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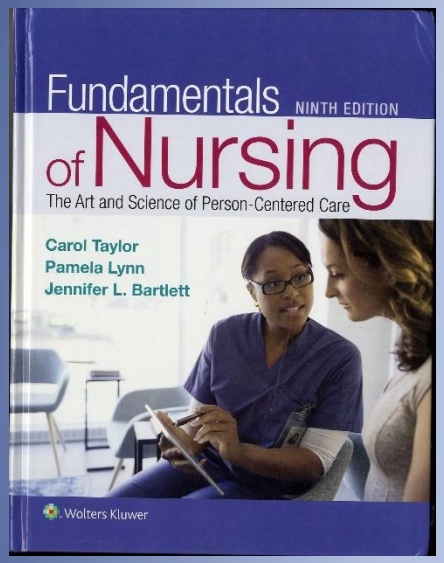

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Parts of a Research Journal Article-Page 40, Table 2-6

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Abstract	The abstract is at the beginning of the article. It summarizes the entire article and usually provides the purpose of the study, a description of the subjects, data collection and data analysis, and a summary of important findings.
Introduction • Review of the literature • Statement of the purpose	The literature review discusses relevant studies that have been conducted in the area of this study. A statement of the specific goals or purpose of the study often follows the review.
Method • Subjects • Design • Data collection • Data analysis	The methods section provides in detail how the study was conducted, including who and how many subjects, what research design was used, what data were collected and how, and types of analysis done. There should be enough information so that the study could be replicated (repeated).
Results	The results (findings) are often presented both in words and in charts, tables, or graphs. It is important to understand what the results were and if they are meaningful.
Discussion (conclusion)	The discussion section reports what the results mean in regard to the purpose of the study and the literature review. It may also include suggestions for further research and application to nursing education or practice, as appropriate.
References	The references are at the end of the article and include a list of articles and books used by the researcher.

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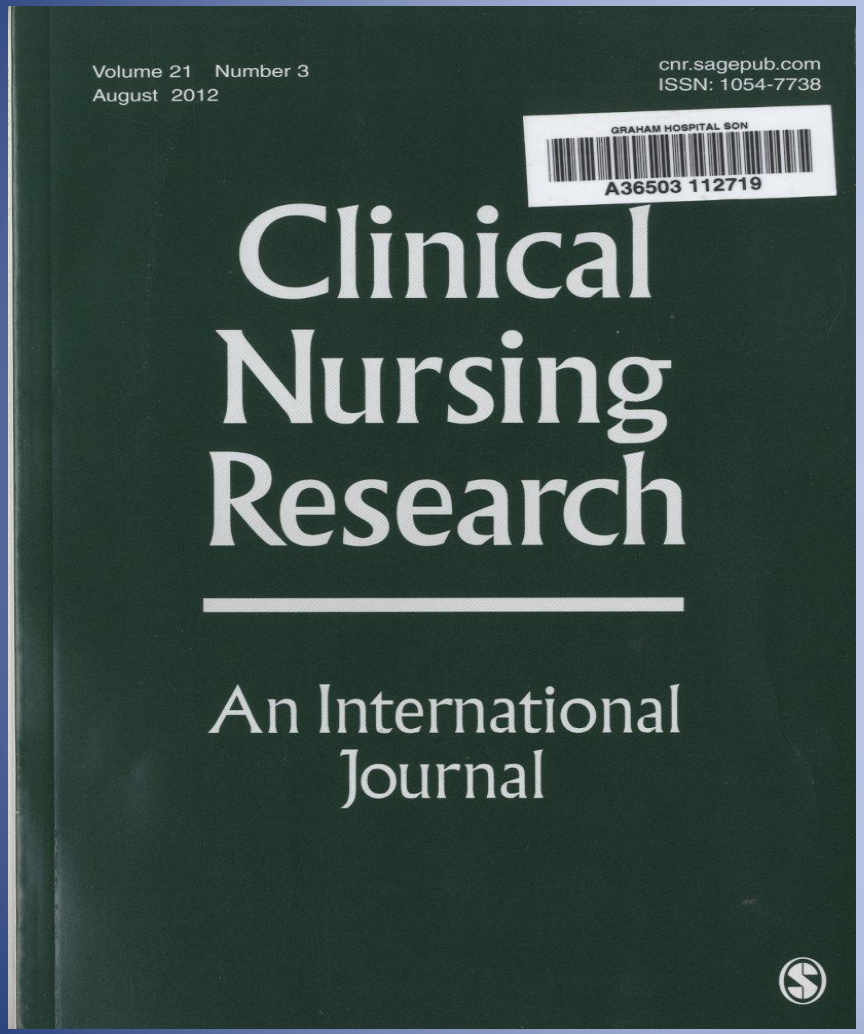

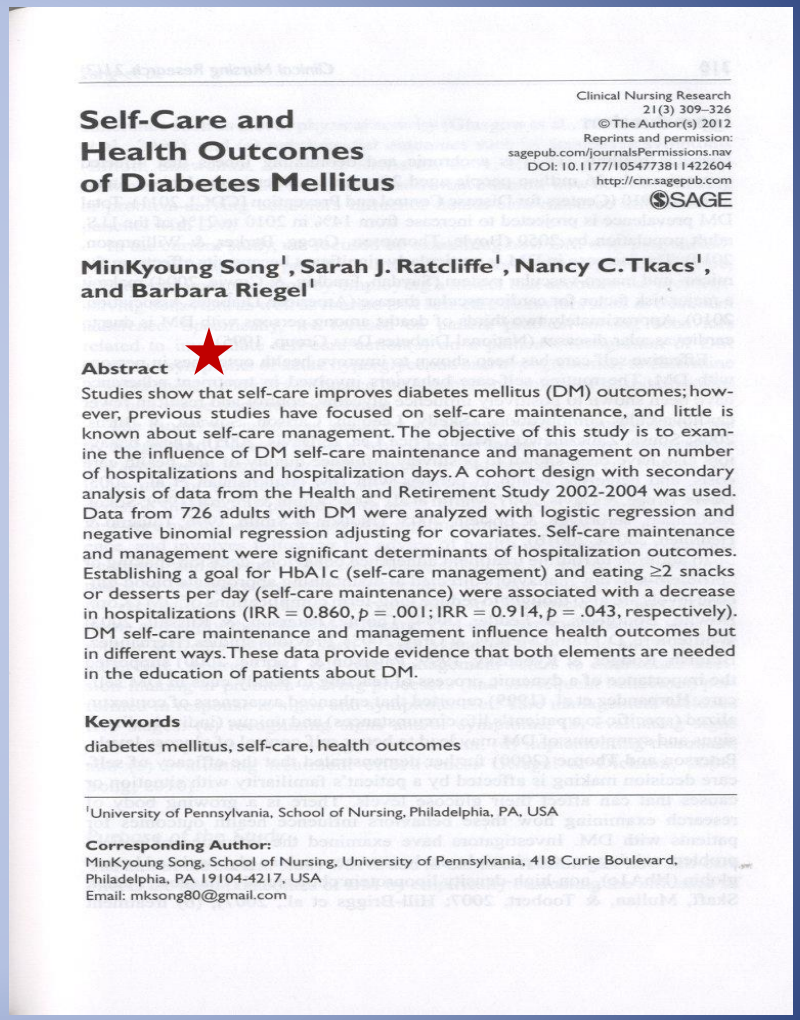

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Self-Care and Health Outcomes of Diabetes Mellitus

MinKyoung Song[1], Sarah J. Ratcliffe[1], Nancy C. Tkacs[1], and Barbara Riegel[1]

Abstract

Studies show that self-care improves diabetes mellitus (DM) outcomes; however, previous studies have focused on self-care maintenance, and little is known about self-care management. The objective of this study is to examine the influence of DM self-care maintenance and management on number of hospitalizations and hospitalization days. A cohort design with secondary analysis of data from the Health and Retirement Study 2002-2004 was used. Data from 726 adults with DM were analyzed with logistic regression and negative binomial regression adjusting for covariates. Self-care maintenance and management were significant determinants of hospitalization outcomes. Establishing a goal for HbA1c (self-care management) and eating ≥2 snacks or desserts per day (self-care maintenance) were associated with a decrease in hospitalizations (IRR = 0.860, $p = .001$; IRR = 0.914, $p = .043$, respectively). DM self-care maintenance and management influence health outcomes but in different ways. These data provide evidence that both elements are needed in the education of patients about DM.

Keywords

diabetes mellitus, self-care, health outcomes

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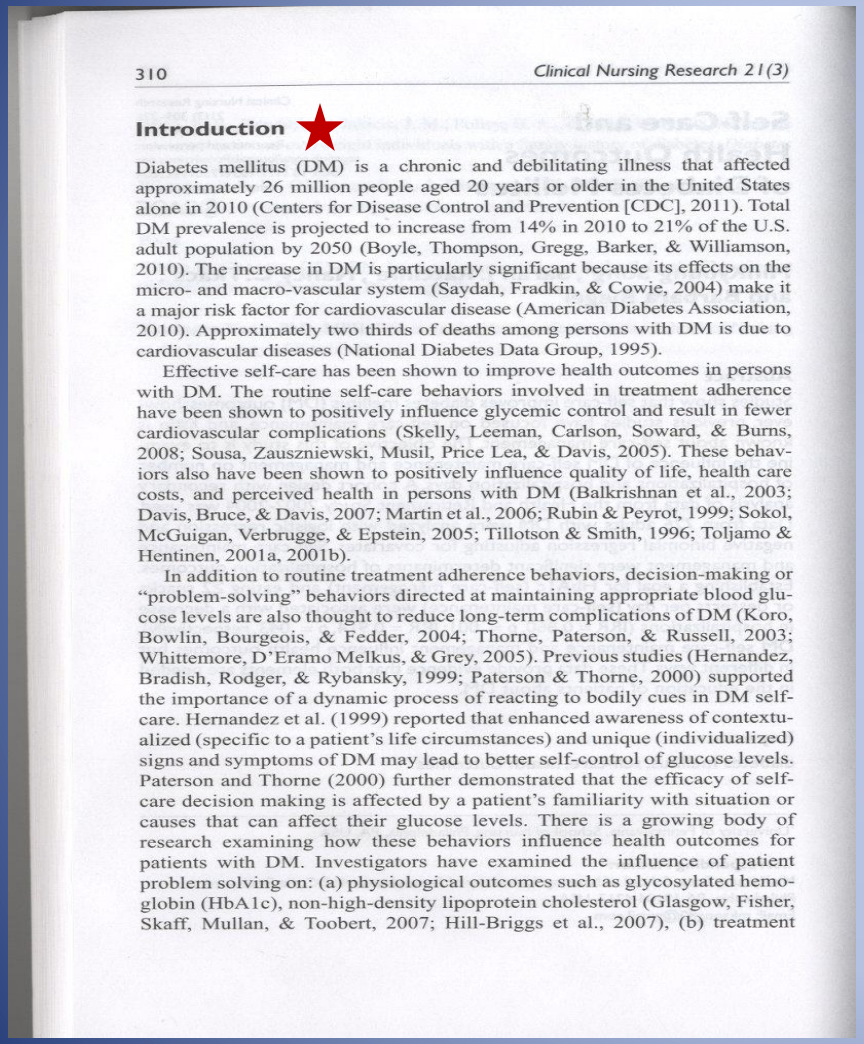
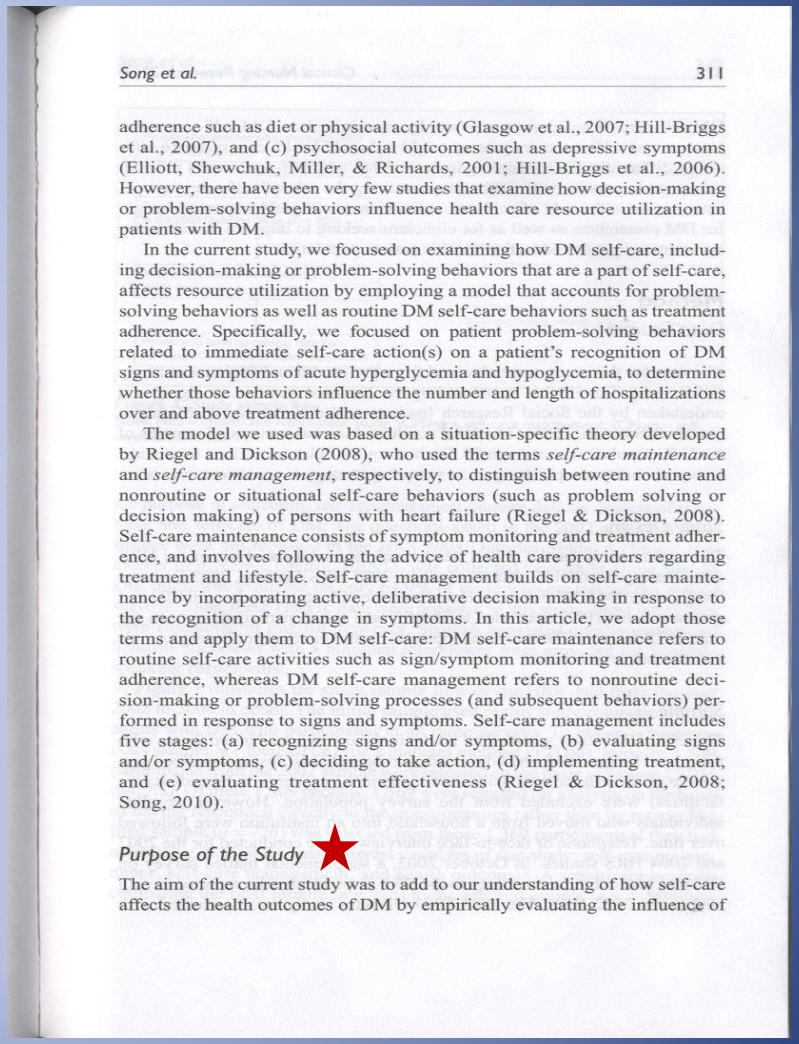


Introduction

Diabetes mellitus (DM) is a chronic and debilitating illness that affected approximately 26 million people aged 20 years or older in the United States alone in 2010 (Centers for Disease Control and Prevention [CDC], 2011). Total DM prevalence is projected to increase from 14% in 2010 to 21% of the U.S. adult population by 2050 (Boyle, Thompson, Gregg, Barker, & Williamson, 2010). The increase in DM is particularly significant because its effects on the micro- and macro-vascular system (Saydah, Fradkin, & Cowie, 2004) make it a major risk factor for cardiovascular disease (American Diabetes Association, 2010). Approximately two thirds of deaths among persons with DM is due to cardiovascular diseases (National Diabetes Data Group, 1995).

Effective self-care has been shown to improve health outcomes in persons with DM. The routine self-care behaviors involved in treatment adherence have been shown to positively influence glycemic control and result in fewer cardiovascular complications (Skelly, Leeman, Carlson, Soward, & Burns, 2008; Sousa, Zauszniewski, Musil, Price Lea, & Davis, 2005). These behaviors also have been shown to positively influence quality of life, health care costs, and perceived health in persons with DM (Balkrishnan et al., 2003; Davis, Bruce, & Davis, 2007; Martin et al., 2006; Rubin & Peyrot, 1999; Sokol, McGuigan, Verbrugge, & Epstein, 2005; Tillotson & Smith, 1996; Toljamo & Hentinen, 2001a, 2001b).

In addition to routine treatment adherence behaviors, decision-making or "problem-solving" behaviors directed at maintaining appropriate blood glucose levels are also thought to reduce long-term complications of DM (Koro, Bowlin, Bourgeois, & Fedder, 2004; Thorne, Paterson, & Russell, 2003; Whittemore, D'Eramo Melkus, & Grey, 2005). Previous studies (Hernandez, Bradish, Rodger, & Rybansky, 1999; Paterson & Thorne, 2000) supported the importance of a dynamic process of reacting to bodily cues in DM self-care. Hernandez et al. (1999) reported that enhanced awareness of contextualized (specific to a patient's life circumstances) and unique (individualized) signs and symptoms of DM may lead to better self-control of glucose levels. Paterson and Thorne (2000) further demonstrated that the efficacy of self-care decision making is affected by a patient's familiarity with situation or causes that can affect their glucose levels. There is a growing body of research examining how these behaviors influence health outcomes for patients with DM. Investigators have examined the influence of patient problem solving on: (a) physiological outcomes such as glycosylated hemoglobin (HbA1c), non-high-density lipoprotein cholesterol (Glasgow, Fisher, Skaff, Mullan, & Toobert, 2007; Hill-Briggs et al., 2007), (b) treatment



adherence such as diet or physical activity (Glasgow et al., 2007; Hill-Briggs et al., 2007), and (c) psychosocial outcomes such as depressive symptoms (Elliott, Shewchuk, Miller, & Richards, 2001; Hill-Briggs et al., 2006). However, there have been very few studies that examine how decision-making or problem-solving behaviors influence health care resource utilization in patients with DM.

In the current study, we focused on examining how DM self-care, including decision-making or problem-solving behaviors that are a part of self-care, affects resource utilization by employing a model that accounts for problem-solving behaviors as well as routine DM self-care behaviors such as treatment adherence. Specifically, we focused on patient problem-solving behaviors related to immediate self-care action(s) on a patient's recognition of DM signs and symptoms of acute hyperglycemia and hypoglycemia, to determine whether those behaviors influence the number and length of hospitalizations over and above treatment adherence.

The model we used was based on a situation-specific theory developed by Riegel and Dickson (2008), who used the terms *self-care maintenance* and *self-care management*, respectively, to distinguish between routine and nonroutine or situational self-care behaviors (such as problem solving or decision making) of persons with heart failure (Riegel & Dickson, 2008). Self-care maintenance consists of symptom monitoring and treatment adherence, and involves following the advice of health care providers regarding treatment and lifestyle. Self-care management builds on self-care maintenance by incorporating active, deliberative decision making in response to the recognition of a change in symptoms. In this article, we adopt those terms and apply them to DM self-care: DM self-care maintenance refers to routine self-care activities such as sign/symptom monitoring and treatment adherence, whereas DM self-care management refers to nonroutine decision-making or problem-solving processes (and subsequent behaviors) performed in response to signs and symptoms. Self-care management includes five stages: (a) recognizing signs and/or symptoms, (b) evaluating signs and/or symptoms, (c) deciding to take action, (d) implementing treatment, and (e) evaluating treatment effectiveness (Riegel & Dickson, 2008; Song, 2010).

Purpose of the Study

The aim of the current study was to add to our understanding of how self-care affects the health outcomes of DM by empirically evaluating the influence of

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DM self-care on health outcomes and by examining how DM self-care maintenance and self-care management might influence health care resource utilization differently. Understanding in more detail why self-care results in better outcomes in persons with DM and quantifying the role of self-care management vis-à-vis the role of self-care maintenance will yield important insight for DM researchers as well as for clinicians seeking to improve disease management and patient education for this patient population.

Method

Data Sources

The data for this study were obtained from the Health and Retirement Study (HRS, n.d.). The HRS is sponsored by the National Institute on Aging and undertaken by the Social Research Institute at the University of Michigan (Juster & Suzman, 1995). The HRS conducts biennial surveys of samples of the U.S. population above age 50. Each sample is selected under a multistage area probability sample design; the sampling strategy is consistent over time.

Study Design

The current study used a cohort design with secondary analysis of the HRS data. Three years of HRS data were used—2002 HRS database, 2003 Diabetes Study, and 2004 HRS database. Household identification number (HHID) and person number (PN) were used to identify and match participants across the three HRS data sets. The study was approved by the University of Pennsylvania's institutional review board.

