PROFESSION AND SOCIETY

Turnover of New Graduate Nurses in Their First Job Using Survival Analysis

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Abstract

Purpose: To examine factors related to turnover of new graduate nurses in their first job.

Design: Data were obtained from a 3-year panel survey (2006–2008) of the Graduates Occupational Mobility Survey that followed-up college graduates in South Korea. The sample consisted of 351 new graduates whose first job was as a full-time registered nurse in a hospital.

Methods: Survival analysis was conducted to estimate survival curves and related factors, including individual and family, nursing education, hospital, and job dissatisfaction (overall and 10 specific job aspects).

Findings: The estimated probabilities of staying in their first job for 1, 2, and 3 years were 0.823, 0.666, and 0.537, respectively. Nurses reporting overall job dissatisfaction had significantly lower survival probabilities than those who reported themselves to be either neutral or satisfied. Nurses were more likely to leave if they were married or worked in small (vs. large), nonmetropolitan, and nonunionized hospitals. Dissatisfaction with interpersonal relationships, work content, and physical work environment was associated with a significant increase in the hazards of leaving the first job.

Conclusions: Hospital characteristics as well as job satisfaction were significantly associated with new graduates' turnover.

Clinical Relevance: The high turnover of new graduates could be reduced by improving their job satisfaction, especially with interpersonal relationships, work content, and the physical work environment.

New graduate nurses are the major source of the supply of nurses to meet patient needs. However, new graduates have been reported to experience intense stress and challenges when they transition from school to their first work setting (Duchscher, 2009; Pellico, Brewer, & Kovner, 2009). A recent report released by the Institute of Medicine (2011) addressed difficulties of new graduates' transition to practice and the need for managing the transition to reduce their high turnover rates. Kovner and Brewer (2010) reported that 18.1% of newly licensed nurses left their first employer within a year of starting a job, and 26.2% did so within 2 years. To support a suc-

cessful transition and reduce turnover rates among new graduates, it is necessary to better understand factors affecting their turnover (Kovner et al., 2007).

Previous studies on nurse turnover provide evidence of factors related to nurse turnover intention and actual turnover: job satisfaction and intent to leave, plus organizational, economic, and individual characteristics (Coomber & Barriball, 2007; Hayes et al., 2006). Studies examining new graduates' turnover have demonstrated that higher job satisfaction, organizational commitment, empowerment, support, and pay have all been associated with lower turnover or intent to leave (Beecroft, Dorey,

& Wenten, 2008; Kovner, Brewer, Greene, & Fairchild, 2009; Roche, Lamoureux, & Teehan, 2004). New nurses' participation in nurse residency and internship programs also was reported to decrease new graduates' turnover (Newhouse, Hoffman, Suflita, & Hairston, 2007; Ulrich et al., 2010). For example, in their 10-year longitudinal study of new graduate nurses, Ulrich et al. (2010) reported a decrease in turnover after implementing such a residency program for registered nurses (RNs).

Although those studies have contributed evidence on nurse turnover, new methodological approaches are still required to advance nurse turnover research. First, longitudinal research designs have been suggested to be stronger than other designs because longitudinal studies could increase the ability to predict turnover when compared with cross-sectional studies (Hayes et al., 2006). Longitudinal designs are necessary when researchers want to follow up on actual turnover after assessing turnover intention, considering that turnover intention alone accounts for only a portion of actual turnover (Hayes et al., 2006; Mor Barak, Nissly, & Levin, 2001). Several of these longitudinal research projects on nurse turnover have been launched, such as the European Nurses' Early Exit Study, in which 10 European countries participated (Hasselhorn & Müller, 2005). Similarly, the longitudinal RN Work Project began in 2006 to track career changes in a nationally representative sample of more than 2,000 newly licensed RNs (Kovner & Brewer, 2010). Second, advanced statistical techniques may yield more fine-grained results about patterns of nurse turnover. For example, survival analysis is a statistical method that has the advantages of simultaneously taking into account not only the actual occurrence of turnover but also when it occurs, allowing an enhanced understanding of the timing of turnover (Allison, 2010). Survival analysis has been used frequently in health sciences (e.g., to investigate when deaths occur over time in patients with specific conditions), but relatively less often in nursing research. Recently, Nooney, Unruh, and Yore (2010) did conduct a survival analysis to identify factors related to career changes and labor force separation among RNs. Applying survival analysis to longitudinal data is expected to advance methodological approaches in turnover research by examining actual turnover rather than turnover intention and accounting for both the occurrence of turnover and length of time prior to turnover.

