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Original Article

The laparoscopic approach is more preferred among nurses for benign gynecologic conditions than among nonmedical working women: A nationwide study in Taiwan

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ABSTRACT

Objective: To compare the use of laparoscopy and laparotomy for hysterectomy in treating benign gynecological conditions in nurses and nonmedical working women.
Materials and Methods: A nationwide population-based study was conducted using data from inpatient expenditures of Taiwan's National Health Insurance Research Datasets between 2008 and 2011. All women undergoing total hysterectomies via laparoscopy and laparotomy between the ages of 20 years and 65 years were identified. A generalized equation estimation model was used to compare the differences in laparoscopic hysterectomy (LH) and total abdominal hysterectomy (TAH) between the two groups.
Results: There were 1226 nurses, and 36,624 nonmedical working women, serving as controls, in the present study. The LH rate, as compared to the TAH rate, was significantly higher among nurses than among controls (56% vs. 52%, $p = 0.006$). A multivariate analysis indicated that nurses were significantly more likely to undergo LH (odds ratio, 1.12; 95% confidence interval, 1.01–1.26) than TAH. Nurses were more often treated at medical centers or high-volume hospitals, and were more often treated by high-volume gynecologists.
Conclusion: Compared to nonmedical working women, nurses are more likely to undergo LH rather than TAH. These differences may suggest the influence of medical knowledge and physician–patient interaction on the decision to undergo laparoscopy, in addition to patients' medical conditions.

Introduction

Nursing personnel are vital members of the medical workforce, and their health is an important contributor to healthcare productivity and quality of care [1]. The diverse occupational and environmental hazards that nurses encounter during their daily activities, have been found to contribute to reducing work productivity [1]. In addition, in a more stressful and busy work environment, nurses might use the toilet less than their physiologic needs dictate, which may result in an increased incidence of renal and bladder pathologic changes [2]. When nurses become patients, their disease-related work productivity loss may have profound impacts on patient care and clinical practice. Therefore, nurses' health may lead to decreased productivity and quality of patient care.

Women with clinically diagnosed symptomatic uterine leiomyoma, adenomyosis, or other dysfunctional uterine bleeding are the common causes of hysterectomy [3]. Hysterectomy is the most common gynecological procedure worldwide [4]. It is performed in approximately 16,000 women in Taiwan, annually [5]. As the concept of minimally invasive surgery and surgical techniques advances, laparoscopic hysterectomy (LH) is increasingly being used

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as an alternative to the traditional abdominal or vaginal approaches [6]. Although a laparoscopic approach offers advantages of less postoperative pain, shorter hospital stay, and faster recovery and return to normal activities of daily life [5,7,8], this procedure also has a potential risk of urological complications, urinary tract injuries, and longer operating times [7,8]. Therefore, some women may prefer to have hysterectomies performed by traditional TAH to avoid these potential complications when informed of the risks of LH [9,10]. As shown in our previous study, LH was used in 5.2% of hysterectomies in 1996 and its use increased to 40.4% in 2005. This was associated with concomitant decrease of total abdominal hysterectomy (TAH) [6]. A similar trend was also noted in a United States study that showed the use of LH had increased from 3.3% in 2000 to 43.5% in 2010 [11]. Meanwhile, media publicity, public awareness, and patient preference for minimally invasive surgeries have gradually increased in conjunction with the demand for LH [8]. Previous studies have reported that patient socioeconomic status (SES), medical condition, and factors relating to the medical institution and healthcare provider may also influence hysterectomy rates [12–16]. The nursing workforce is vital to the provision of patient care.

Nursing personnel are important to the provision of patient care and familiar with the healthcare system because of their training and working environment [17,18]. Nurses may have better medical knowledge of the advantages and disadvantages associated with either TAH or LH than nonmedical working women. Different approaches of hysterectomy may affect nurses' ability to return to work and resume job tasks. In addition, the LH approach has the benefit of rapid recovery, quick return to work, and better cosmesis when compared with conventional TAH [8]. Therefore, nurses have a different understanding base from which to make a surgical decision [17]. It is to be expected that nurses would act in a more rational and appropriate manner when making their own surgical treatment decisions, after being provided with adequate information about their choices. To our knowledge, no study has been conducted to investigate the effect of employment as a nurse on choosing either LH or TAH when undergoing a hysterectomy. The present study compared this choice between female nurses and nonmedical working women in Taiwan. The clinical implications are the understanding of the different choice of hysterectomy among nurses, which may affect nurses and their colleagues, as well as work productivity.

