Nursing Unit Turnover, Workgroup Processes, and Unit-level Patient Outcomes

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November 7, 2007

BACKGROUND

- Nursing workforce crisis, and continued shortages
  - 21.3% RNs turnover rate (10-30%) in 2000 (HSM 2002)
  - Increased vacancy rates (10.2%, HSM 2002)
- Need for enhanced recruitment and retention strategies
- Dysfunctional aspects of turnover
  - Economic cost, negative impacts on quality and patient outcomes
- Prime focus of empirical research on turnover
  - Antecedents of turnover

BACKGROUND

- Theoretical efforts integrating turnover model (Staw 1980, Price 1977, Mobley 1982, Cavanagh 1989, Pfeffer 1979)
  - Negative consequences – morale, cohesion, coordination, communication, and group learning
  - Positive consequences – innovation and adaptation
- Lack of empirical research on turnover consequences (Alexander et al. 1994, Castle et al. 2005, Zimmerman et al. 2002)
  - Direct effects on quality of care
  - Limited studies on underlying mechanisms
  - Aggregated turnover within organization

Figure 1. Input-Process-Outcome Framework (McGrath, 1964)

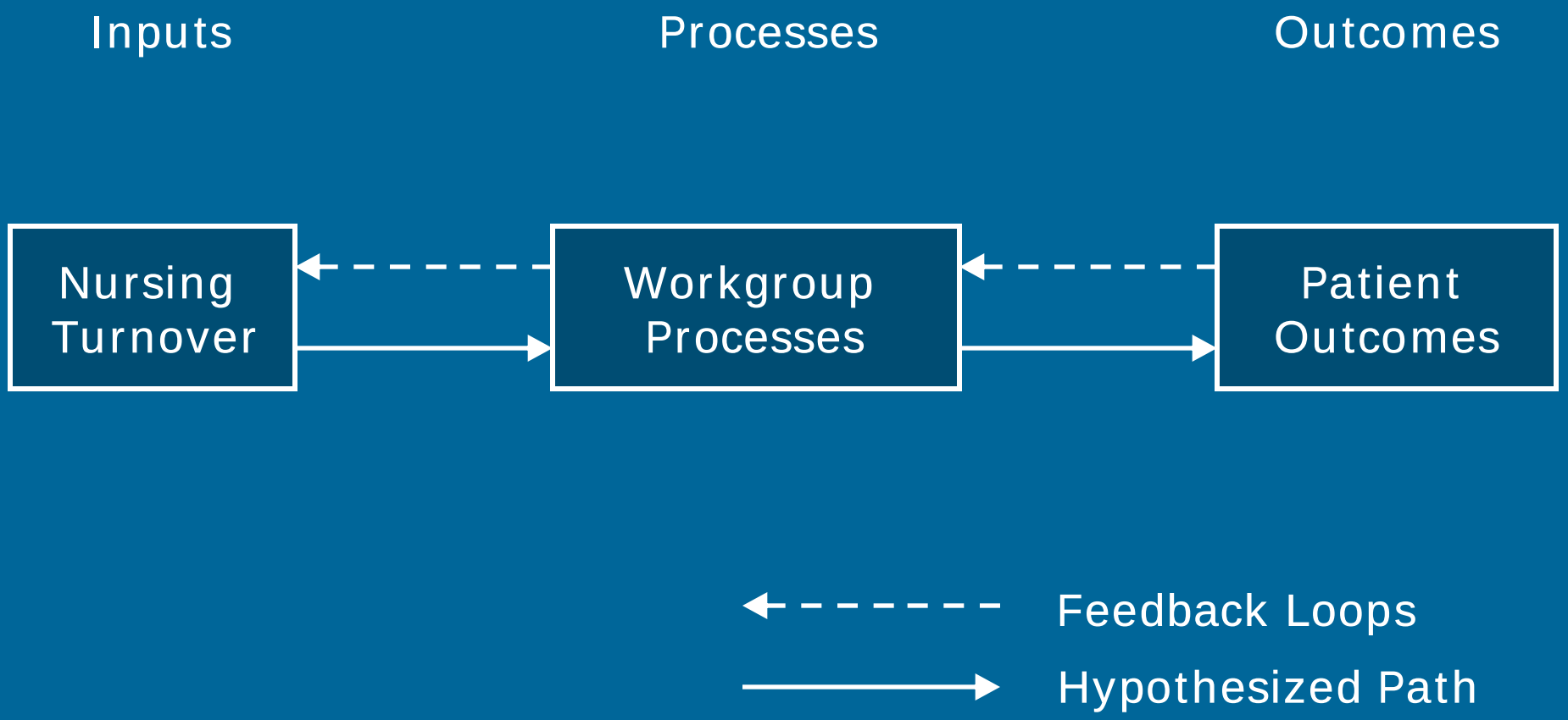
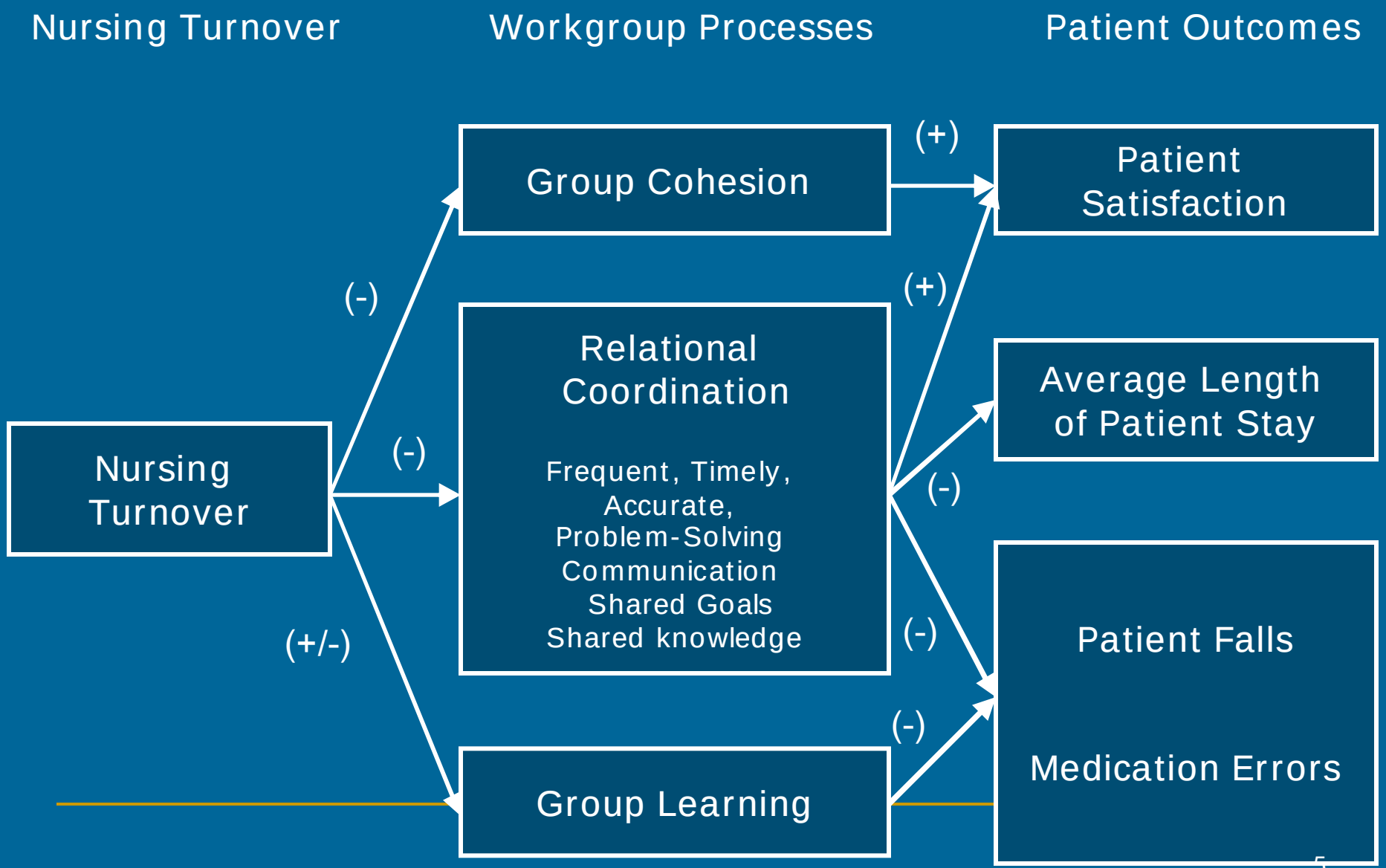