Sample

The 2002 HRS study sampled all adults in the contiguous United States who were born before 1948 and who resided in households. Institutionalized persons (e.g., those in prisons, jails, nursing homes, long-term or dependent care facilities) were excluded from the survey population. However, enrolled individuals who moved from a household into an institution were followed over time. Telephone or face-to-face interviews were conducted for the 2002 and 2004 HRS studies. In October 2003, a supplemental mailed survey on DM was sent out in two mailings to the HRS respondents who reported having DM in the 2002 HRS. The HRS 2003 Diabetes Study was conducted with

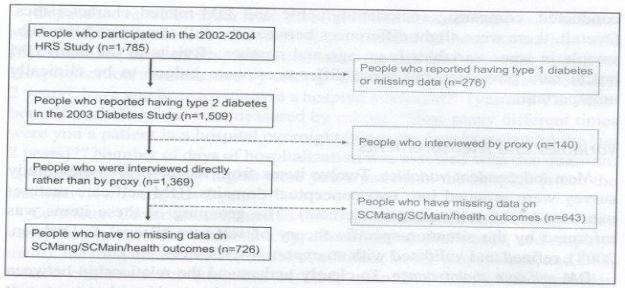

Figure 1. Study sample flow
Note: HRS = Health and Retirement Study; SCMang = self-care management; SCMain = self-care maintenance.

the purpose of collecting self-reported questionnaire data on aspects of treatment and self-care of DM. The questions asked in the 2002 and 2004 HRS studies were not repeated in the HRS 2003 Diabetes Study. A clinical biomarker of glycemic control, HbA1c, was collected through at-home HbA1c kits, but it was available on only 64.9% of those who completed the mailed surveys. Thus, these HbA1c data were not used in this study. Most interviews were conducted in English; however, Spanish translated questionnaires and Spanish interviews with a bilingual interviewer were provided for Spanish-speaking participants.

Figure 1 illustrates the study sample flow of the HRS data from the year 2002 to 2004 in detail. The initial sample used in this study comprised 1,785 adults with DM who participated in all three surveys. To obtain a homogenous sample, we focused on type 2 diabetes mellitus (T2DM). Initially, 1,509 participants from the 2002 sample were selected on the basis of having T2DM (84.5%). Of these 1,509 persons, 1,369 were selected for analysis on the basis of having responded directly to the questionnaires rather than by proxy. The final sample ($n = 726$) was selected from those 1,369 participants if they had no missing data on the main interest variables of this study: self-care maintenance, self-care management, and health outcomes. A sensitivity analysis comparing the final sample ($n = 726$) to the original sample ($n = 1,369$) was

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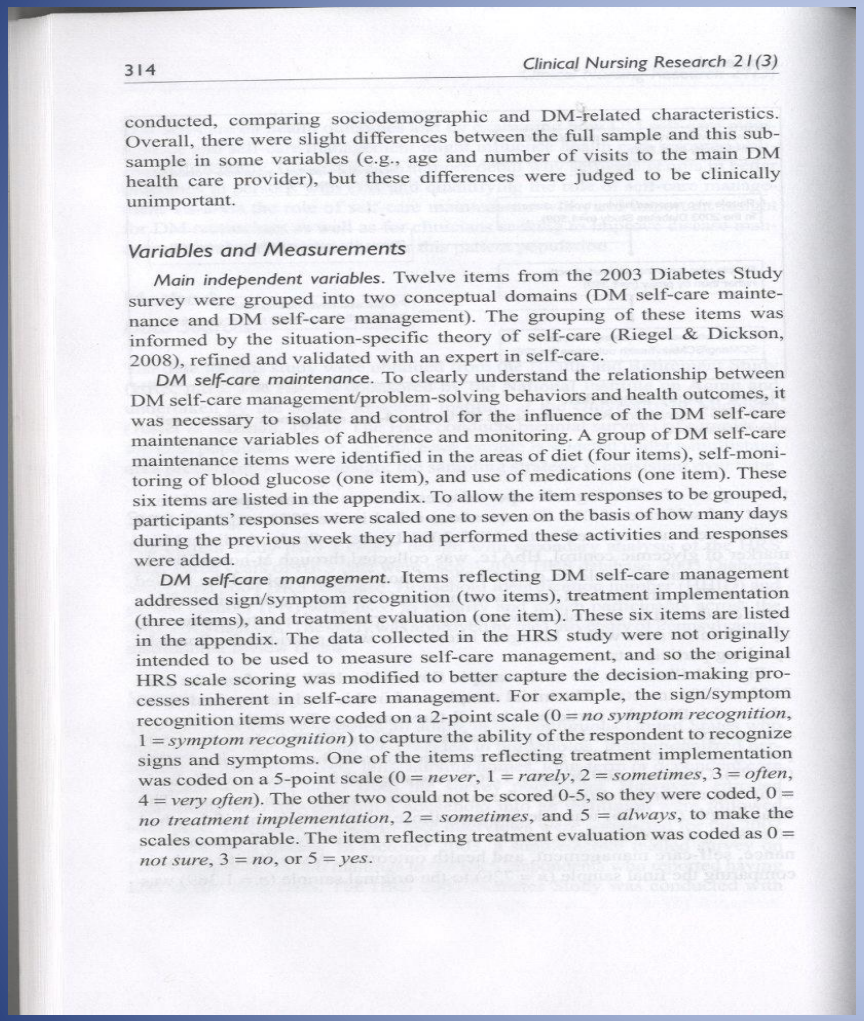


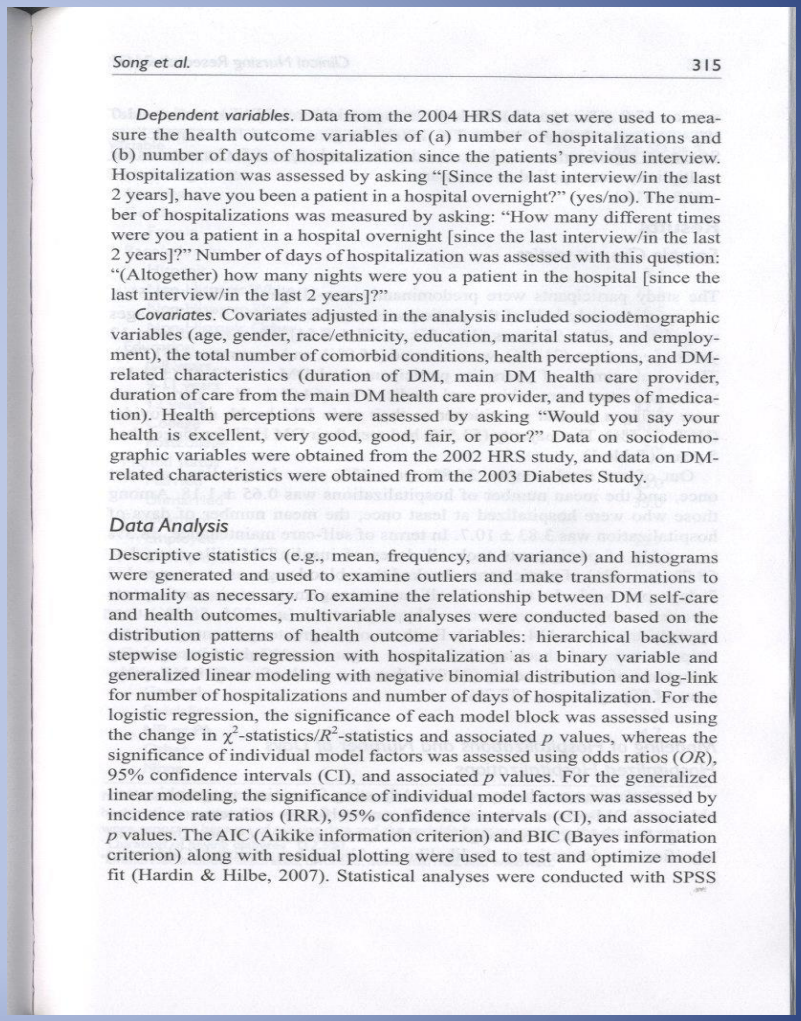
conducted, comparing sociodemographic and DM-related characteristics. Overall, there were slight differences between the full sample and this subsample in some variables (e.g., age and number of visits to the main DM health care provider), but these differences were judged to be clinically unimportant.

Variables and Measurements

Main independent variables. Twelve items from the 2003 Diabetes Study survey were grouped into two conceptual domains (DM self-care maintenance and DM self-care management). The grouping of these items was informed by the situation-specific theory of self-care (Riegel & Dickson, 2008), refined and validated with an expert in self-care.

DM self-care maintenance. To clearly understand the relationship between DM self-care management/problem-solving behaviors and health outcomes, it was necessary to isolate and control for the influence of the DM self-care maintenance variables of adherence and monitoring. A group of DM self-care maintenance items were identified in the areas of diet (four items), self-monitoring of blood glucose (one item), and use of medications (one item). These six items are listed in the appendix. To allow the item responses to be grouped, participants' responses were scaled one to seven on the basis of how many days during the previous week they had performed these activities and responses were added.

DM self-care management. Items reflecting DM self-care management addressed sign/symptom recognition (two items), treatment implementation (three items), and treatment evaluation (one item). These six items are listed in the appendix. The data collected in the HRS study were not originally intended to be used to measure self-care management, and so the original HRS scale scoring was modified to better capture the decision-making processes inherent in self-care management. For example, the sign/symptom recognition items were coded on a 2-point scale (0 = *no symptom recognition*, 1 = *symptom recognition*) to capture the ability of the respondent to recognize signs and symptoms. One of the items reflecting treatment implementation was coded on a 5-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *very often*). The other two could not be scored 0-5, so they were coded, 0 = *no treatment implementation*, 2 = *sometimes*, and 5 = *always*, to make the scales comparable. The item reflecting treatment evaluation was coded as 0 = *not sure*, 3 = *no*, or 5 = *yes*.



Dependent variables. Data from the 2004 HRS data set were used to measure the health outcome variables of (a) number of hospitalizations and (b) number of days of hospitalization since the patients' previous interview. Hospitalization was assessed by asking "[Since the last interview/in the last 2 years], have you been a patient in a hospital overnight?" (yes/no). The number of hospitalizations was measured by asking: "How many different times were you a patient in a hospital overnight [since the last interview/in the last 2 years]?" Number of days of hospitalization was assessed with this question: "(Altogether) how many nights were you a patient in the hospital [since the last interview/in the last 2 years]?"

Covariates. Covariates adjusted in the analysis included sociodemographic variables (age, gender, race/ethnicity, education, marital status, and employment), the total number of comorbid conditions, health perceptions, and DM-related characteristics (duration of DM, main DM health care provider, duration of care from the main DM health care provider, and types of medication). Health perceptions were assessed by asking "Would you say your health is excellent, very good, good, fair, or poor?" Data on sociodemographic variables were obtained from the 2002 HRS study, and data on DM-related characteristics were obtained from the 2003 Diabetes Study.

Data Analysis

Descriptive statistics (e.g., mean, frequency, and variance) and histograms were generated and used to examine outliers and make transformations to normality as necessary. To examine the relationship between DM self-care and health outcomes, multivariable analyses were conducted based on the distribution patterns of health outcome variables: hierarchical backward stepwise logistic regression with hospitalization as a binary variable and generalized linear modeling with negative binomial distribution and log-link for number of hospitalizations and number of days of hospitalization. For the logistic regression, the significance of each model block was assessed using the change in χ^2-statistics/R^2-statistics and associated p values, whereas the significance of individual model factors was assessed using odds ratios (*OR*), 95% confidence intervals (CI), and associated p values. For the generalized linear modeling, the significance of individual model factors was assessed by incidence rate ratios (IRR), 95% confidence intervals (CI), and associated p values. The AIC (Aikike information criterion) and BIC (Bayes information criterion) along with residual plotting were used to test and optimize model fit (Hardin & Hilbe, 2007). Statistical analyses were conducted with SPSS

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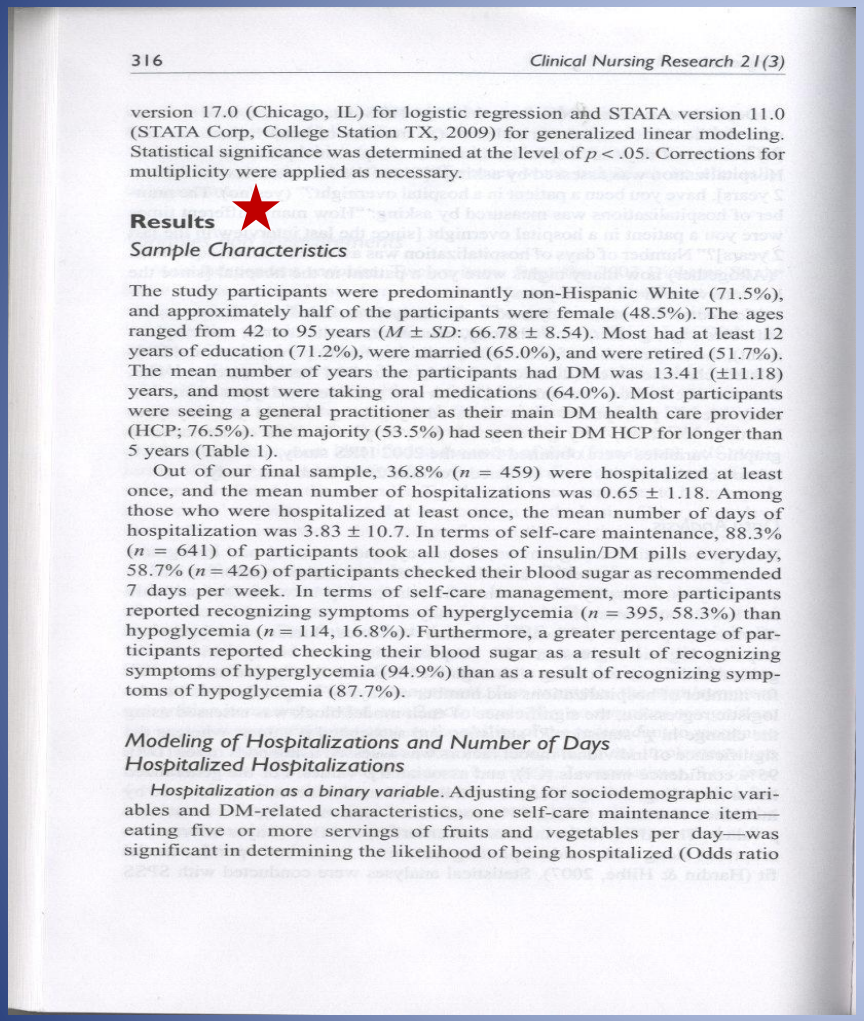

version 17.0 (Chicago, IL) for logistic regression and STATA version 11.0 (STATA Corp, College Station TX, 2009) for generalized linear modeling. Statistical significance was determined at the level of $p < .05$. Corrections for multiplicity were applied as necessary.

Results

Sample Characteristics

The study participants were predominantly non-Hispanic White (71.5%), and approximately half of the participants were female (48.5%). The ages ranged from 42 to 95 years ($M \pm SD$: 66.78 ± 8.54). Most had at least 12 years of education (71.2%), were married (65.0%), and were retired (51.7%). The mean number of years the participants had DM was 13.41 (±11.18) years, and most were taking oral medications (64.0%). Most participants were seeing a general practitioner as their main DM health care provider (HCP; 76.5%). The majority (53.5%) had seen their DM HCP for longer than 5 years (Table 1).

Out of our final sample, 36.8% (n = 459) were hospitalized at least once, and the mean number of hospitalizations was 0.65 ± 1.18. Among those who were hospitalized at least once, the mean number of days of hospitalization was 3.83 ± 10.7. In terms of self-care maintenance, 88.3% (n = 641) of participants took all doses of insulin/DM pills everyday, 58.7% (n = 426) of participants checked their blood sugar as recommended 7 days per week. In terms of self-care management, more participants reported recognizing symptoms of hyperglycemia (n = 395, 58.3%) than hypoglycemia (n = 114, 16.8%). Furthermore, a greater percentage of participants reported checking their blood sugar as a result of recognizing symptoms of hyperglycemia (94.9%) than as a result of recognizing symptoms of hypoglycemia (87.7%).

Modeling of Hospitalizations and Number of Days Hospitalized Hospitalizations

Hospitalization as a binary variable. Adjusting for sociodemographic variables and DM-related characteristics, one self-care maintenance item—eating five or more servings of fruits and vegetables per day—was significant in determining the likelihood of being hospitalized (Odds ratio

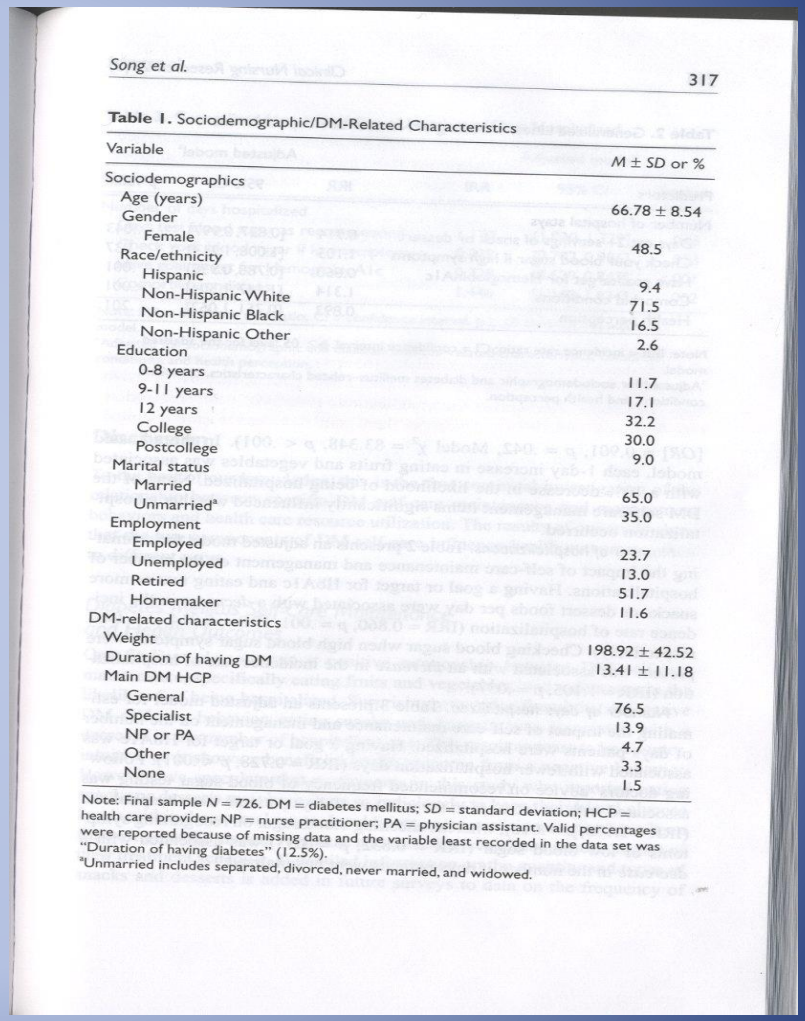

Table 1. Sociodemographic/DM-Related Characteristics

Variable	$M \pm SD$ or %
Sociodemographics	
Age (years)	66.78 ± 8.54
Gender	
Female	48.5
Race/ethnicity	
Hispanic	9.4
Non-Hispanic White	71.5
Non-Hispanic Black	16.5
Non-Hispanic Other	2.6
Education	
0-8 years	11.7
9-11 years	17.1
12 years	32.2
College	30.0
Postcollege	9.0
Marital status	
Married	65.0
Unmarried[a]	35.0
Employment	
Employed	23.7
Unemployed	13.0
Retired	51.7
Homemaker	11.6
DM-related characteristics	
Weight	198.92 ± 42.52
Duration of having DM	13.41 ± 11.18
Main DM HCP	
General	76.5
Specialist	13.9
NP or PA	4.7
Other	3.3
None	1.5

Note: Final sample N = 726. DM = diabetes mellitus; SD = standard deviation; HCP = health care provider; NP = nurse practitioner; PA = physician assistant. Valid percentages were reported because of missing data and the variable least recorded in the data set was "Duration of having diabetes" (12.5%).
[a]Unmarried includes separated, divorced, never married, and widowed.

