer-Goossensen D, Scheele M, van Genugten L, Lingsma HF, Dippel DWJ, Koudstaal PJ, et al. Motivational interviewing in a nurse-led outpatient clinic to support lifestyle behaviour change after admission to a stroke unit: a randomized controlled trial. *Eur J Cardiovasc Nurs.* 2022; 21(1): 36-45. doi: [10.1093/eurjcn/zvab001](https://doi.org/10.1093/eurjcn/zvab001)
 35. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JP, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *J Clin Epidemiol.* 2009; 62(10): e1-34. doi: [10.1016/j.jclinepi.2009.06.006](https://doi.org/10.1016/j.jclinepi.2009.06.006)
 36. Thomas BH, Ciliska D, Dobbins M, Micucci S. A process for systematically reviewing the literature: providing the research evidence for public health nursing interventions. *Worldviews Evid Based Nurs.* 2004; 1(3): 176-84. doi: [10.1111/j.1524-475X.2004.04006.x](https://doi.org/10.1111/j.1524-475X.2004.04006.x)
 37. Kearney-Nunnery R. *Advancing Your Career Concepts in Professional Nursing.* 7th ed. New York: FA Davis Company; 2019.
 38. Poitras ME, Chouinard MC, Gallagher F, Fortin M. Nursing activities for patients with chronic disease in primary care settings: a practice analysis. *Nurs Res.* 2018; 67(1): 35-42. doi: [10.1097/nnr.0000000000000253](https://doi.org/10.1097/nnr.0000000000000253)
 39. Farazian F, Emami Moghadam Z, Heshmati Nabavi F, Behnam Vashani H. Effect of self-care education designed based on bandura's self-efficacy model on patients with hypertension: a randomized clinical trial. *Evid Based Care.* 2019; 9(2): 44-52. doi: [10.22038/ebcj.2019.36466.1944](https://doi.org/10.22038/ebcj.2019.36466.1944)
 40. Laurant M, van der Biezen M, Wijers N, Watananirun K, Kontopantelis E, van Vught AJ. Nurses as substitutes for doctors in primary care. *Cochrane Database Syst Rev.* 2018; 7(7): CD001271. doi: [10.1002/14651858.CD001271.pub3](https://doi.org/10.1002/14651858.CD001271.pub3)
 41. Pitman A, Suleman S, Hyde N, Hodgkiss A. Depression and anxiety in patients with cancer. *BMJ.* 2018; 361: k1415. doi: [10.1136/bmj.k1415](https://doi.org/10.1136/bmj.k1415)
 42. Cohen SD, Cukor D, Kimmel PL. Anxiety in patients treated with hemodialysis. *Clin J Am Soc Nephrol.* 2016; 11(12): 2250-5. doi: [10.2215/cjn.02590316](https://doi.org/10.2215/cjn.02590316)
 43. Stamenkovic DM, Rancic NK, Latas MB, Neskovic V, Rondovic GM, Wu JD, et al. Preoperative anxiety and implications on postoperative recovery: what can we do to change our history. *Minerva Anesthesiol.* 2018; 84(11): 1307-17. doi: [10.23736/s0375-9393.18.12520-x](https://doi.org/10.23736/s0375-9393.18.12520-x)
 44. Kanda M, Ota E, Fukuda H, Miyauchi S, Gilmour S, Kono Y, et al. Effectiveness of community-based health services by nurse practitioners: protocol for a systematic review and meta-analysis. *BMJ Open.* 2015; 5(6): e006670. doi: [10.1136/bmjopen-2014-006670](https://doi.org/10.1136/bmjopen-2014-006670)
 45. Davison EA, Swanson EA. Patient and nurse experiences in a rural chronic disease management program: a qualitative evaluation. *Prof Case Manag.* 2018; 23(1): 10-8. doi: [10.1097/ncm.0000000000000244](https://doi.org/10.1097/ncm.0000000000000244)
 46. Sheikh M, Boerma T, Cometto G, Duvivier R. Human resources for universal health coverage: a call for papers. *Bull World Health Organ.* 2013; 91(2): 84-84A. doi: [10.2471/blt.13.117200](https://doi.org/10.2471/blt.13.117200)
 47. Palesy D, Jakimowicz S, Saunders C, Lewis J. Home care in Australia: an integrative review. *Home Health Care Serv Q.* 2018; 37(2): 113-39. doi: [10.1080/01621424.2018.1438952](https://doi.org/10.1080/01621424.2018.1438952)