Material and methods

Data sources

This nationwide population-based cross-sectional study was conducted based on the data from Taiwan's National Health Insurance Research Database (NHIRD) for inpatient expenditures by admissions, linked with inpatient expenditures by admissions, registries for contracted medical facilities, medical personnel, and beneficiaries. All individually identifiable health information was deidentified and encrypted by the National Health Insurance Administration. In addition, the Institutional Review Board of the Kaohsiung Medical University Hospital, Kaohsiung, Taiwan approved this study (KMUH-IRB-20150017). The procedure and diagnostic codes were classified according to International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) coding system.

Study population

We identified 44,661 women who underwent total hysterectomies either via laparoscopy or laparotomy in Taiwan between 2008 and 2011 from the NHIRD inpatient expenditures by admissions. We excluded 1904 women (4.3%) who had vaginal total hysterectomies and 4879 patients (10.9%) who had a principal diagnosis of uterine, cervical, ovarian, or bladder cancer (ICD-9-CM codes 179–184, 188, 189, and 233), or malignant neoplasm without a specified site (199). In addition, 28 (0.06%) women younger than 20 years or older than 65 years were excluded. The data of the remaining included patients were linked to the NHIRD registry for medical personnel to identify those who were nurses (including registered professional nurses and registered nurses). Since the SES of nurses may be higher than that of the average women, we included only nonmedical working women who were full-time employees of government agencies or private institutions such as civil servants, government employees, private sector employees, teachers, employers, and professionals, with an insurable monthly wage in our control group. Our final sample consisted of 1226 nurses and 36,624 nonmedical working women, all of who underwent total hysterectomies.

Measured variables

Total hysterectomy approaches were classified as TAH (ICD-9-CM procedure code 68.4) or LH with different levels of laparoscopic assistance (ICD-9-CM procedure code 68.51; including laparoscopic-assisted vaginal hysterectomy, total laparoscopic hysterectomy, robotic-assisted laparoscopic hysterectomy, or other minimally invasive hysterectomies) based on the ICD-9-CM coding system [6]. In addition, the laparoscopic code (54.21) was used for laparoscopic hysterectomy procedures without defined ICD-9-CM procedure codes. The National Health Insurance Administration mandate minimal care requirements and standardized procedures, as well as the performance of quarterly expert reviews on random samples of the medical records from each hospital to ensure the quality of care and accuracy of the claim files.

The following covariates were included in the analysis: patient characteristics (age, SES, principal diagnosis, and comorbidity); hospital characteristics (accreditation level and annual surgery volume); information about the gynecologist (sex, age, and annual surgery volume); and year of surgery. Mutually exclusive diagnoses of hysterectomy were determined based on prior research and information available in the NHIRD. All clinical episodes of hysterectomy were classified on the basis of the primary cause of hospitalization, and this method has been applied by others [14]. Principal diagnoses of hysterectomy were identified as followed: leiomyoma (ICD-9-CM code 218), benign neoplasm of uterus (219), adenomyosis with and/or without endometriosis (617), disorders of uterus not otherwise specified (621), and others (all other diagnosis codes). In addition, our definitions of the modified Charlson's comorbidity index (CCI) were based on inpatient claims data occurring during the 6 months prior to the index date [19,20]. We also used the CCI to stratify patients' comorbid conditions during the same hospital admission for the hysterectomy and to calculate a comorbidity score. Information on individual SES was provided from the NHIRD registry for beneficiaries. The SES of patients was defined as their own insurable monthly wage and was divided into three categories: low [< new Taiwan dollars (NT$) 20,000], middle (NT$20,000–39,999), and high (≥ NT$40,000).

Information on the characteristics of hospitals and gynecologists was provided from the registry for contracted medical facilities and registry for medical personnel. Under the Taiwanese hospital accreditation system, medical centers were the hospitals with better medical care and teaching ability, followed by regional hospitals and local hospitals. In addition, the surgical volume of hospitals/gynecologists was classified based on the average