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Table 2. Generalized Linear Modeling of Number of Hospitalizations

Predictors	Adjusted model[a] IRR	95% CI	p value
Number of hospital stays			
Days eat 2+ servings of snack or dessert	0.914	[0.837, 0.997]	.043
Check your blood sugar if high symptoms	1.105	[1.006, 1.214]	.037
Have goal/target for HemoglobinA1c	0.860	[0.788, 0.938]	.001
Comorbid conditions	1.314	[1.147, 1.504]	<.001
Health perception	0.893	[0.751, 1.062]	.201

Note: IRR = incidence rate ratio; CI = confidence interval. $p \geq .05$ level for the adjusted model.
[a]Adjusted for sociodemographic and diabetes mellitus–related characteristics, comorbid conditions, and health perception.

[*OR*] = 0.901, $p = .042$, Model $\chi^2 = 83.348$, $p < .001$). In the adjusted model, each 1-day increase in eating fruits and vegetables was associated with a 10% decrease in the likelihood of being hospitalized. None of the DM self-care management items significantly influenced whether a hospitalization occurred.

Number of hospitalizations. Table 2 presents an adjusted model for estimating the impact of self-care maintenance and management on the number of hospitalizations. Having a goal or target for HbA1c and eating two or more snacks or dessert foods per day were associated with a *decrease* in the incidence rate of hospitalization (IRR = 0.860, $p = .001$; IRR = 0.914, $p = .043$, respectively). Checking blood sugar when high blood sugar symptoms were present was associated with an *increase* in the incidence rate of hospitalization (IRR = 1.105, $p = .037$).

Number of days hospitalized. Table 3 presents an adjusted model for estimating the impact of self-care maintenance and management on the number of days patients were hospitalized. Having a goal or target for HbA1c was associated with fewer hospitalization days (IRR = 0.728, $p < .001$). Following doctors' advice on recommended frequency of blood-sugar testing was associated with an *increase* in the number of days patients were hospitalized (IRR = 1.170, $p = .016$), whereas checking blood sugar on recognizing symptoms of low blood sugar (IRR = 0.832, $p = .033$) was associated with a *decrease* in the number of days patients were hospitalized.

Table 3. Generalized Linear Modeling of Number of Days Hospitalized

Predictors	Adjusted model[a] IRR	95% CI	p value
Number of days hospitalized			
Days test blood sugar as recommended	1.170	[1.030, 1.329]	.016
Check your blood sugar if low symptoms	0.832	[0.702, 0.986]	.033
Have goal/target for HemoglobinA1c	0.728	[0.629, 0.843]	<.001
Comorbid conditions	1.446	[1.140, 1.834]	.002

Note: IRR = incidence rate ratio; CI = confidence interval. $p \geq .05$ level for the adjusted model.
[a]Adjusted for sociodemographic and diabetes mellitus–related characteristics, comorbid conditions, and health perception.

Discussion

To the best of our knowledge, this is the first empirical investigation of the relationship between specific DM self-care maintenance and management behaviors and health care resource utilization. The results of our study show that the two components of DM self-care influence health outcomes, albeit in different ways.

Diabetes Mellitus Self-Care Maintenance and Health Outcomes

Our findings demonstrate a positive relationship between DM self-care maintenance, specifically eating fruits and vegetables, and a decrease in the likelihood of being hospitalized. Surprisingly, we also found that a negative DM self-care behavior, eating snacks and desserts, was associated with a decrease in the number of hospitalizations. This result appears to be counterintuitive as it shows a beneficial health outcome from a negative behavior. However, we speculate that participants in this study who reported eating snacks or desserts may have done so judiciously to keep their blood glucose levels within the normal range. In addition, some participants may have been following insulin-dosing regimens and therefore consumed snacks as part of their treatment schedule. If detailed information on the quantity and types of snacks and desserts is added in future surveys to data on the frequency of

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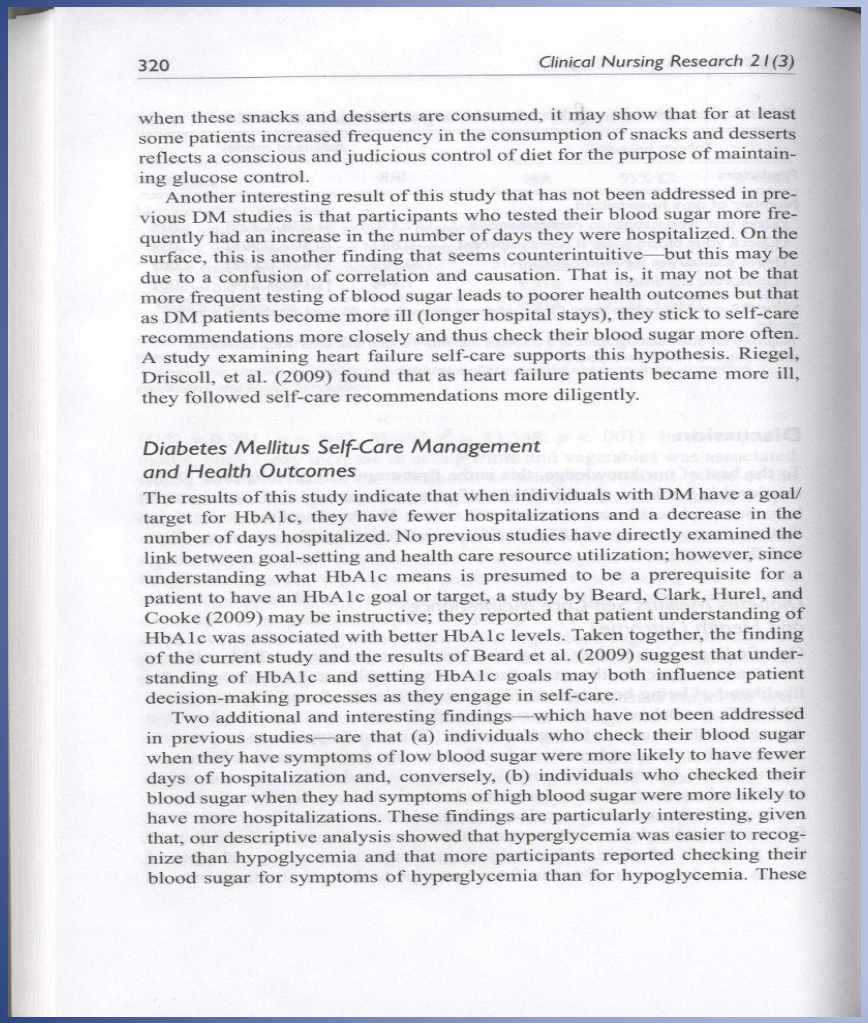


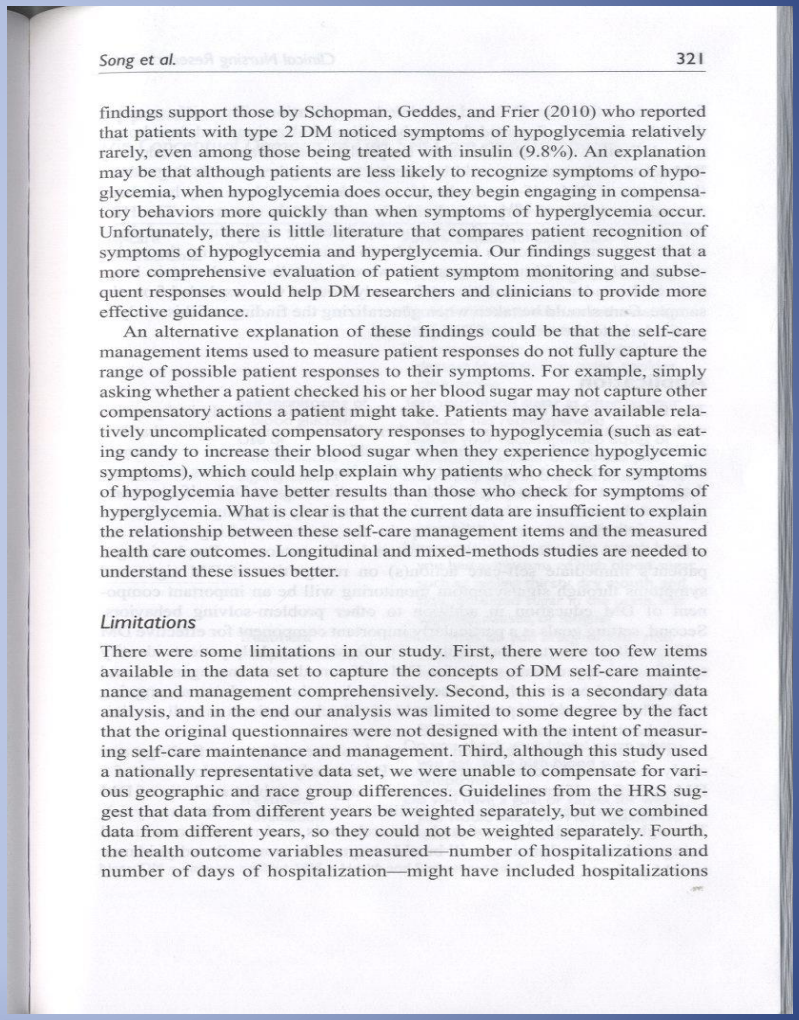
when these snacks and desserts are consumed, it may show that for at least some patients increased frequency in the consumption of snacks and desserts reflects a conscious and judicious control of diet for the purpose of maintaining glucose control.

Another interesting result of this study that has not been addressed in previous DM studies is that participants who tested their blood sugar more frequently had an increase in the number of days they were hospitalized. On the surface, this is another finding that seems counterintuitive—but this may be due to a confusion of correlation and causation. That is, it may not be that more frequent testing of blood sugar leads to poorer health outcomes but that as DM patients become more ill (longer hospital stays), they stick to self-care recommendations more closely and thus check their blood sugar more often. A study examining heart failure self-care supports this hypothesis. Riegel, Driscoll, et al. (2009) found that as heart failure patients became more ill, they followed self-care recommendations more diligently.

Diabetes Mellitus Self-Care Management and Health Outcomes

The results of this study indicate that when individuals with DM have a goal/target for HbA1c, they have fewer hospitalizations and a decrease in the number of days hospitalized. No previous studies have directly examined the link between goal-setting and health care resource utilization; however, since understanding what HbA1c means is presumed to be a prerequisite for a patient to have an HbA1c goal or target, a study by Beard, Clark, Hurel, and Cooke (2009) may be instructive; they reported that patient understanding of HbA1c was associated with better HbA1c levels. Taken together, the finding of the current study and the results of Beard et al. (2009) suggest that understanding of HbA1c and setting HbA1c goals may both influence patient decision-making processes as they engage in self-care.

Two additional and interesting findings—which have not been addressed in previous studies—are that (a) individuals who check their blood sugar when they have symptoms of low blood sugar were more likely to have fewer days of hospitalization and, conversely, (b) individuals who checked their blood sugar when they had symptoms of high blood sugar were more likely to have more hospitalizations. These findings are particularly interesting, given that, our descriptive analysis showed that hyperglycemia was easier to recognize than hypoglycemia and that more participants reported checking their blood sugar for symptoms of hyperglycemia than for hypoglycemia. These



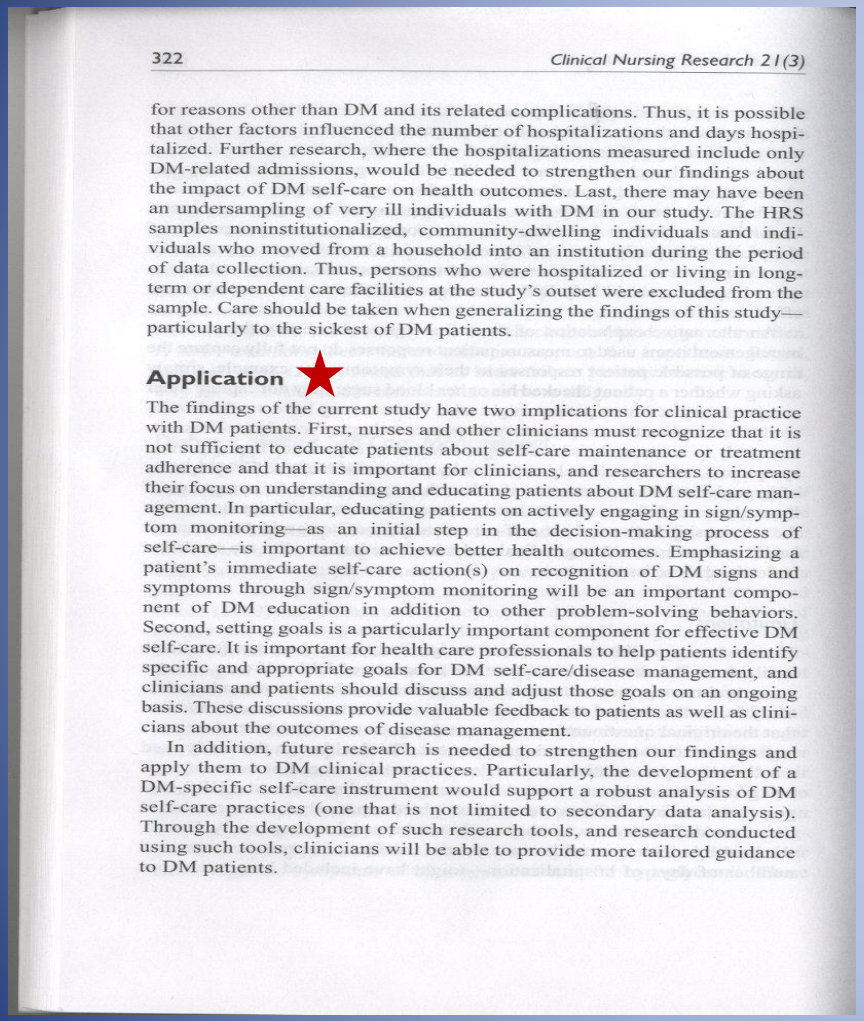
findings support those by Schopman, Geddes, and Frier (2010) who reported that patients with type 2 DM noticed symptoms of hypoglycemia relatively rarely, even among those being treated with insulin (9.8%). An explanation may be that although patients are less likely to recognize symptoms of hypoglycemia, when hypoglycemia does occur, they begin engaging in compensatory behaviors more quickly than when symptoms of hyperglycemia occur. Unfortunately, there is little literature that compares patient recognition of symptoms of hypoglycemia and hyperglycemia. Our findings suggest that a more comprehensive evaluation of patient symptom monitoring and subsequent responses would help DM researchers and clinicians to provide more effective guidance.

An alternative explanation of these findings could be that the self-care management items used to measure patient responses do not fully capture the range of possible patient responses to their symptoms. For example, simply asking whether a patient checked his or her blood sugar may not capture other compensatory actions a patient might take. Patients may have available relatively uncomplicated compensatory responses to hypoglycemia (such as eating candy to increase their blood sugar when they experience hypoglycemic symptoms), which could help explain why patients who check for symptoms of hypoglycemia have better results than those who check for symptoms of hyperglycemia. What is clear is that the current data are insufficient to explain the relationship between these self-care management items and the measured health care outcomes. Longitudinal and mixed-methods studies are needed to understand these issues better.

Limitations

There were some limitations in our study. First, there were too few items available in the data set to capture the concepts of DM self-care maintenance and management comprehensively. Second, this is a secondary data analysis, and in the end our analysis was limited to some degree by the fact that the original questionnaires were not designed with the intent of measuring self-care maintenance and management. Third, although this study used a nationally representative data set, we were unable to compensate for various geographic and race group differences. Guidelines from the HRS suggest that data from different years be weighted separately, but we combined data from different years, so they could not be weighted separately. Fourth, the health outcome variables measured—number of hospitalizations and number of days of hospitalization—might have included hospitalizations

Identifying Research Articles

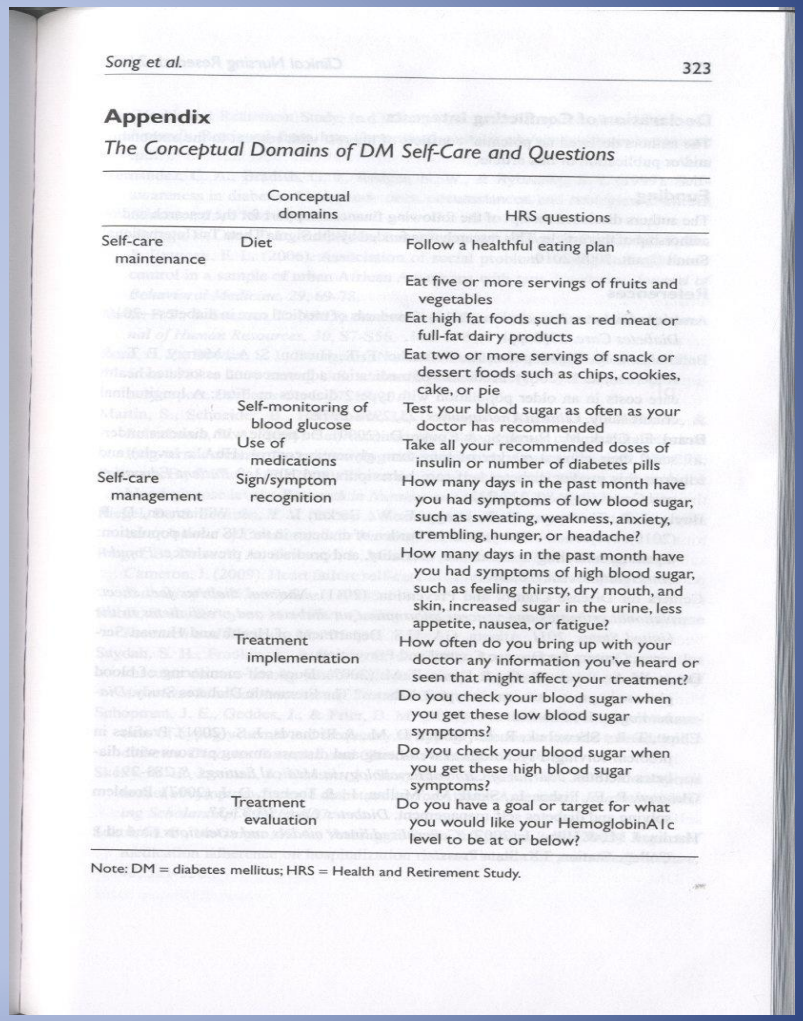


for reasons other than DM and its related complications. Thus, it is possible that other factors influenced the number of hospitalizations and days hospitalized. Further research, where the hospitalizations measured include only DM-related admissions, would be needed to strengthen our findings about the impact of DM self-care on health outcomes. Last, there may have been an undersampling of very ill individuals with DM in our study. The HRS samples noninstitutionalized, community-dwelling individuals and individuals who moved from a household into an institution during the period of data collection. Thus, persons who were hospitalized or living in long-term or dependent care facilities at the study's outset were excluded from the sample. Care should be taken when generalizing the findings of this study—particularly to the sickest of DM patients.

Application

The findings of the current study have two implications for clinical practice with DM patients. First, nurses and other clinicians must recognize that it is not sufficient to educate patients about self-care maintenance or treatment adherence and that it is important for clinicians, and researchers to increase their focus on understanding and educating patients about DM self-care management. In particular, educating patients on actively engaging in sign/symptom monitoring—as an initial step in the decision-making process of self-care—is important to achieve better health outcomes. Emphasizing a patient's immediate self-care action(s) on recognition of DM signs and symptoms through sign/symptom monitoring will be an important component of DM education in addition to other problem-solving behaviors. Second, setting goals is a particularly important component for effective DM self-care. It is important for health care professionals to help patients identify specific and appropriate goals for DM self-care/disease management, and clinicians and patients should discuss and adjust those goals on an ongoing basis. These discussions provide valuable feedback to patients as well as clinicians about the outcomes of disease management.

In addition, future research is needed to strengthen our findings and apply them to DM clinical practices. Particularly, the development of a DM-specific self-care instrument would support a robust analysis of DM self-care practices (one that is not limited to secondary data analysis). Through the development of such research tools, and research conducted using such tools, clinicians will be able to provide more tailored guidance to DM patients.