48. Andrade AM, Silva KL, Seixas CT, Braga PP. Nursing practice in home care: an integrative literature review. *Rev Bras Enferm.* 2017; 70(1): 210-9. doi: [10.1590/0034-7167-2016-0214](https://doi.org/10.1590/0034-7167-2016-0214)
49. Brédart A, Coens C, Aaronson N, Chie WC, Efficace F, Conroy T, et al. Determinants of patient satisfaction in oncology settings from European and Asian countries: preliminary results based on the EORTC IN-PATSAT32 questionnaire. *Eur J Cancer.* 2007; 43(2): 323-30. doi: [10.1016/j.ejca.2006.10.016](https://doi.org/10.1016/j.ejca.2006.10.016)
50. Heshmati Nabavi F, Rajabpoor M, Mahmoodi J, Pouresmail Z, Mikaniki T. Comparing the patient's satisfaction with educational performance of the physicians and the nurses. *Jundishapur J Chronic Dis Care.* 2016; 5(1): e60306. doi: [10.17795/jjcdc-29190](https://doi.org/10.17795/jjcdc-29190)
51. Samimi Kalat M, Ramezani M, Heshmati Nabavi F, Saki A. Investigation the suitability of patient education pamphlets and patient satisfaction among teaching hospitals in 2015. *Evid Based Care.* 2019; 8(4): 45-51. doi: [10.22038/ebcj.2018.34642.1883](https://doi.org/10.22038/ebcj.2018.34642.1883)
52. Visser A, Bos WC, Prins JB, Hoogerbrugge N, van Laarhoven HW. Breast self-examination education for BRCA mutation carriers by clinical nurse specialists. *Clin Nurse Spec.* 2015; 29(3): E1-7. doi: [10.1097/nur.0000000000000118](https://doi.org/10.1097/nur.0000000000000118)
53. Walker MS, Ristvedt SL, Haughey BH. Patient care in multidisciplinary cancer clinics: does attention to psychosocial needs predict patient satisfaction? *Psychooncology.* 2003; 12(3): 291-300. doi: [10.1002/pon.651](https://doi.org/10.1002/pon.651)
54. Uitterhoeve R, Bensing J, Dilven E, Donders R, de Mulder P, van Achterberg T. Nurse-patient communication in cancer care: does responding to patient's cues predict patient satisfaction with communication. *Psychooncology.* 2009; 18(10): 1060-8. doi: [10.1002/pon.1434](https://doi.org/10.1002/pon.1434)
55. Guo Y, Chen Y, Lane DA, Liu L, Wang Y, Lip GYH. Mobile health technology for atrial fibrillation management integrating decision support, education, and patient involvement: mAF app trial. *Am J Med.* 2017; 130(12): 1388-96.e6. doi: [10.1016/j.amjmed.2017.07.003](https://doi.org/10.1016/j.amjmed.2017.07.003)
56. Bastable SB. *Nurse as Educator: Principles of Teaching and Learning for Nursing Practice.* 5th ed. USA: Jones & Bartlett Learning; 2019.
57. Sahyouni R, Mahmoodi A, Mahmoodi A, Rajaii RR, Hasjim BJ, Bustillo D, et al. Interactive iBook-based patient education in a neurotrauma clinic. *Neurosurgery.* 2017; 81(5): 787-94. doi: [10.1093/neuros/nyx095](https://doi.org/10.1093/neuros/nyx095)
58. Morgan ER, Laing K, McCarthy J, McCrate F, Seal MD. Using tablet-based technology in patient education about systemic therapy options for early-stage breast cancer: a pilot study. *Curr Oncol.* 2015; 22(5): e364-9. doi: [10.3747/co.22.2476](https://doi.org/10.3747/co.22.2476)
59. Maganty N, Ilyas M, Zhang N, Sharma A. Online, game-based education for melanoma recognition: a pilot study. *Patient Educ Couns.* 2018; 101(4): 738-42. doi: [10.1016/j.pec.2017.11.003](https://doi.org/10.1016/j.pec.2017.11.003)
60. Pouresmail Z, Heshmati Nabavi F, Abdollahi A, Shakeri MT, Saki A. Effect of using a simulation device for ostomy self-care teaching in Iran: a pilot, randomized clinical trial. *Wound Manag Prev.* 2019; 65(6): 30-9.