Thus, using longitudinal data and survival analysis, the purposes of this study were to determine turnover rates by estimating the survival curves of new graduate nurses in their first job and to examine factors related to their turnover.

Conceptual Model

This study was guided by a conceptual model consisting of four areas of turnover predictors: individual and family, nursing education, hospital characteristics, and job satisfaction. Individual or family characteristics and job satisfaction were included in the model based on previous findings (Coomber & Barriball, 2007; Hayes et al., 2006). The father's education level was included as a proxy of the family socioeconomic status because most new graduates were expected to be young and not yet married. The literature has reported an inverse relationship between family income and turnover, suggesting that more affluent individuals may have less motivation to change jobs to improve their income status (Wai Chi Tai, Bame, & Robinson, 1998).

A distinctive feature of this model is an emphasis on nursing education (i.e., type of nursing degree, reason for choosing nursing major). As in many countries, in South Korea, there are two types of nursing education programs: a 3-year diploma and a 4-year bachelor's (BSN) program. Considering that the nursing leadership has made an effort to standardize entry-level educational requirements for RNs at the baccalaureate level in Korea, examination of survival curves of nurses holding each type of degree will support decision making to inform national nursing education policy. Nurses with higher levels of education have been reported to be more likely to leave because of their greater occupational mobility than the less educated (Hayes et al., 2006; Kovner et al., 2009; Shields & Ward, 2001). Reasons for choosing a nursing major were included in the model under the assumption that they would influence nursing professionalism, commitment to the nursing profession, and future turnover behaviors.

The other emphasis of the model is on hospital structural characteristics (i.e., size, location, unionization). One of the gaps in existing knowledge is the lack of examination of macrolevel variables such as organization size, setting, and structure (Mor Barak et al., 2001). Therefore, possible differences in new graduates' turnover were examined by different hospital characteristics. Hospital size and location were initially expected to affect turnover based on reports that small, rural hospitals had difficulties in recruiting and retaining nurses (Krebs, Madigan, & Tullai-McGuinness, 2008; Meraviglia et al., 2009). Unionization was also selected as a hospital characteristic based on the findings that unions influence nurses' job satisfaction and turnover (Seago, Spetz, Ash, Herrera, & Keane, 2011). In Korea, not all hospitals have a labor union. Individual nurses in unionized hospitals can choose whether or not to join the union. Identifying

specific types of hospitals with high turnover rates was expected to be helpful for seeking solutions to alleviate the nurse shortage and geographical imbalance.

Method

Data Sources

Data were from a 3-year panel survey of the 2005 Graduates Occupational Mobility Survey (GOMS) conducted by the Korea Employment Information Service (KEIS). The purpose of the GOMS is to produce data needed to understand the transition of college graduates to the labor market, and to support policy making to assure the employment stability of highly educated youth. The 2005 GOMS consisted of a 5% nationally representative sample ($N = 26,544$) of graduates from 2- to 4-year colleges or universities in August 2004 or February 2005, using multistage stratified sampling (e.g., years of education, region, college major, and gender; KEIS, 2009). The 1st-year survey of the 2005 GOMS was conducted in 2006, followed by the 2nd-year survey in 2007 and the 3rd-year survey in 2008. The three-wave 2005 GOMS data were released to the public through the KEIS Web site (http://survey.keis.or.kr/survey_keis/) and were downloaded for this study. The three datasets were merged by using individual panel numbers. Data did not include any information that could identify individuals.

Study Sample

Using information on their college major, 483 nursing graduates were identified. Then, 415 nursing graduates who started their first job in a hospital as an RN by the time the 3rd-year survey had been completed in 2008 were selected. Part-time nurses ($n = 30$) were excluded because their turnover was expected to be different from that of full-time nurses. Thirty-four graduates who started their first job in 2004 or earlier also were excluded from the sample because either their first position was not in nursing or they graduated from RN-BSN programs (and were thus not "new" graduates). The final study sample included 351 new graduate nurses working in hospitals as full-time employees. The study sample consisted of 75% diploma and 25% BSN graduates, which was very close to the national average of 77% diploma and 23% BSN degree holders (Korean Nurses Association, 2007).