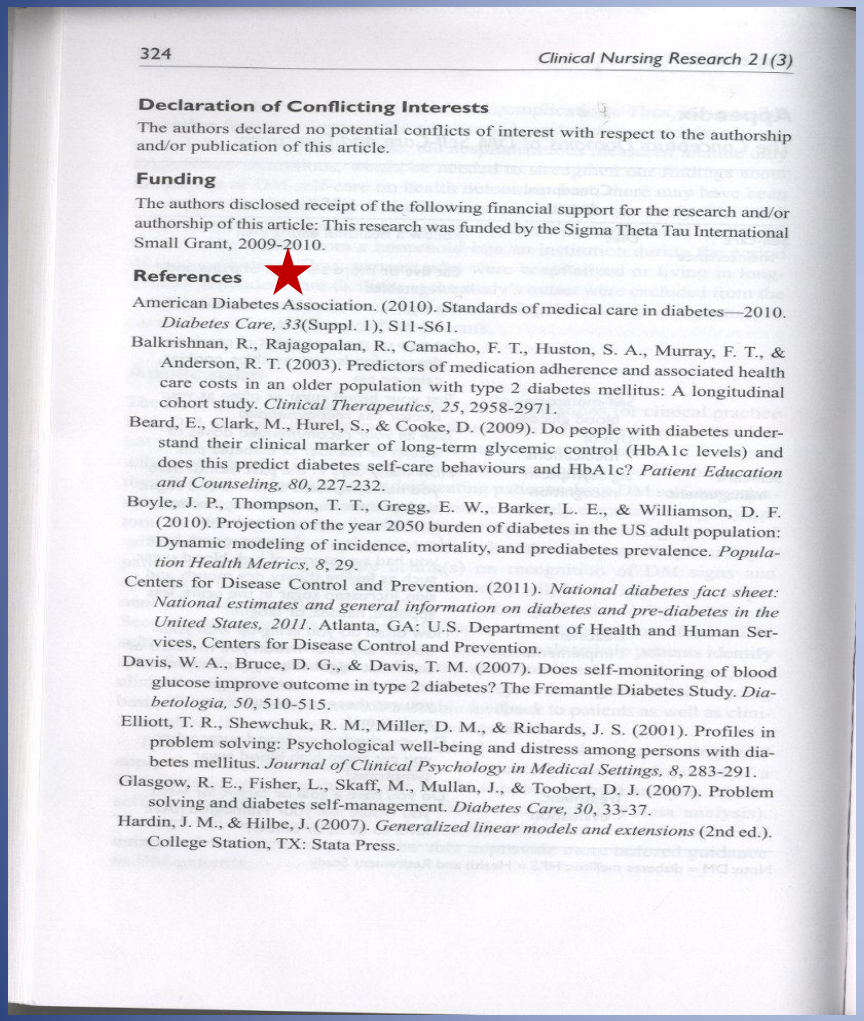
Appendix

The Conceptual Domains of DM Self-Care and Questions

	Conceptual domains	HRS questions
Self-care maintenance	Diet	Follow a healthful eating plan
		Eat five or more servings of fruits and vegetables
		Eat high fat foods such as red meat or full-fat dairy products
		Eat two or more servings of snack or dessert foods such as chips, cookies, cake, or pie
	Self-monitoring of blood glucose	Test your blood sugar as often as your doctor has recommended
	Use of medications	Take all your recommended doses of insulin or number of diabetes pills
Self-care management	Sign/symptom recognition	How many days in the past month have you had symptoms of low blood sugar, such as sweating, weakness, anxiety, trembling, hunger, or headache?
		How many days in the past month have you had symptoms of high blood sugar, such as feeling thirsty, dry mouth, and skin, increased sugar in the urine, less appetite, nausea, or fatigue?
	Treatment implementation	How often do you bring up with your doctor any information you've heard or seen that might affect your treatment?
		Do you check your blood sugar when you get these low blood sugar symptoms?
		Do you check your blood sugar when you get these high blood sugar symptoms?
	Treatment evaluation	Do you have a goal or target for what you would like your HemoglobinA1c level to be at or below?

Note: DM = diabetes mellitus; HRS = Health and Retirement Study.

Identifying Research Articles



Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

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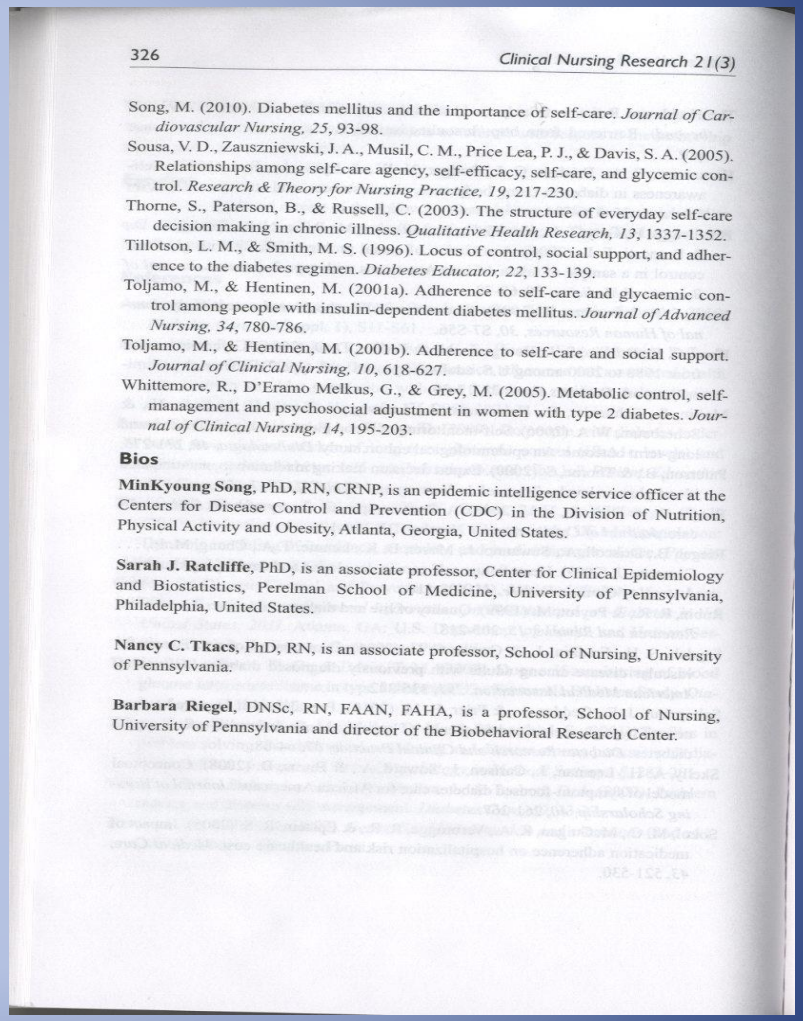

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   Applied Nursing Research, Clinical Nursing Research, Journal of Nursing Scholarship, Journal of Professional Nursing, Nursing Outlook, Nursing Research, Nutrition in Clinical Practice*, Perspectives in Psychiatric Care*, Psychiatric Services*, Simulation in Healthcare.

2. **Research Databases Available to GHSON**

   AHRQ — Agency for Healthcare Research & Quality
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   CINAHL — Cumulated Index to Nursing and Allied Health Literature
   http://search.ebscohost.com

   PUBMED
   http://www.ncbi.nlm.nih.gov/pubmed

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- **Browsing** the journals in the library is a good way to come up with a research article if your topic is very broad, such as OB or Psych, or if you just need a research article but have not determined a topic yet.
- **Searching the databases** is more helpful if you already have a specific topic or topics assigned.
- Some assignments simply require a research article to be included. It's often most effective to find a research article on the primary or broadest topic, then use other sources for additional, more specific subtopics that you can then apply to the information in the research article.

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- Assignment?
- Instructor?

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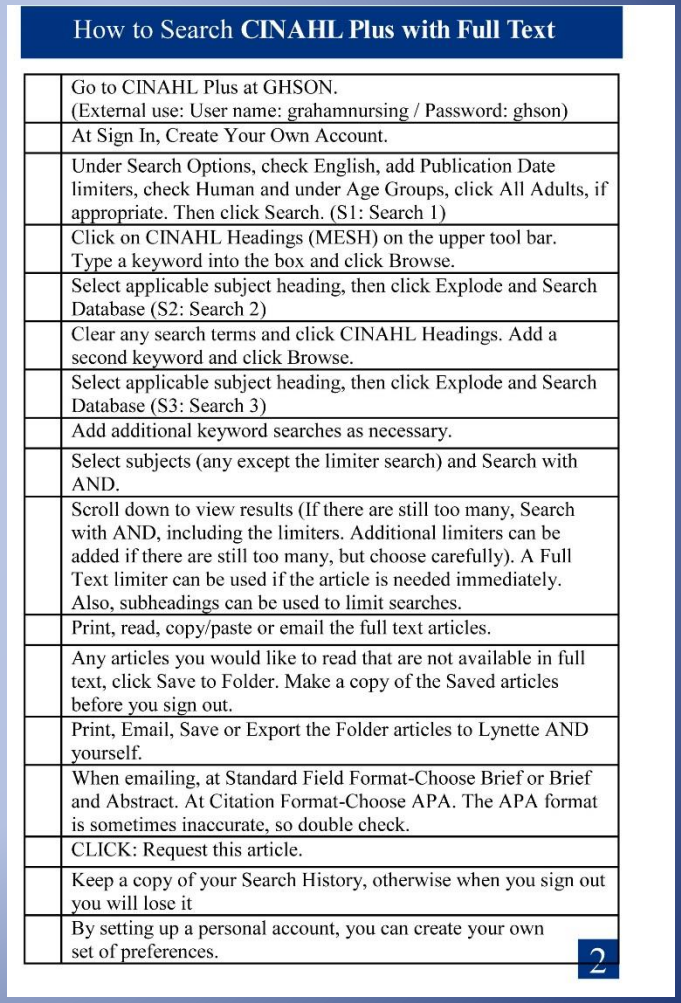

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	Click on CINAHL Headings (MESH) on the upper tool bar. Type a keyword into the box and click Browse.
	Select applicable subject heading, then click Explode and Search Database (S2: Search 2)
	Clear any search terms and click CINAHL Headings. Add a second keyword and click Browse.
	Select applicable subject heading, then click Explode and Search Database (S3: Search 3)
	Add additional keyword searches as necessary.
	Select subjects (any except the limiter search) and Search with AND.
	Scroll down to view results (If there are still too many, Search with AND, including the limiters. Additional limiters can be added if there are still too many, but choose carefully). A Full Text limiter can be used if the article is needed immediately. Also, subheadings can be used to limit searches.
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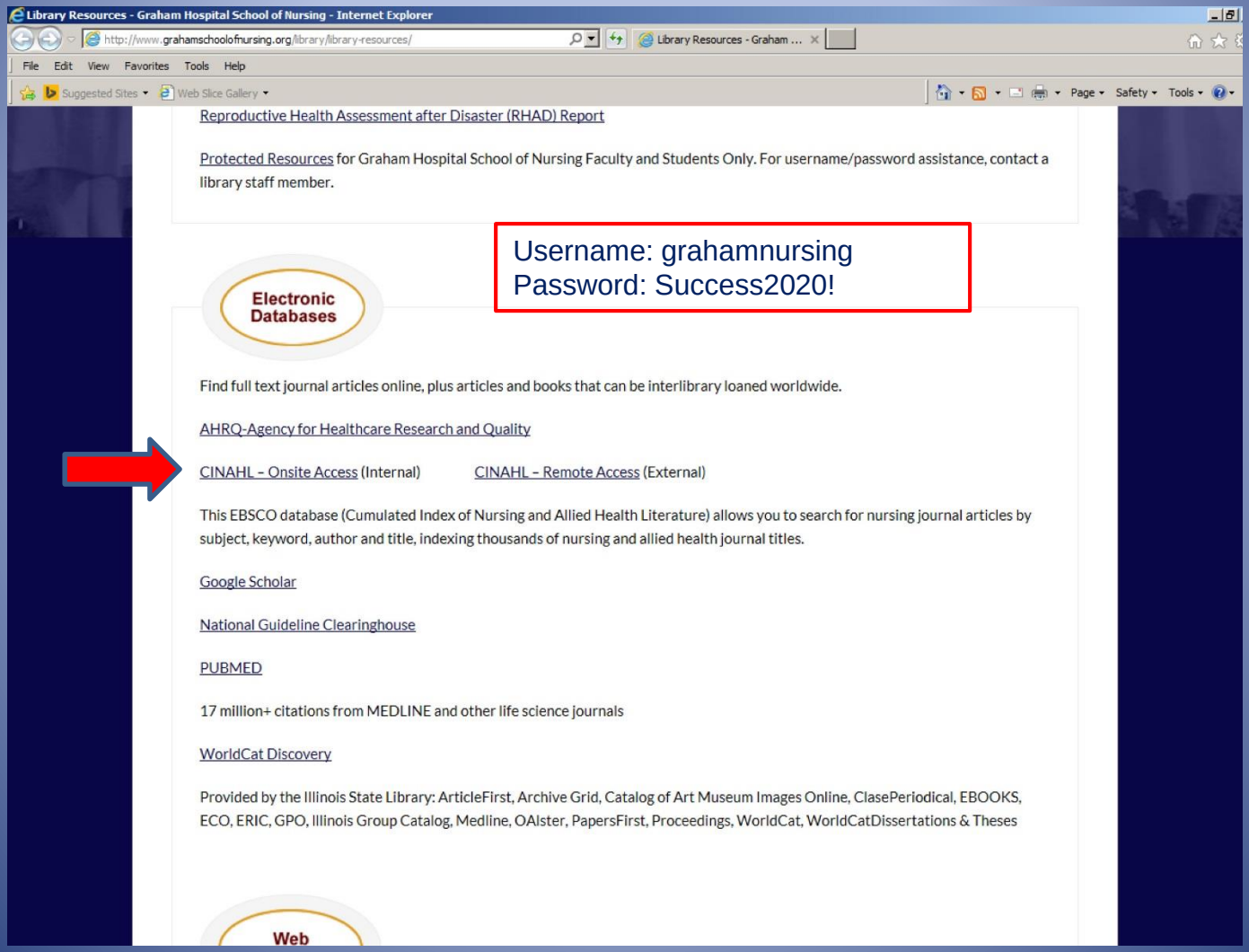
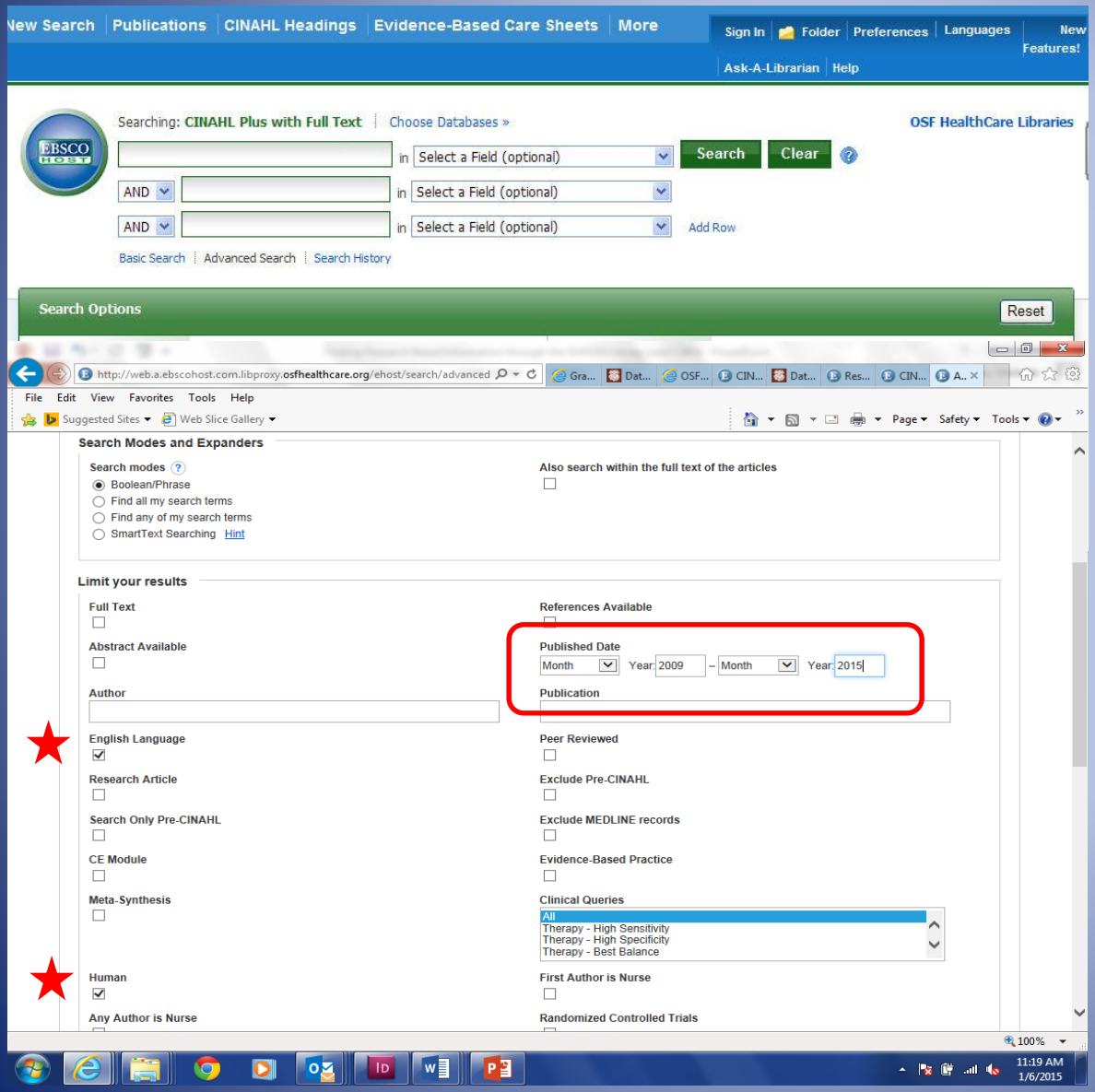


First page with search options

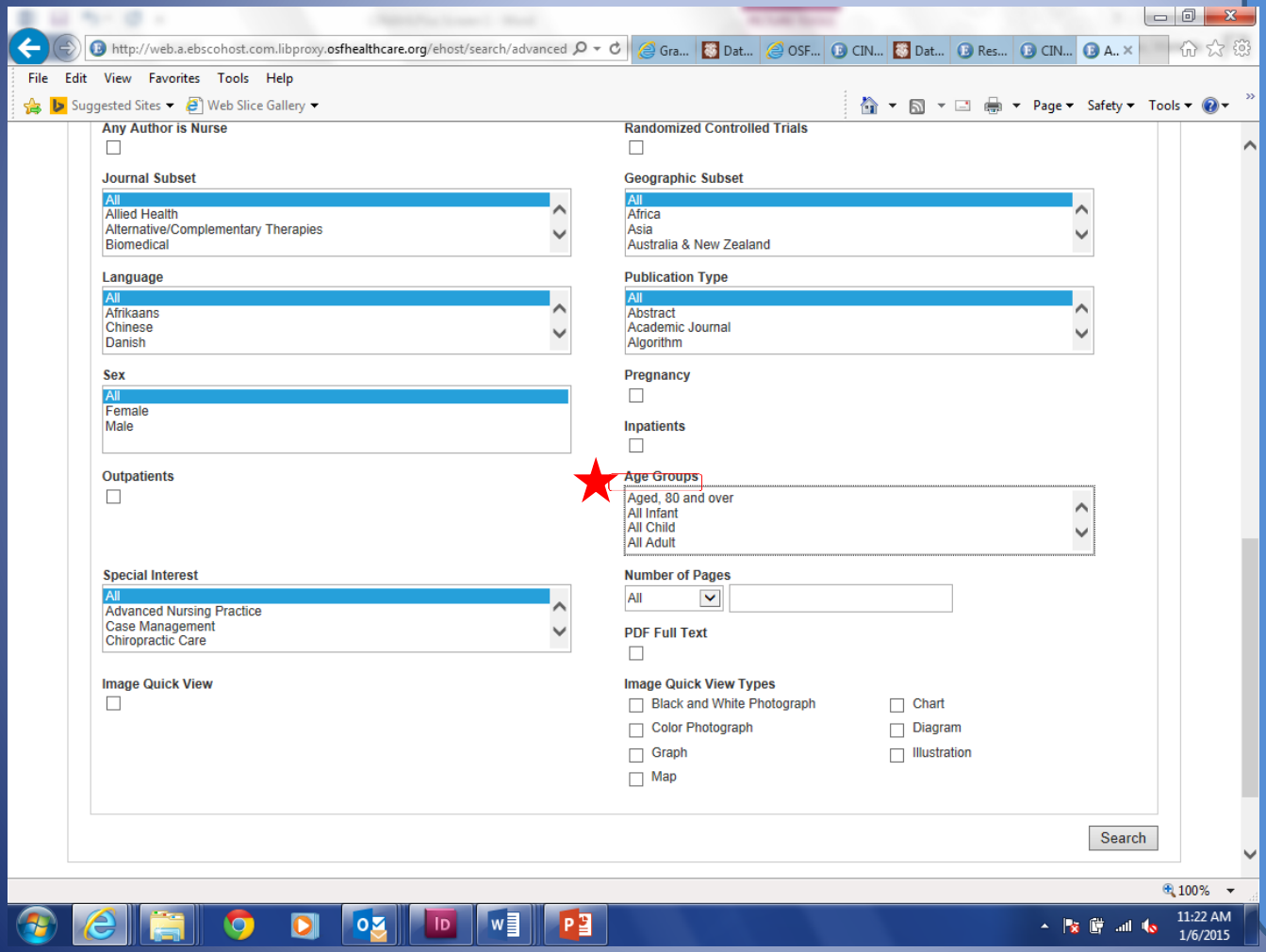


Use the limiters on this page. They will save you time.