Figure 2. Hypothesized Path Model



RESEARCH QUESTIONS

- How does nursing unit turnover affect key workgroup processes?
- How do workgroup processes mediate the impact of nursing unit turnover on patient outcomes?

METHODS

- Outcomes Research in Nursing Administration Project-II (ORNA-II) (Mark, 2002)
  - Design: Causal modeling study design to investigate relationships among RN staffing adequacy, work environments, and organizational and patient outcomes
  - Sample: Two medical-surgical nursing units at each hospitals randomly selected (286 nursing units located in 143 acute care general hospitals), and 4,911 nurses and 2, 722 patients who responded the study questionnaires.
  - Data collection: 2003 through 2004 (six consecutive months)

METHODS

- Current Study
  - Non-experimental causal modeling study
  - Nursing unit as the unit of analysis
  - A reasonable period of time prior to measuring outcome variables - controlling endogenous problem of turnover and justifying the causal relationship between turnover and outcomes.

METHODS

- Variables
  - Explanatory variable of interest: average crude turnover rates
  - Process variables: workgroup cohesion (Hinshaw et al. 1985), relational coordination (Gittell, 2000), and workgroup learning (Rybowiak et al. 1999)
  - Dependent variables: patient satisfaction (Mark et al. 2003), average length of patient stay, patient falls, and medication errors
  - Other controls: patient acuity, unit size, work complexity (Campbell 1988), nurse experience and education, RN hours, and hospital characteristics (hospital size, technological sophistication, and teaching status)

Table 1. Time Sequences of Selected Variables

Variables	January	February	March	April	May	June
Explanatory variables						
Nursing unit turnover	X	X	X	X		
Process variables						
Group cohesion					X	
Relational coordination			X			
Workgroup learning			X			
Outcome variables						
Patient satisfaction						X
Average length of patient stay				X	X	X
Patient falls				X	X	X
Medication errors				X	X	X

METHODS

- Data analysis
  - Data aggregation: aggregating individual nurse and patient data to the unit-level data (Interrater agreement)
  - Linear and spline function of turnover – nonlinear relationship between turnover and workgroup learning (Castle 2005)
  - Lagged information approach
  - Linear models (OLS, RE, or FE) and Count models (Poisson or Negative binomial regression)
  - n=268 nursing units from 141 hospitals

RESULTS

- Average crude turnover rates (SD)

JAN_FEB	MAR_APR	JAN_JUN
4.29% (6.47)	4.57% (6.42)	12.65% (12.35)

- Patient outcomes from April to June (SD)

Average length of stay	Patient Falls	Medication errors
4.51days (1.06)	4.03 per 1000pt days (2.36)	0.77 per 1000pt days (1.32)

RESULTS

- Workgroup processes – Correlation coefficients

	Group Cohesion	Relational Coordination
Relational coordination	0.2930**	
Group learning	0.3935**	0.4724**

- Patient outcomes – Correlation coefficients

	Patient satisfaction	Average length of stay	Patient falls
Average length of stay	-0.2578**		
Patient falls	-0.0204	-0.0026	
Medication errors	0.0306	-0.0420	0.1687**

** p < .01 * p < .05

RESULTS

- Workgroup processes and patient outcomes by turnover spline groups

	Low	Medium	High
	Turnover<=2.15 n=124	2.15<Turnover<=4.3 n=38	4.3<Turnover n=106
Group cohesion	4.4363	4.3417	4.3262
Relational coordination	3.6599	3.6453	3.6242
Workgroup learning*	3.8517	3.7025	3.7596
Patient satisfaction	3.4255	3.4650	3.4177
Average length of stay**	4.3754	4.2685	4.7555
Patient falls	4.0913	3.9990	3.9742
Medication errors**	0.8135	0.6860	0.7550

P < .01 * p < .05

RESULTS

- Relationships between turnover and Workgroup processes

	Group cohesion	Relational coordination	Workgroup learning
Turnover (JAN_FEB)		-0.0026^{+}	-0.0088^{+}
Turnover<=2.15			-0.0683*
2.15<Turnover<=4.3			0.0331^{+}
4.3<Turnover			-0.0113^{+}
Turnover (MAR_APR)	-0.0084^{+}		

** p < .01 * p < .05 $^{+}$p<.10

Control for work complexity, nurse characteristics, and hospitals characteristics

RESULTS

- Relationships among turnover, processes, and patient satisfaction

	1a	2a	3a
Turnover (MAR_APR)	-0.0027	-0.0021	
Group cohesion		0.0876**	0.0907**

	1b	2b	3b
Turnover (JAN_FEB)	-0.0010	-0.0006	
Relational coordination		0.1567*	0.1585*

** p < .01 * p < .05 +p<.10

Control for patient acuity, unit size, work complexity, nurse characteristics, and hospitals characteristics

RESULTS

- Relationships among turnover, relational coordination, and average length of stay

	1c	2c	3c
Turnover (JAN_FEB)	0.0176^{+}	0.0190^{+}	
Relational coordination		0.5622^{+}	0.5074

** p < .01 * p < .05 $^{+}$p<.10

Control for patient acuity, unit size, work complexity, nurse characteristics, and hospitals characteristics

RESULTS

- Relationships among turnover, processes, and patient safety – patient falls and medication errors
  - Increased patient health status and teaching hospitals, decreased patient falls
  - Increased nurse education, decreased medication errors
  - None of significant relationships between turnover and workgroup, and patient falls and medication errors

RESULTS

- Signs and significance of coefficient estimates on control variables

	Patient satisfaction	Average length of stay	Patient falls	Medication errors
Work complexity	– *			
Unit size	+ +	– +		
Patient age	+ **			
Patient health	+ **	– **	– **	
Nurse education	– *			– *
RN hours	+ +	– +		
Unit tenure	+ +			
Maintain beds	– +	+ **		
Teaching hospital			– +	

** p < .01 * p < .05 +p<.10

CONCLUSIONS

- Evidence to support the relationship between nursing unit turnover and workgroup processes and positive aspects of turnover.
- Little evidence to support the direct effect of turnover on patient outcomes and the effect of workgroup processes on patient outcomes.
- Time period of turnover measurement and various types of quality indicators
- Consideration about turnover: types of turnover and turnover volatility