Measures

Individual and family characteristics included age at the time of the 1st-year survey, gender, marital status, and father's education (i.e., having 4 or more years of college education or not). Nursing education characteristics included nursing degrees and the reason for choosing a nursing major. Hospital characteristics were size, location, and the presence of labor unions (unionized or not). Hospital size was categorized into three groups based on the number of employees: small (< 300), medium (300–999), and large (1,000 or more) (the GOMS does not report the number of hospital beds). Hospital location was categorized into three groups: Seoul (capital of South Korea), metropolitan (six metropolitan cities other than Seoul), and nonmetropolitan areas. Job satisfaction was measured using 11 questions: 1 question about overall satisfaction and 10 questions concerning specific job aspects. Job satisfaction was measured on a 5-point scale, ranging from *very dissatisfied* to *very satisfied*. The responses were collapsed into two groups (dissatisfied vs. not) to develop a more parsimonious analytic model and also to focus on job dissatisfaction rather than satisfaction, under the assumption that negative attitudes (job dissatisfaction) toward a job would influence turnover decisions more strongly than a positive attitude (job satisfaction). Cronbach's α of 10 aspects of job satisfaction using the 5-point scale was 0.81.

Analysis

Survival analysis was conducted to estimate the survival curves of new graduates and to examine factors related to their turnover. In survival analysis, the occurrence of the event is actual turnover and the timing of events is the duration of the first job. In contrast to logistic analysis with dichotomous dependent variables (e.g., the nurse left the job or not), in which the focus of the analysis is on the occurrence of turnover, survival analysis also analyzes the timing of the turnover, that is, how long the nurse stayed in the first job. In contrast to conventional linear regression approaches in which the dependent variable is the length of the first job, a survival analysis specifically addresses the duration of work for nurses still working at the end of study, called censored cases in survival analysis. Thus, survival analysis has the advantage of taking into account both the occurrence of turnover and length of the first job. Another benefit of using survival analysis is that information about nurses who dropped out during follow-up periods can be utilized in the analysis whereas they are excluded in more traditional analyses.

Nurses in the sample were categorized into three groups based on the occurrence of turnover: leavers, stayers, and dropouts. Duration of the first job for leavers was quantified as the length of the first job in months. Stayers were censored cases due to termination of the

survey, and their duration of the first job was the time in months from starting the first job to the date on which the 3rd-year survey was conducted. Dropouts referred to those who had been lost to follow-up in the second- or 3rd-year survey. Duration of the first job for a nurse who dropped out in the 2nd-year survey was the time between starting the first job and the date when the 1st-year survey was completed; duration for dropouts in the 3rd-year survey was between starting the first job and the 2nd-year survey being completed.

Estimation and comparison of survival curves were conducted using the Kaplan-Meier method (Allison, 2010). The difference in the survival curves of new graduates reporting overall job dissatisfaction versus those reporting to be neutral or satisfied was examined using the log-rank test, which is the most widely used test for differences in the survival curves. To examine factors associated with leaving the first job, Cox proportional hazards regression was conducted using the SAS PHREG procedure (Allison, 2010). First, univariate regression for each independent variable was conducted and variables with $p \leq .20$ from the univariate regression analyses were candidates for the multivariate regression model. Then a backward elimination process was undertaken to develop the final multivariate model. Overall job dissatisfaction was excluded from the models because of a possible overlap between overall job satisfaction and 10 aspect-specific job dissatisfaction items. The proportional hazard assumptions for Cox regression models were tested using Schoenfeld residuals and found not to be violated. Results of Cox regression were presented by providing hazard ratios (HRs) and 95% confidence limits (CLs).

Results

Forty-five percent of the sample was composed of leavers who quit their first job before the 3rd-year survey had been conducted (**Table 1**). The mean age was 24 years, and the majority were female (96%), single (95%), and 3-year diploma graduates (75%). Two thirds chose a nursing major because of employment opportunities; no nurses chose the major because of social reputation or recognition. One third worked in large hospitals and 39% worked in hospitals located in nonmetropolitan areas. Approximately half of the respondents were working in unionized hospitals. Seventeen percent reported overall job dissatisfaction. Job aspects with large proportions of nurses dissatisfied were working hours (37%) and pay (33%).