We recommend that you check or complete:
English Language
Human
Age Groups
Publication Dates
(appropriate to your assignment).

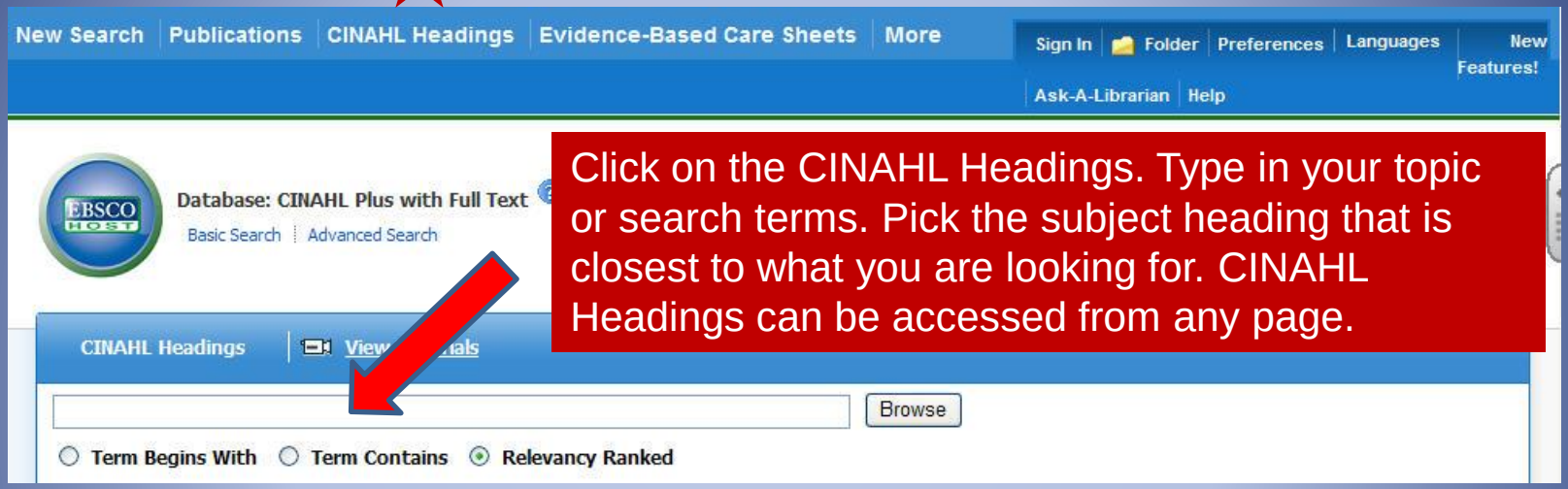
Then run the Search.

First page with search options continued



If you want to limit your search further, you can make other selections. However, a word of caution. Narrowing your search by using many limiters will very quickly end in no results. Search each time you add. By checking Full Text, you will eliminate articles that we might have on the shelf in the library or articles we could request from another library.

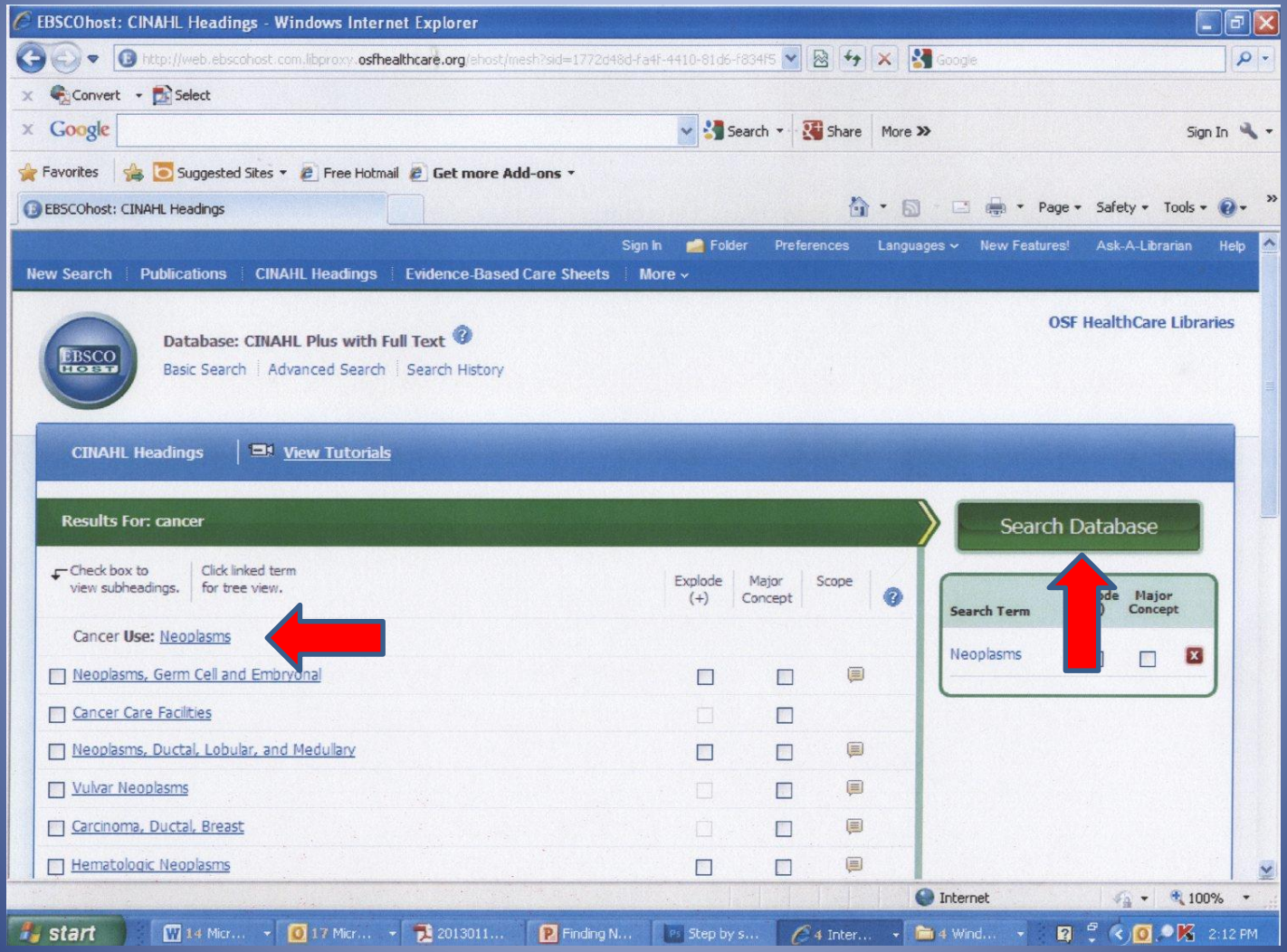
CINAHL Headings



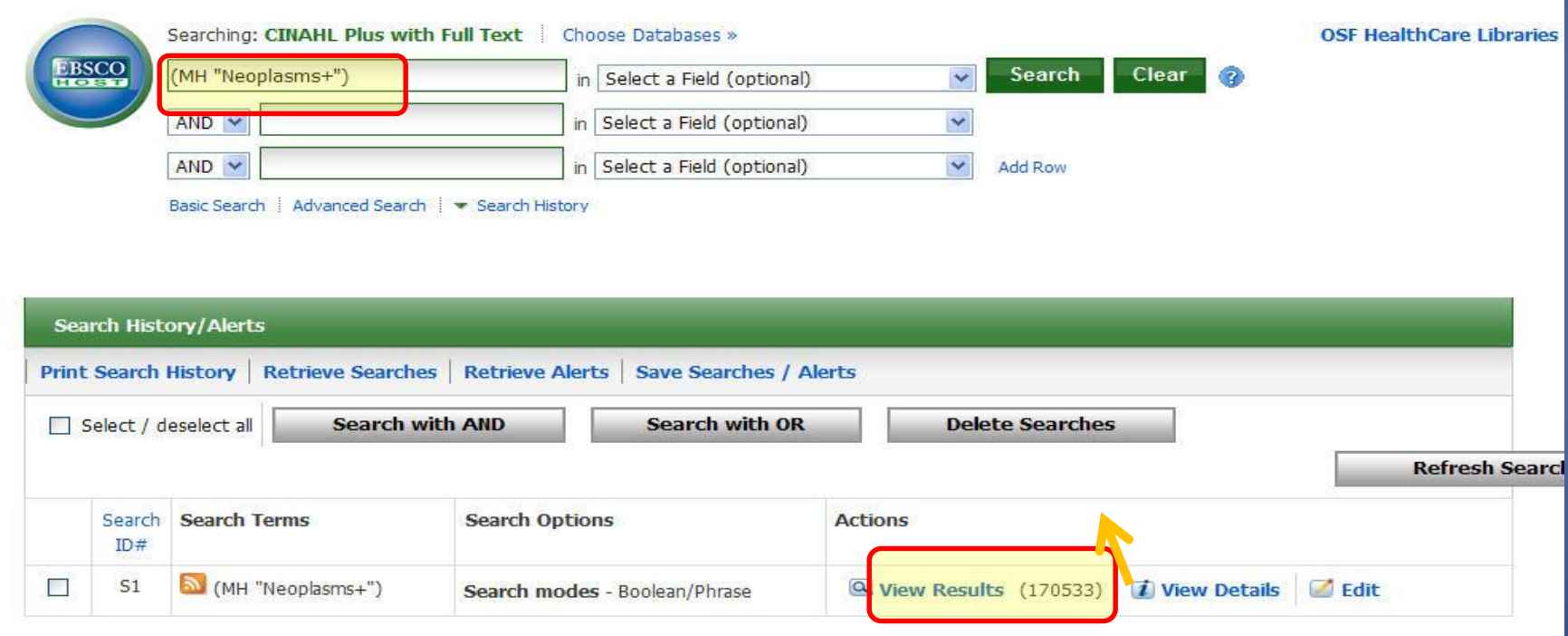
- This is a great tool to verify that the your terminology is the same used by the database. Using the same terminology is essential in retrieving the results you want.

neoplasms

For example, “cancer” is not a medical subject heading, but if you use the CINAHL Headings, you’ll be lead to the correct term to search, “neoplasms.”



The MH before “Neoplasms+” represents Mesh Heading which is the terminology that the database uses. Ideally, if your subjects have MH in front of the term, and you have chosen the terms accurately, you should receive results that meet your needs.



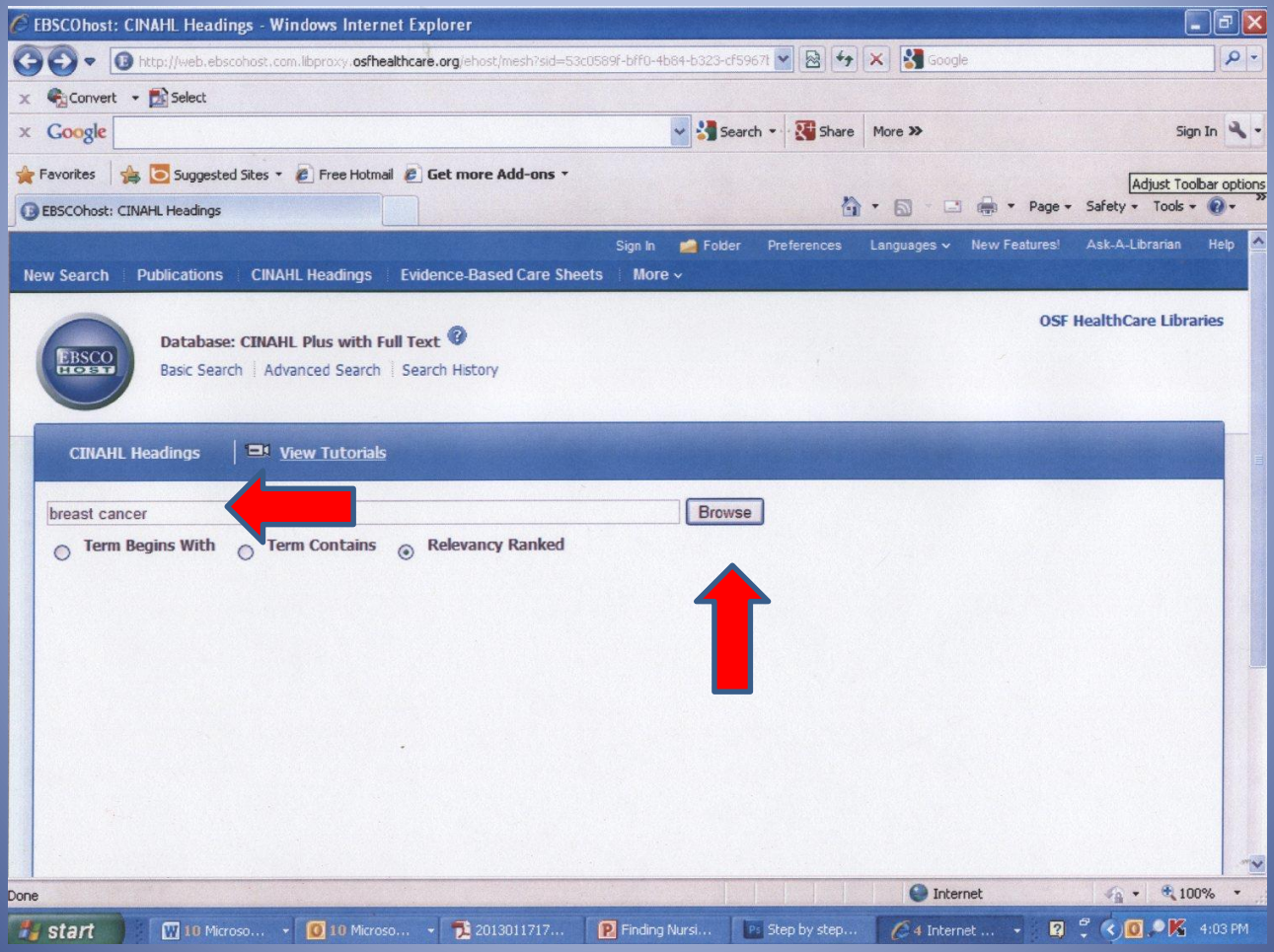
Please note the result number is HUGE due to the use of a non-specific subject heading.

To begin a search, first run a search of the basic limiters as a group as shown previously.

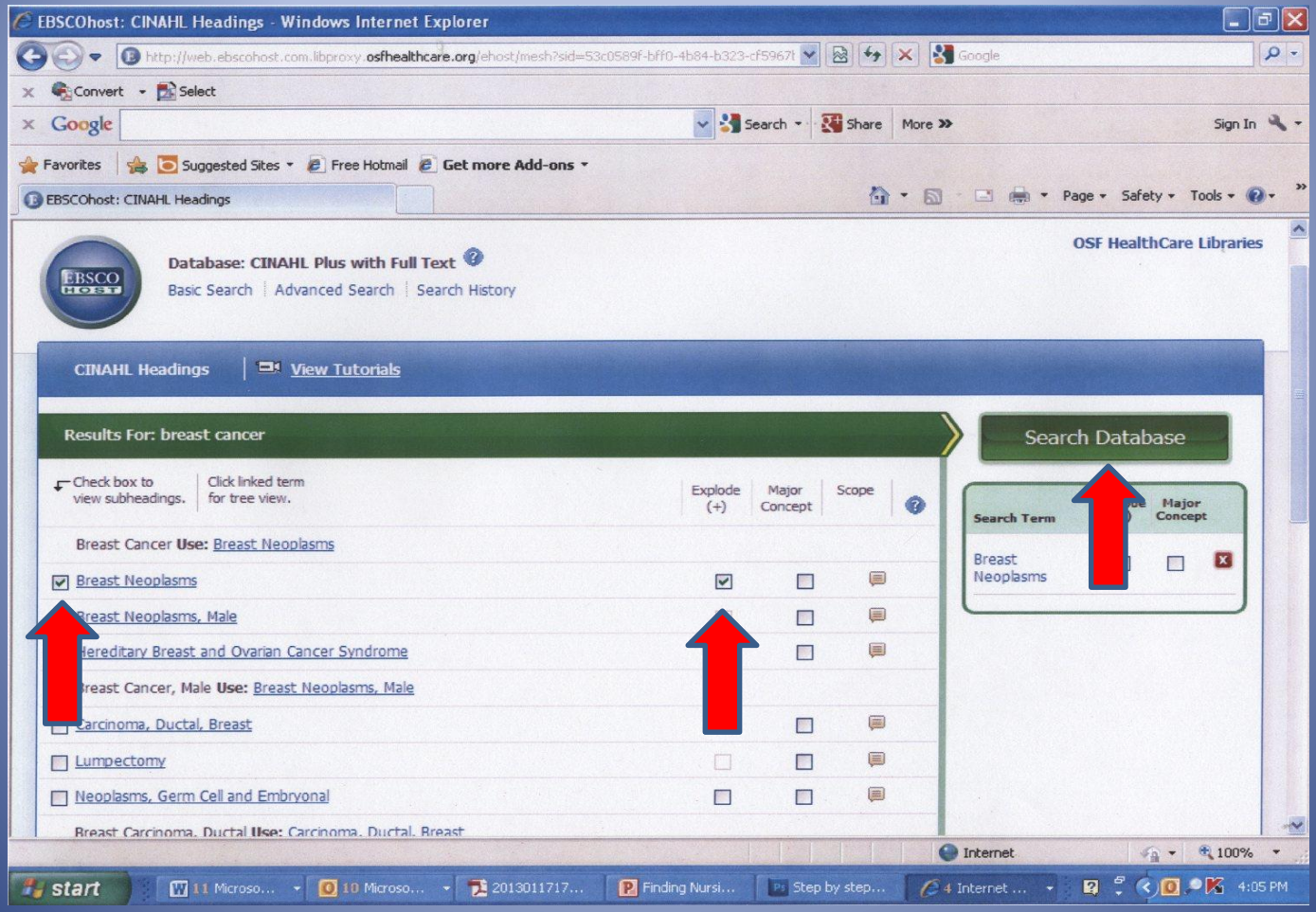
We're going to look for articles about how breast cancer affects breast feeding using these search terms:

- Breast cancer
- Breast feeding

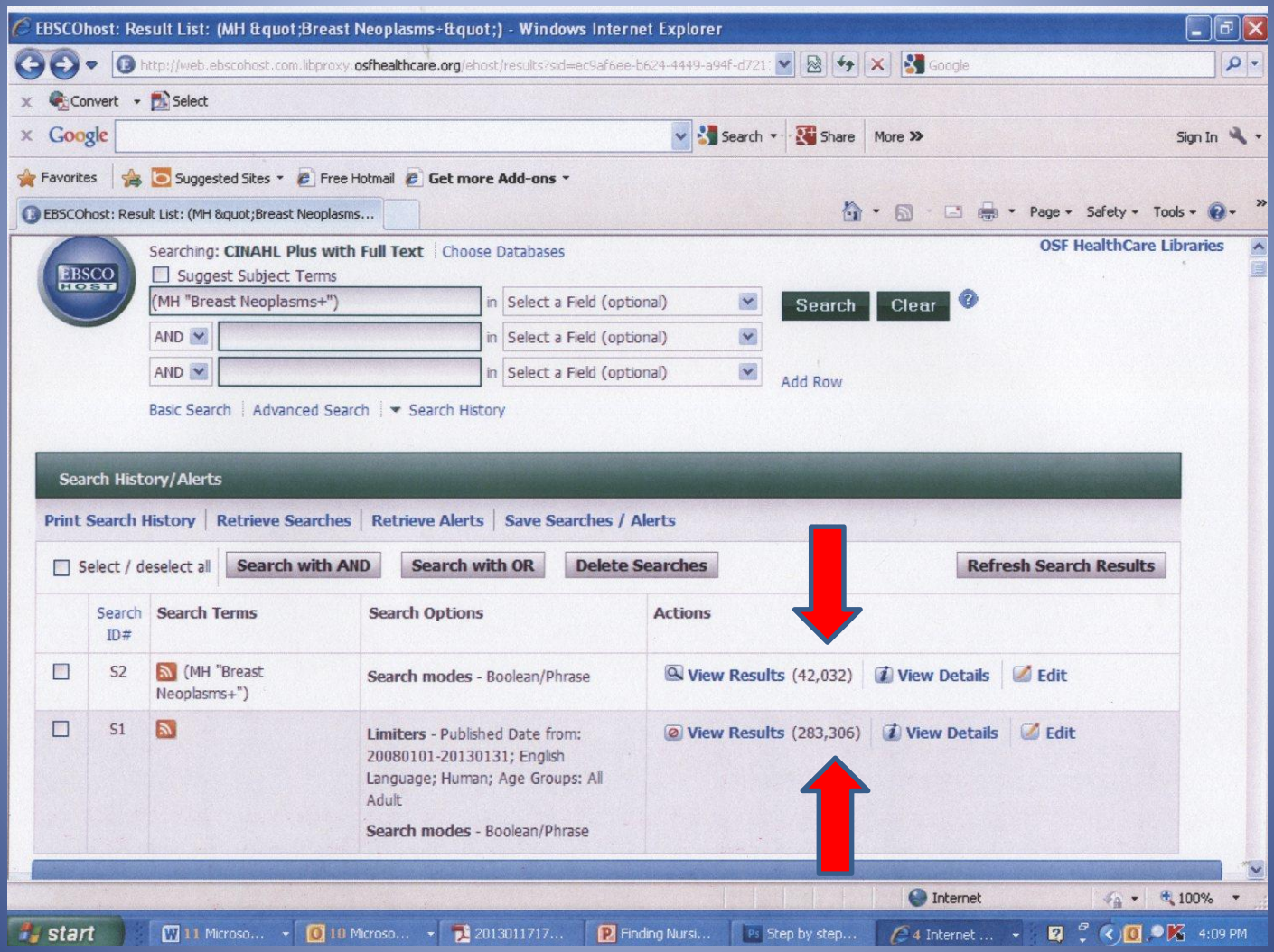
Use the CINAHL Headings to run a search on "breast cancer" by clicking on CINAHL Headings, then enter your topic and click Browse.



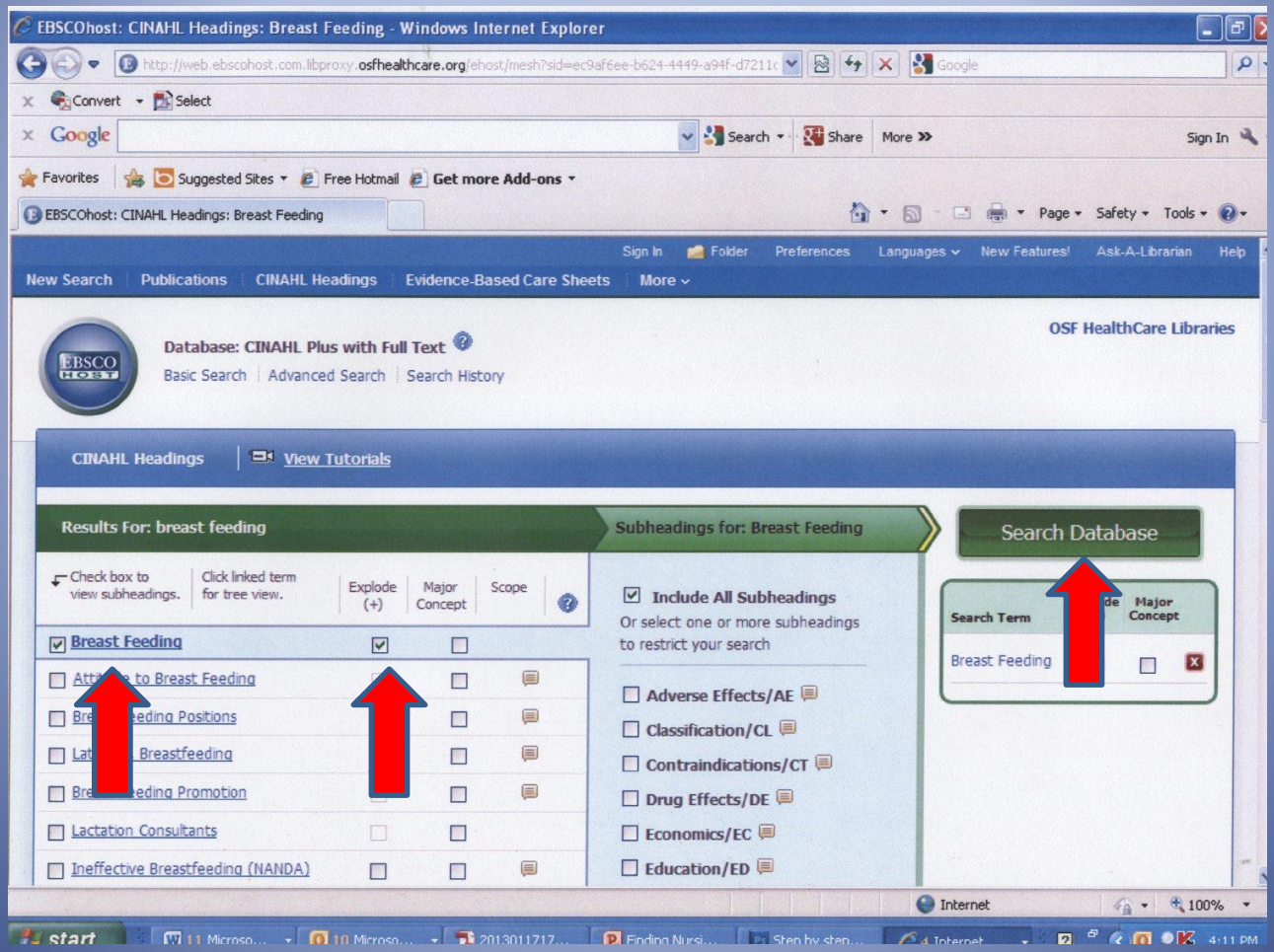
CINAHL will lead you to “breast neoplasms.” Check the subject and click Explode to get as many results as possible.



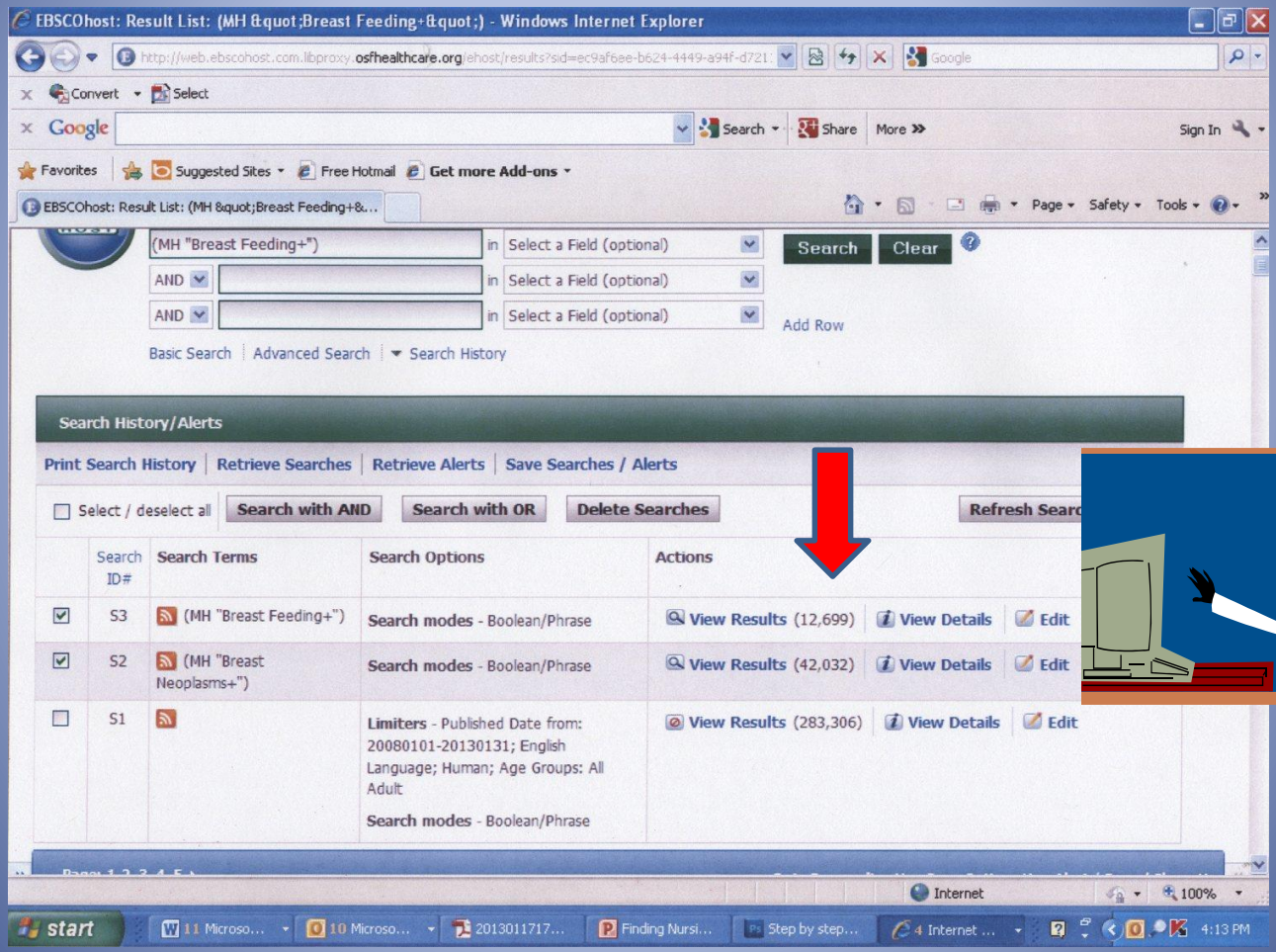
See the results below of the limiter search and the “breast neoplasms” search.

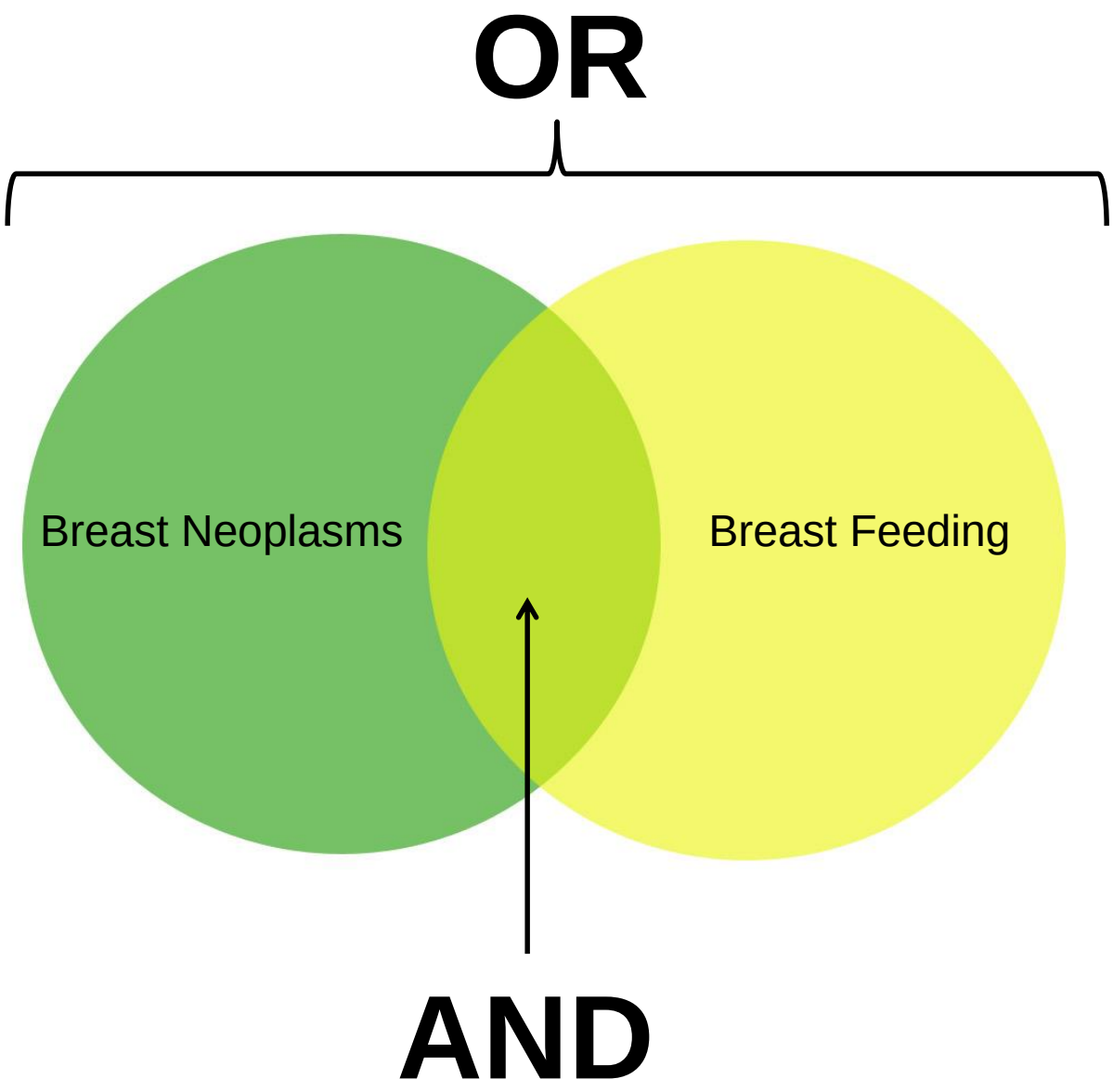


In CINAHL Headings, search for another subject, this time “breast feeding.” Explode and Search.

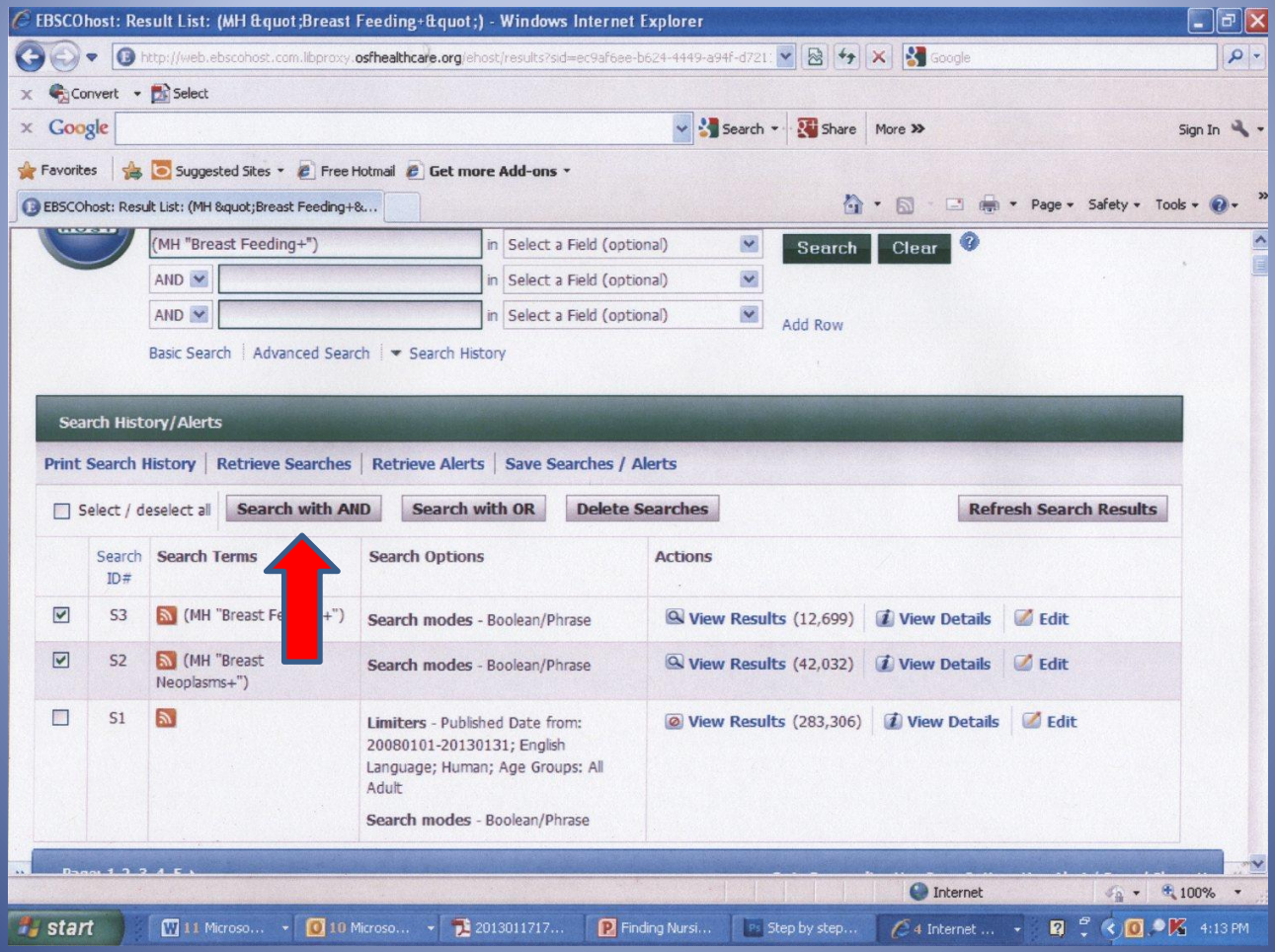


Now you have a list of 3 searches. Look at the number of results.