Survival Curve of New Graduate Nurses

The survival curve of new graduate nurses is shown in **Figure,** part A. The estimated probabilities that a new

Table 1. Characteristics of New Graduate Nurses (N = 351)

	n (%) or Mean ± SD
Event/censoring	
Leaver	159 (45.3)
Stayer (complete, censored)	130 (37.0)
Dropout (incomplete, censored)	62 (17.7)
Individual and family	
Age in 2006 (years)	24.2 ± 2.1
Female (vs. male)	338 (96.3)
Married (vs. not)	19 (5.4)
Father with 4+ years college (vs. not)	60 (17.1)
Nursing education	
Diploma (vs. BSN)	264 (75.2)
Reason for choosing nursing major	
Employment opportunity	232 (66.1)
Aptitude and interest	60 (17.1)
Other	59 (16.8)
Hospital	
Size	
Small	134 (38.2)
Medium	104 (29.6)
Large	113 (32.2)
Location	
Seoul (capital)	116 (33.0)
Metropolitan	98 (27.9)
Nonmetropolitan	137 (39.0)
Unionized (vs. not)	170 (48.9)
Job dissatisfaction	
Overall	61 (17.4)
Pay	117 (33.3)
Employment security	34 (9.7)
Work content	57 (16.2)
Physical work environments	87 (24.8)
Working hours	130 (37.0)
Personal growth	93 (26.5)
Interpersonal relationship	46 (13.1)
Social insurance and fringe benefits	83 (23.6)
Advancement system	80 (22.8)
Social reputation for the job	25 (7.1)

graduate nurse will survive (i.e., stay in his or her first job) for 1, 2, or 3 years were 0.823, 0.666, and 0.537, respectively; 95% CL was [0.78, 0.86], [0.62, 0.72], and [0.48, 0.59], respectively. The survival curves of those who were dissatisfied overall versus not dissatisfied were significantly different (log-rank test $p < .001$; **Figure**, part B). The 1-, 2-, and 3-year survival probabilities of nurses who were dissatisfied were 0.541, 0.320, and 0.182, respectively, whereas those of nurses who were not dissatisfied were 0.882, 0.738, and 0.610, respectively.

Factors Associated With the Survival of New Graduate Nurses

Results from univariate and multivariate Cox proportional hazards regression survival analysis are shown in

Kaplan-Meier Curves for new graduate nurses

Kaplan-Meier Curves for job dissatisfaction
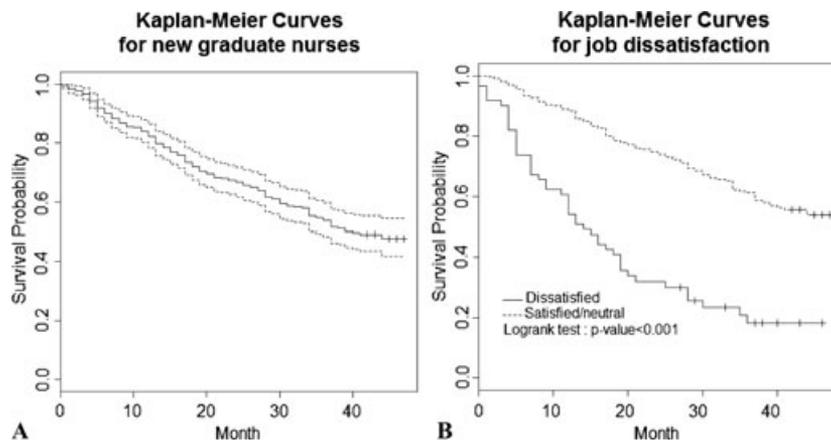
Figure. A: Survival curve of new graduate nurses. Dotted lines indicate the upper and lower limits for a 95% confidence interval. **B:** Comparison of survival curves between new graduate nurses who were dissatisfied versus not (i.e., satisfied or neutral).

Table 2. In the univariate analysis, nurses were more likely to leave their first job if they were married or worked in small, nonmetropolitan, and nonunionized hospitals. Several aspects of job dissatisfaction were significantly associated with turnover: pay, employment security, work content, physical work environment, personal growth, interpersonal relationships, and social reputation for the job.