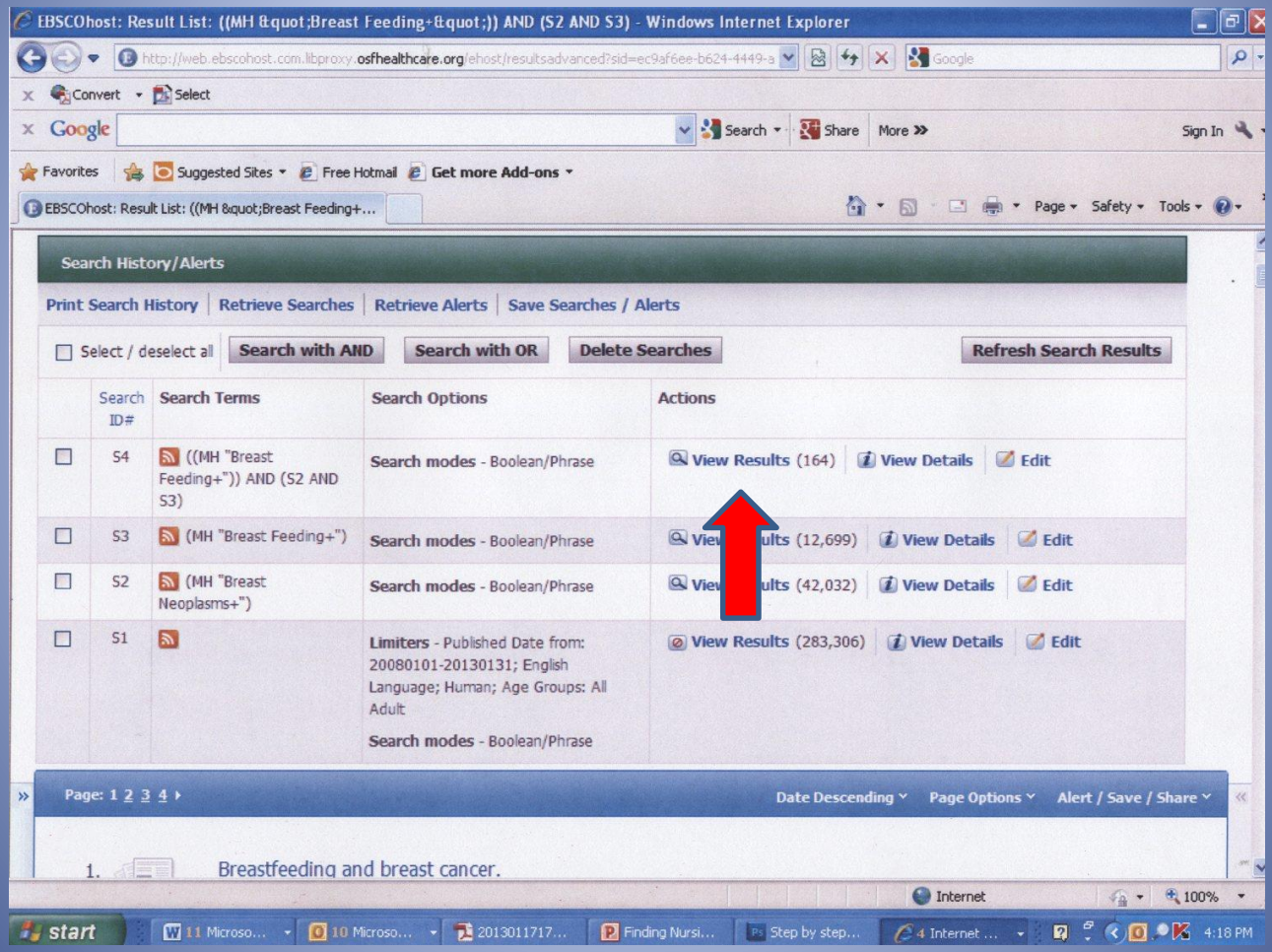



OR
Breast Neoplasms
Breast Feeding
AND

To find out how “breast feeding” is affected by “breast neoplasms,” combine the two searches with “AND”.



Results


EBSCOhost: Result List: ((MH "Breast Feeding+")) AND (S2 AND S3) - Windows Internet Explorer
Search History/Alerts
Print Search History | Retrieve Searches | Retrieve Alerts | Save Searches / Alerts
Select / deselect all
Search with AND
Search with OR
Delete Searches
Refresh Search Results
Search ID#
Search Terms
Search Options
Actions
S4
((MH "Breast Feeding+")) AND (S2 AND S3)
Search modes - Boolean/Phrase
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Edit
S3
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Search modes - Boolean/Phrase
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S2
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1. Breastfeeding and breast cancer.

3. Breast Density and Breast Cancer Incidence in the Lebanese Population: Results from a Retrospective Multicenter Study.

Academic Journal

(includes abstract) Salem, Christine; Atallah, David; Safi, Joelle; Chahine, Georges; Haddad, Antoine; El Kassis, Nadine; Maalouly, Laura-Maria; Moubarak, Malak; Dib, Mary; Ghossain, Michel; BioMed Research International, 7/2/2017; 1-9. (9p) (Article - research, tables/charts) ISSN: 2314-6133 AN: 123912601

Abstract: Purpose. To study the distribution of breast mammogram density in Lebanese women and correlate it with breast cancer (BC) incidence. Methods. Data from 1,049 women who had screening or diagnostic mammography were retrospectively reviewed. Age, menopausal status, contraceptives or hormonal replacement therapy (HRT), parity, breastfeeding, history of BC, breast mammogram density and final BI-RADS assessment were collected. Breast density was analyzed in each age category and compared according to factors that could influence breast density and BC incidence. Results. 120 (11.4%) patients had BC personal history with radiation and/or chemotherapy; 66 patients were postmenopausal under HRT. Mean age was 52.58±11.90 years. 76.4% of the patients (30–39 years) had dense breasts. Parity, age, and menopausal status were correlated to breast density whereas breastfeeding and personal/family history of BC and HRT were not. In multivariate analysis, it was shown that the risk of breast cancer significantly increases 3.3% with age (P=0.005), 2.5 times in case of menopause (P=0.004), and 1.4 times when breast density increases (P=0.014). Conclusion. Breast density distribution in Lebanon is similar to the western society. Similarly to other studies, it was shown that high breast density was statistically related to breast cancer, especially in older and menopausal women.

Subjects: Breast Neoplasms Epidemiology; Incidence; Breast Tissue Density Analysis; Breast Neoplasms Risk Factors; Adult: 19-44 years; Middle Aged: 45-64 years; Female

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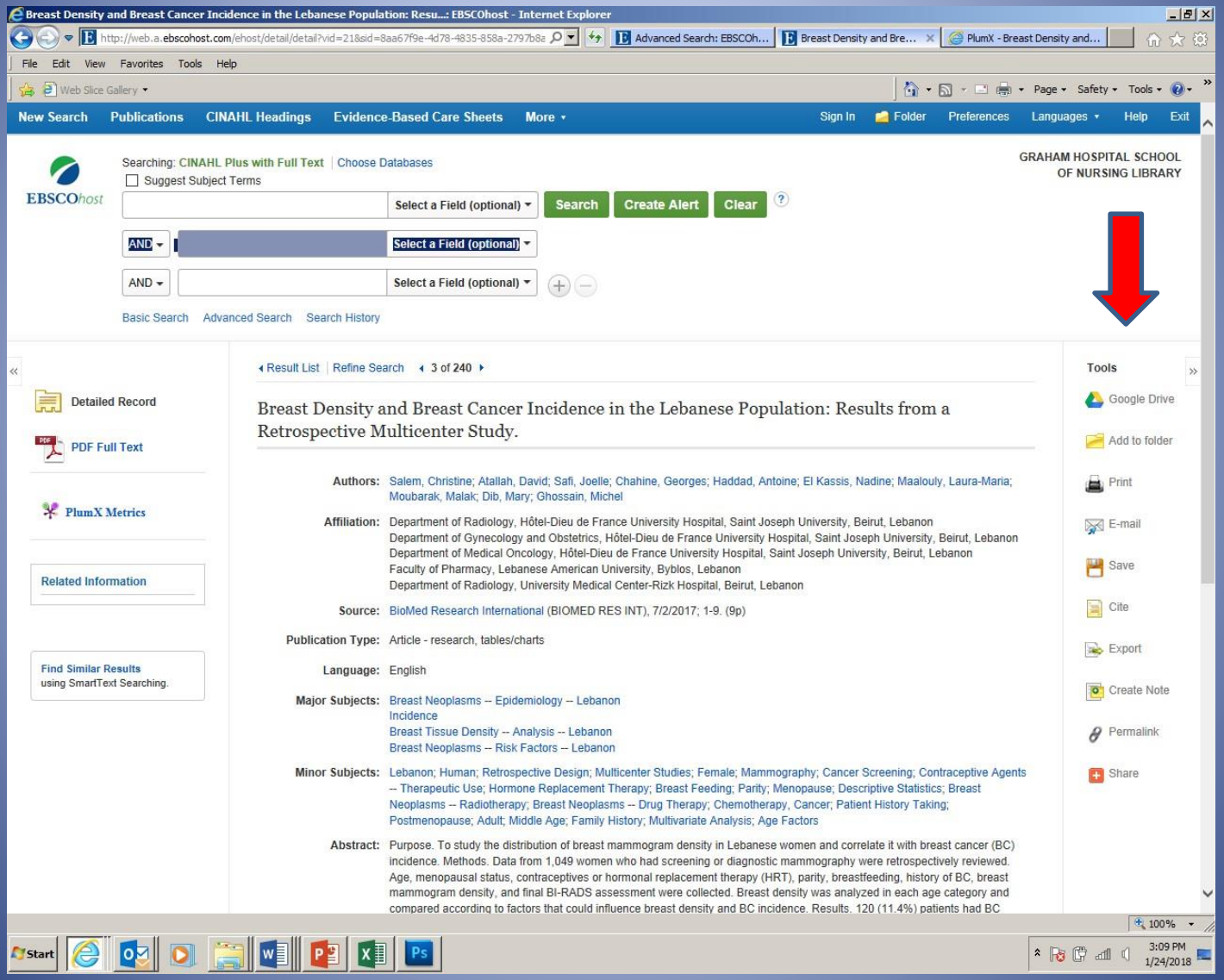

4. **Breastfeeding Mode and Risk of Breast Cancer: A Dose–Response Meta-Analysis.**

Academic Journal

(includes abstract) Unar-Munguía, Mishel; Torres-Mejía, Gabriela; Colchero, M. Arantxa; González de Cosío, Teresita; Journal of Human Lactation, May2017; 33(2): 422-434. (13p) (Article - meta analysis, research, systematic review, tables/charts) ISSN: 0890-3344 AN: 122841951

Abstract: Background: Breastfeeding reduces women's risk of breast cancer. Since exclusive breastfeeding has a stronger hormonal effect, it could theoretically result in a greater reduction in breast cancer risk than any breastfeeding mode. No meta-analysis has examined breast cancer risk by breastfeeding mode. Research aim: The authors conducted a meta-analysis for breast cancer risk in parous women who breastfed exclusively or in any mode versus parous women who formula fed their infants, and they estimated the summary dose–response association by the accumulated duration of any breastfeeding mode. Methods: A systematic review of studies published between 2005 and 2015 analyzing breastfeeding and breast cancer risk in women was conducted in PubMed and EBSCOhost. A meta-analysis (n = 65 studies) with fixed effects (or random effects, if heterogeneity existed) was carried out stratified by breastfeeding mode and menopausal and parity status. A summary dose–response association was estimated using the generalized least-squares method. Results: The summary relative risk (SRR) for breast cancer in parous women who breastfed exclusively was 0.72, 95% confidence interval (CI) [0.58, 0.90], versus parous women who had never breastfed. For parous women who breastfed any mode, the SRR was lower in both premenopausal women (0.86, 95% CI [0.80, 0.93]) and postmenopausal women (0.89, 95% CI [0.83, 0.95]). There was no heterogeneity or publication bias. There is weak evidence of a difference between exclusive and any breastfeeding mode (p = .08). The summary dose–response curve was nonlinear (p < .001). Conclusion: Exclusive breastfeeding among parous women reduces the risk of breast cancer compared with parous women who do not breastfeed exclusively.

Subjects: Breast Neoplasms Risk Factors; Breast Feeding Meth… …tion and Control; Dose-Response Relationship Evaluation; Female

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5. **Breast Cancer, Breast…eding, and Mastectomy: A C… …h.**

Academic Journal

(includes abstract) …hmoghaddam, Narges; Benn, Cheryl; Kho… …y Powell; Lamyian, Minoor; Journal of Human Lactation, May2017; 33(2): 454-457. (4p) (Arti… …41945

Abstract: The article focuses on the rising cases of mastectomy a… …of reproductive age. Mastectomy removes the chance for mothers to breastfeed infan… …of nutrition for babies. It tells about the importance of breastfeeding which can be supported th… …by among women in their reproductive age. It speaks about raising awareness among wom… …ge about early detection of breast cancer.

Subjects: Breast Neoplasms Prevention and Control; Early Dete… …g; Mastectomy Adverse Effects

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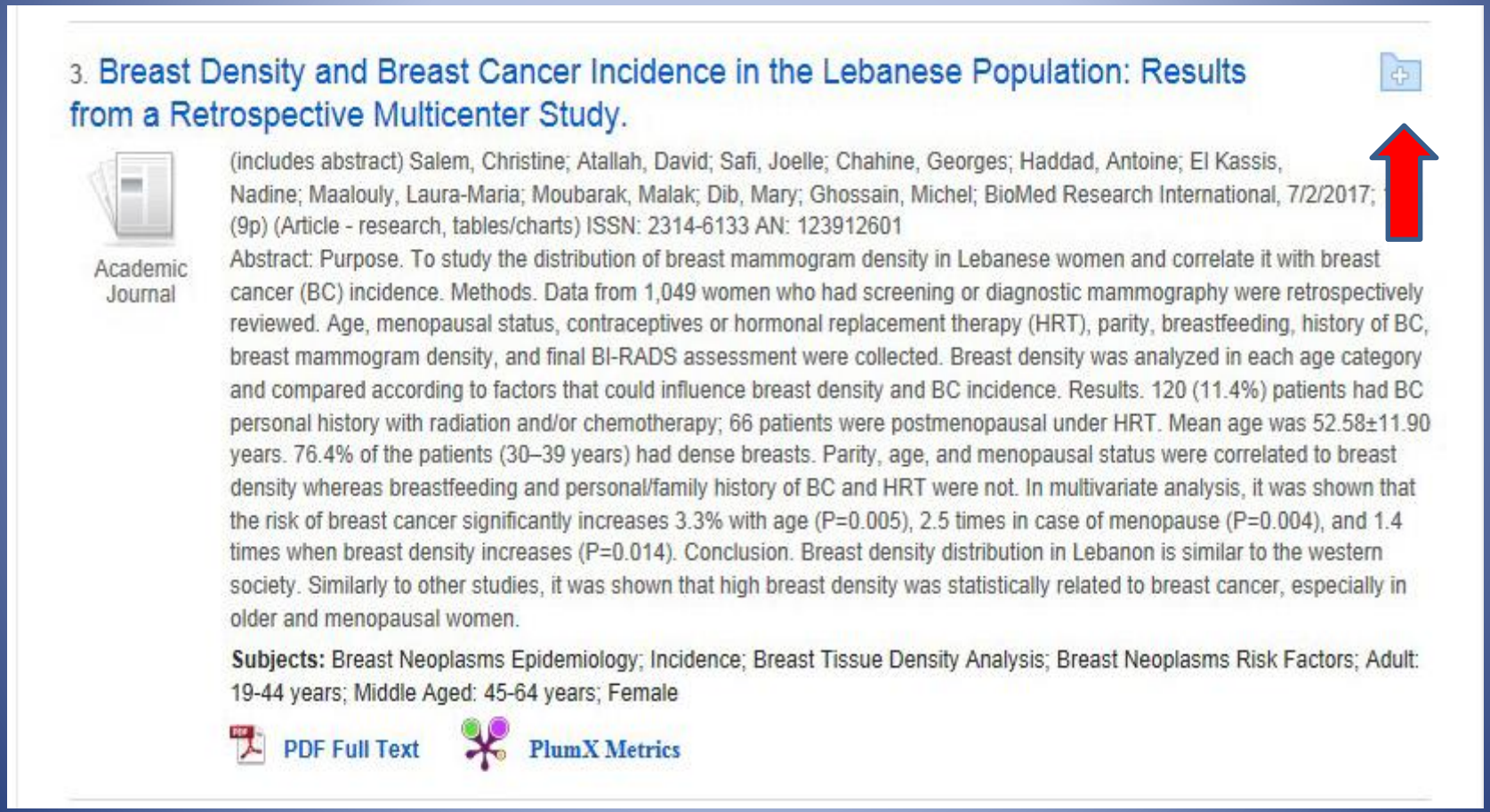

3. Breast Density and Breast Cancer Incidence in the Lebanese Population: Results from a Retrospective Multicenter Study.

Academic Journal

(includes abstract) Salem, Christine; Atallah, David; Safi, Joelle; Chahine, Georges; Haddad, Antoine; El Kassis, Nadine; Maalouly, Laura-Maria; Moubarak, Malak; Dib, Mary; Ghossain, Michel; BioMed Research International, 7/2/2017; (9p) (Article - research, tables/charts) ISSN: 2314-6133 AN: 123912601

Abstract: Purpose. To study the distribution of breast mammogram density in Lebanese women and correlate it with breast cancer (BC) incidence. Methods. Data from 1,049 women who had screening or diagnostic mammography were retrospectively reviewed. Age, menopausal status, contraceptives or hormonal replacement therapy (HRT), parity, breastfeeding, history of BC, breast mammogram density, and final BI-RADS assessment were collected. Breast density was analyzed in each age category and compared according to factors that could influence breast density and BC incidence. Results. 120 (11.4%) patients had BC personal history with radiation and/or chemotherapy; 66 patients were postmenopausal under HRT. Mean age was 52.58±11.90 years. 76.4% of the patients (30–39 years) had dense breasts. Parity, age, and menopausal status were correlated to breast density whereas breastfeeding and personal/family history of BC and HRT were not. In multivariate analysis, it was shown that the risk of breast cancer significantly increases 3.3% with age (P=0.005), 2.5 times in case of menopause (P=0.004), and 1.4 times when breast density increases (P=0.014). Conclusion. Breast density distribution in Lebanon is similar to the western society. Similarly to other studies, it was shown that high breast density was statistically related to breast cancer, especially in older and menopausal women.