In multivariate Cox proportional hazards regression using the backward elimination method, nurses were significantly more likely to leave if they were married or worked in small, nonmetropolitan, and nonunionized hospitals. Dissatisfaction with work content, physical work environment, and interpersonal relationships was associated with a significant increase in the hazards of leaving the first job. Working in small (vs. large) hospitals had the greatest hazard ratio of 3.236, followed by being married (HR = 2.580). Out of 10 aspects of job dissatisfaction, interpersonal relationships had the greatest impact on the likelihood of nurse turnover (HR = 2.346) followed by work content (HR = 2.169).

Discussion

This study reports high turnover rates of new graduate nurses; 17.7%, 33.4%, and 46.3% were estimated to leave the first job within 1, 2, and 3 years, respectively. These turnover rates indicate that new graduates had a great risk for leaving their first job within a year, yet the risk did not decrease after only 1 year of working. Although many studies report nurse turnover rates, it is difficult to compare these turnover rates with those from other studies because turnover rates can vary depending on the sample mix (e.g., all nurses or new graduates only), clinical settings, specific approach to measurement of turnover, and study designs. When compared

with turnover rates from two longitudinal studies of new graduates, the 1-year turnover rate found here was close to the 18.1% in Kovner and Brewer's (2010) study but lower than the 27% found by Ulrich et al. (2010). The 2-year turnover rate was higher than the 26.2% found by Kovner and Brewer (2010) but lower than the 49% found by Ulrich et al. (2010).

Factors affecting turnover in this study were found to be consistent with those from previous studies that utilized analytical methods other than survival analysis. Nurses who were married were more likely to leave, suggesting that marriage may increase family responsibility and cause work-family conflict (Kovner et al., 2009). Also, married nurses might be more likely to leave because their income provides an additional source of income for the household, thereby relieving some pressure on the nurse to remain employed. Consistent with the literature (Wai Chi Tai et al., 1998), nurses whose fathers had 4 or more years of college education, which was considered having a higher family socioeconomic status, tended to be less likely to leave in the univariate analysis ($p = .081$), but the finding was not significant in the multivariate analysis. Nurses with diploma degrees appeared to be more likely to leave ($p = .075$) than BSN graduates in the univariate analysis, but not in the multivariate analysis. However, the short follow-up period of less than 4 years in this study may not be long enough to reveal differences in turnover due to nursing education. Examination of career trajectory by nursing degrees over 10 years is suggested to better inform evidence-based decision making on nursing education policies.

Another highlight of the study is the independent and statistically significant effects of hospital size, location, and unionization on turnover, even after adjusting for job satisfaction. Not surprisingly, working in small and nonmetropolitan hospitals increased the hazard of leaving the first job. These findings support prior evidence that small,

Table 2. Cox Proportional Hazards Regression Analysis of Nurses' Leaving the First Job: Hazard Ratio (HR) and 95% Confidence Limit (CL)

	Univariate			Multivariate		
	HR	95% CL	p	HR	95% CL	p
Individual and family						
Age in 2006	1.034	[0.96, 1.11]	.346			
Female (vs. male)	1.544	[0.63, 3.76]	.340			
Married (vs. not)	2.489	[1.44, 4.32]	.001	2.580	[1.45, 4.59]	.001
Father with 4+ years college (vs. not)	0.659	[0.41, 1.05]	.081			
Nursing education						
Diploma (vs. BSN)	1.428	[0.97, 2.12]	.075			
Reason for choosing nursing major (vs. employment opportunity)						
Aptitude and interest	1.045	[0.69, 1.59]	.836			
Other	1.013	[0.66, 1.55]	.951			
Hospital						
Size (vs. large)						
Small	3.482	[2.30, 5.28]	<.001	3.236	[2.02, 5.19]	<.001
Medium	1.545	[0.97, 2.48]	.070	1.599	[0.96, 2.67]	.072
Location (vs. nonmetropolitan)						
Seoul (capital)	0.569	[0.39, 0.82]	.003	0.829	[0.54, 1.27]	.385
Metropolitan	0.558	[0.38, 0.83]	.004	0.578	[0.39, 0.87]	.008
Unionized (vs. not)	0.489	[0.35, 0.68]	<.001	0.685	[0.47, 0.99]	.047
Job dissatisfaction (vs. satisfied or neutral)						
Pay	1.552	[1.13, 2.13]	.007			
Employment security	2.437	[1.56, 3.80]	<.001			
Work content	2.226	[1.53, 3.23]	<.001	2.169	[1.44, 3.26]	<.001
Physical work environments	2.019	[1.46, 2.80]	<.001	1.449	[1.01, 2.07]	.043
Working hours	1.283	[0.94, 1.76]	.123			
Personal growth	1.540	[1.11, 2.15]	.011			
Interpersonal relationship	1.878	[1.24, 2.84]	.003	2.346	[1.52, 3.62]	<.001
Social insurances and fringe benefits	1.169	[0.82, 1.67]	.389			
Advancement system	1.122	[0.78, 1.62]	.539			
Social reputation for the job	1.825	[1.09, 3.06]	.023			

Note. HR = hazard ratio; CL = confidence limit.

rural hospitals have difficulties in recruiting and retaining nurses (Krebs et al., 2008; Meraviglia et al., 2009). Workforce policies at both organizational and national levels are required to ensure sustainable nurse supply in rural areas and to alleviate geographic imbalance. For example, the National Quality Forum (2004) recommended voluntary turnover as a system-centered performance measure; the Korean government could monitor turnover rates in small rural hospitals and provide financial or nonmonetary incentives for hospitals with low turnover rates. Interestingly, working in unionized hospitals was associated with a decrease in the hazard for leaving. Seago et al. (2011) found that paradoxically, hospitals with RN unions had higher job dissatisfaction but greater retention. Although our study does not explain how

unionization might affect nurse turnover, our findings suggest that unionization could contribute to reducing new graduates' turnover.

The results provide strong evidence that job dissatisfaction is a strong determinant of turnover among new graduates. First, nurses reporting overall job dissatisfaction had significantly higher probabilities of leaving than those not dissatisfied, as previous studies have reported (Coomber & Barriball, 2007; Kovner et al., 2009; Shields & Ward, 2001). Among 10 aspects of job dissatisfaction, interpersonal relationships had the greatest impact on turnover. This finding indicates that establishing good interpersonal relationships is critical for new graduate nurses to stay in their first job. New graduates have been reported to have poor

interpersonal relationships and to experience nurse-to-nurse horizontal violence (McKenna, Smith, Poole, & Coverdale, 2003; Pellico et al., 2009). Nurse leaders and managers need to play key roles to support new graduates to develop interpersonal relationships among nursing staff and other hospital personnel. The second greatest impact on turnover was found in dissatisfaction with work content. This may reflect reality shock and a discrepancy between what recent graduates have learned nursing ought to be and the reality of nursing practice in their hospitals. Job design will be necessary to enable new graduate nurses to provide high quality care and to possess autonomy. Third, the physical work environment was found to be related to turnover, although a recent study reported no effect of physical work environment on job satisfaction (Djukic, Kovner, Budin, & Norman, 2010).

This study had a few limitations. First, the follow-up period of this study was less than 4 years after graduation. Longer observations of new graduates over 5 years will enable a more detailed determination of the trajectory of new graduates' turnover, and detection of possible differences in survival curves and factors related to turnover differing over time (e.g., 1, 5, 10 years). For example, Murrells, Robinson, and Griffiths (2008) reported that predictors of turnover intentions differed by duration of work at 6 months, 18 months, and 3 years. Another limitation was limited information on job characteristics because the survey was not targeted specifically to nursing graduates. More information on these characteristics could deepen the understanding of nurse turnover.

Conclusions

The aim of this study was to estimate the survival curves of new graduate nurses by conducting a survival analysis of nationally representative longitudinal data. The great risk for leaving within a year suggests the need for new approaches and programs to support new graduates' transition to hospitals. The finding that turnover rates were still high even after 1 year of working indicates that new graduate nurses may not be retained without improving their job satisfaction with working conditions. The study findings are also expected to provide a better understanding of nurse turnover, specifically for new graduate nurses. More longitudinal studies using various analytic methods are needed to advance turnover research and ultimately reduce turnover rates in the nursing workforce. Collaborative efforts of nursing schools and hospitals will be beneficial not only to new graduates but also hospitals and the society that expects nurses to meet their nursing care needs.

Clinical Resources

- RN work project: http://www.rnworkproject.org
- The European NEXT-Study: http://www.next.uni-wuppertal.de/EN/index.php

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