Subjects: Breast Neoplasms Epidemiology; Incidence; Breast Tissue Density Analysis; Breast Neoplasms Risk Factors; Adult: 19-44 years; Middle Aged: 45-64 years; Female

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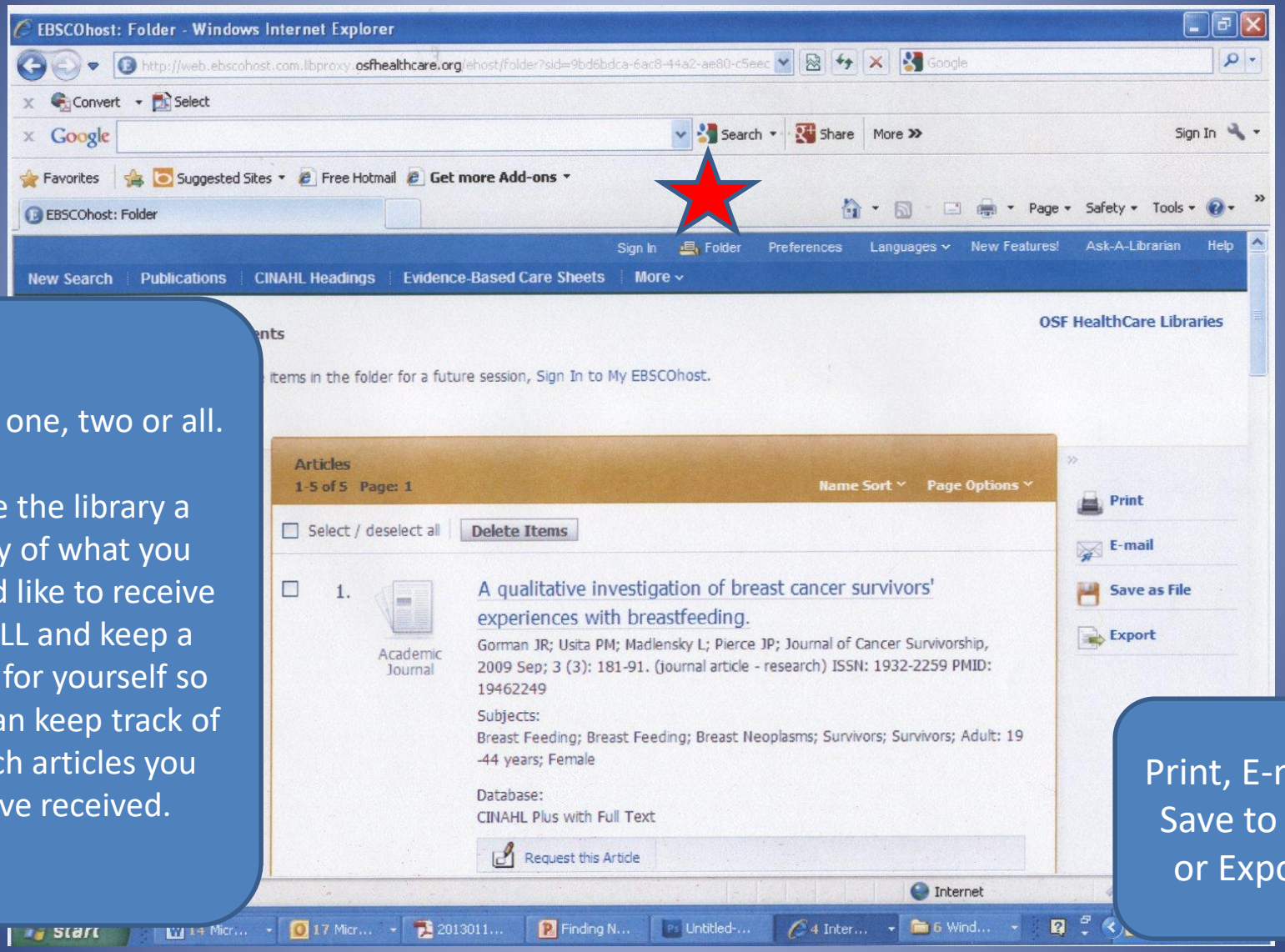

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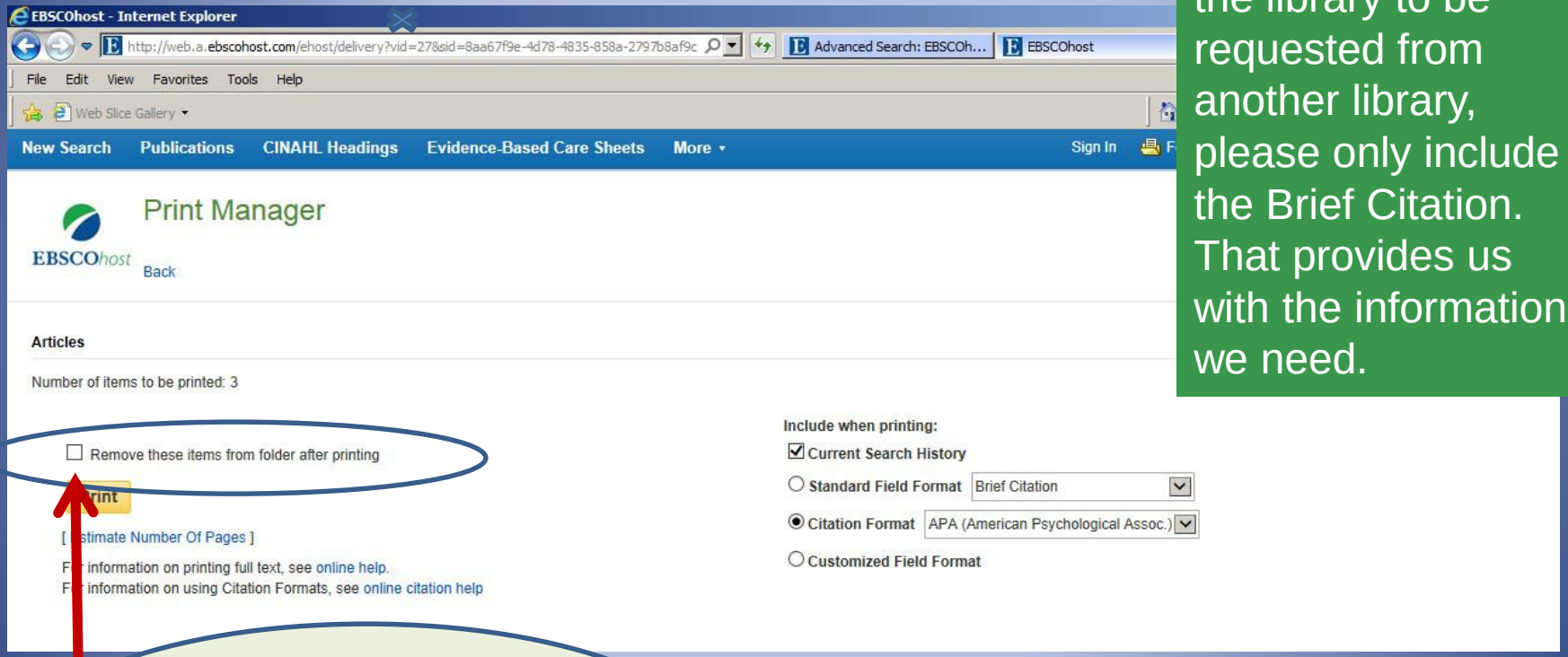

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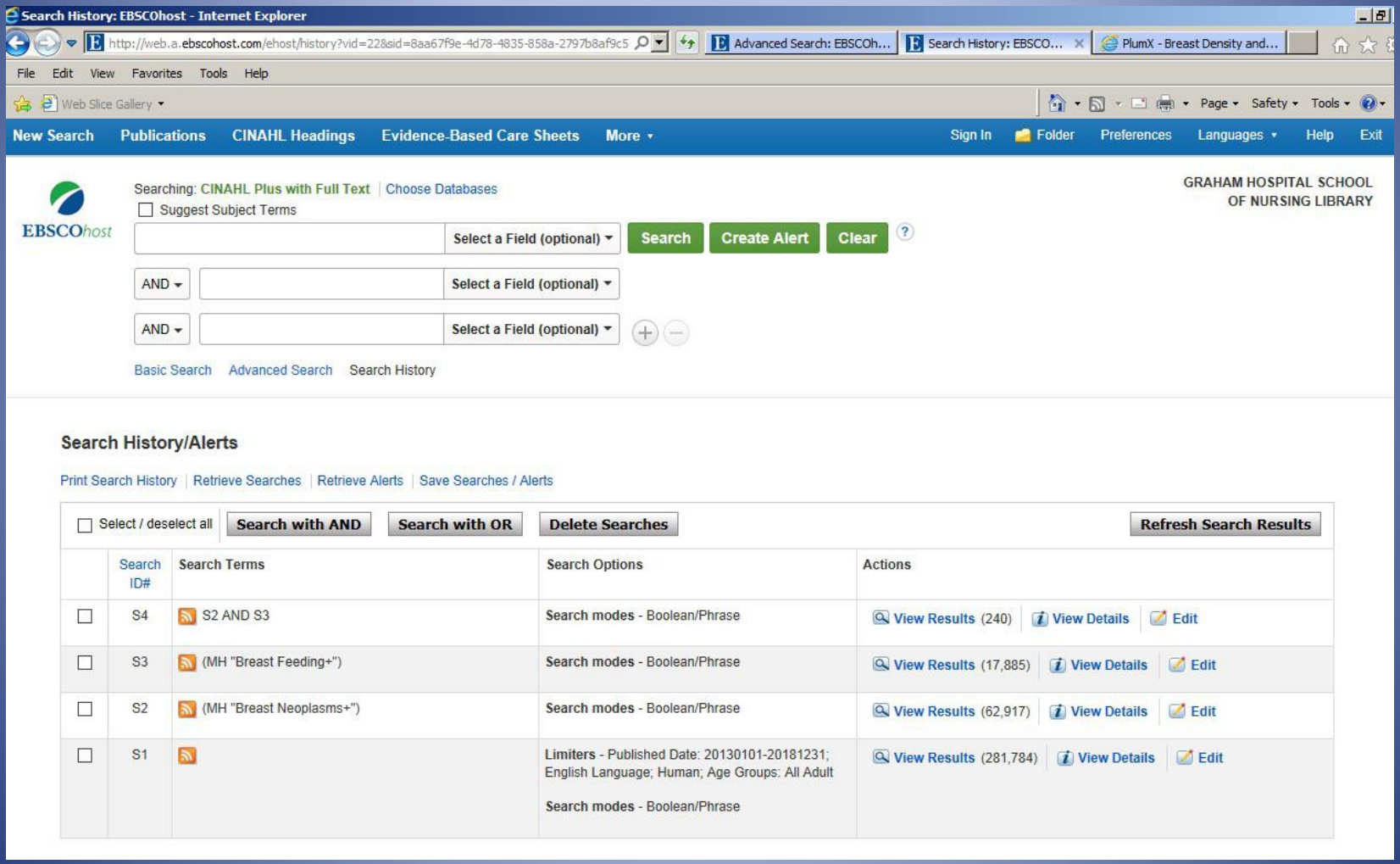

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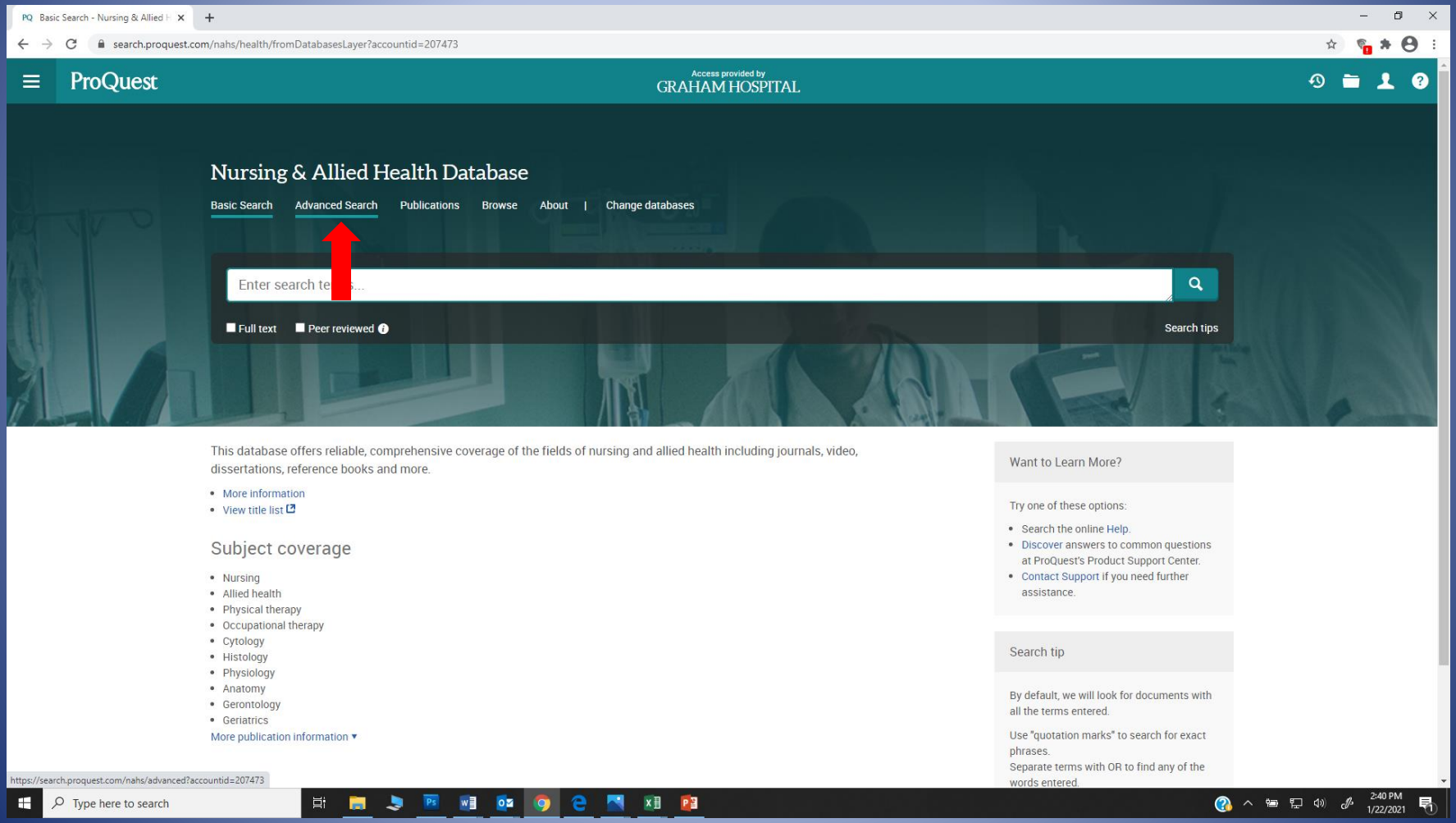

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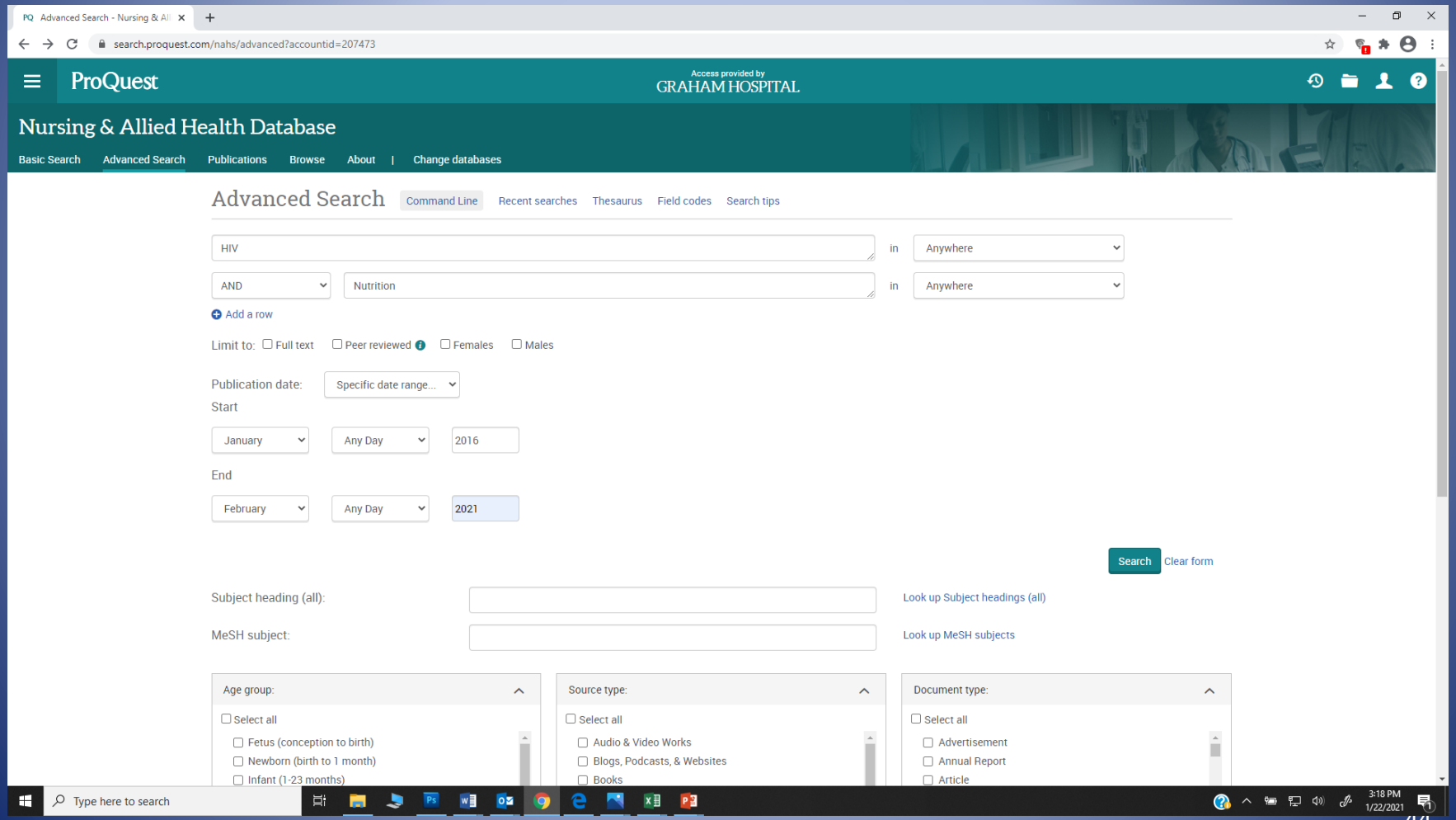

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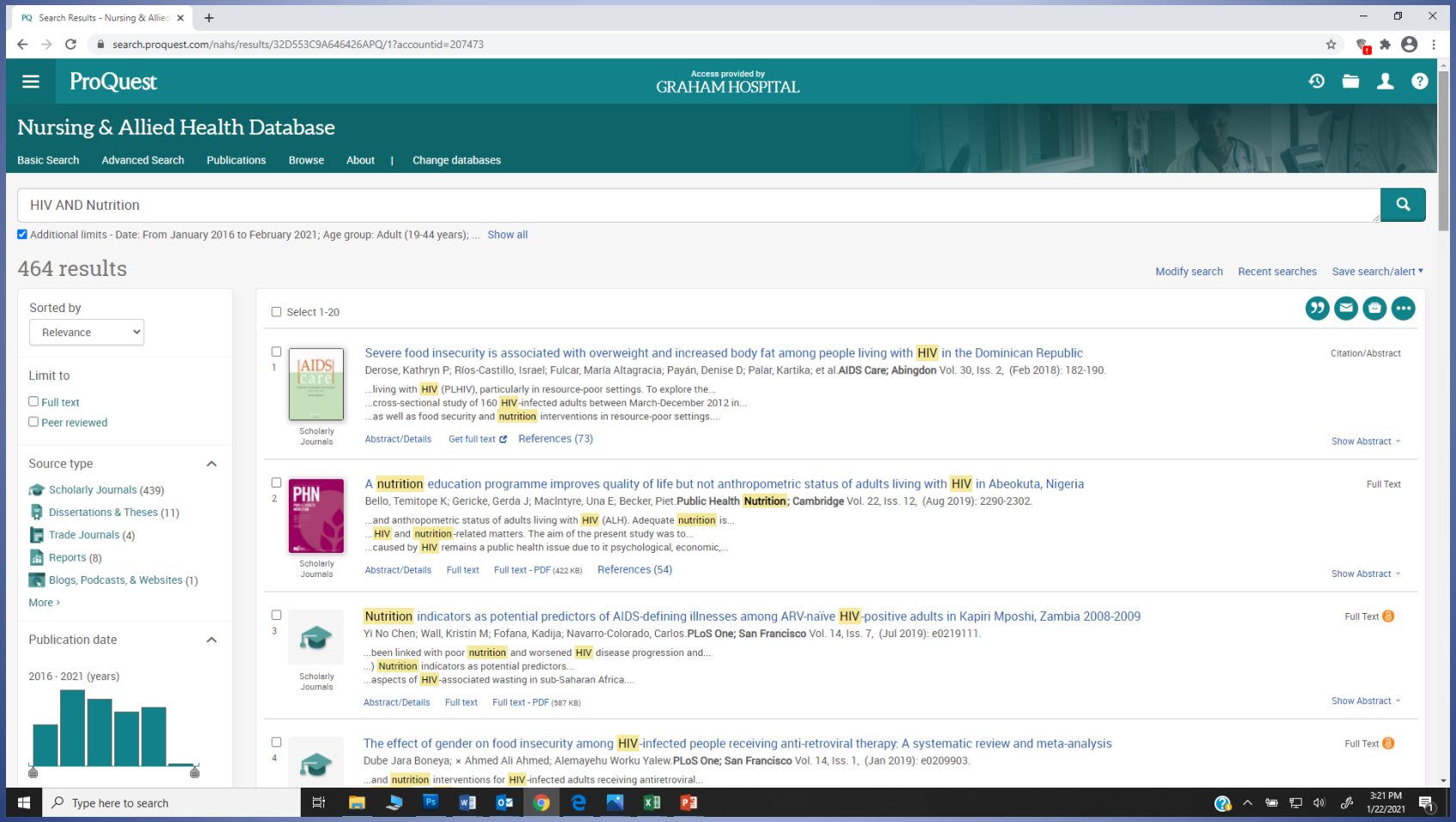

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