

ORIGINAL RESEARCH:
EMPIRICAL RESEARCH - QUANTITATIVE

How do nurses spend their time? A time and motion analysis of nursing activities in an internal medicine unit

Olivia Michel^{1,2} | Alberto-José Garcia Manjon³ | Jérôme Pasquier⁴  |
Claudia Ortoleva Bucher⁵ 

¹Institute of Higher Education and Research in Healthcare, Lausanne University Hospital and University of Lausanne, Lausanne, Switzerland

²School of Health Sciences (HEdS-FR), University of Applied Sciences and Arts Western Switzerland (HES-SO), Fribourg, Switzerland

³Lausanne University Hospital, CHUV, Lausanne, Switzerland

⁴Center for Primary Care and Public Health (Unisanté), University of Lausanne, Lausanne, Switzerland

⁵La Source School of Nursing, University of Applied Sciences and Arts Western Switzerland (HES-SO), Lausanne, Switzerland

Correspondence

Claudia Ortoleva Bucher, La Source School of Nursing, University of Applied Sciences and Arts Western Switzerland (HES-SO), Avenue Vinet 30, 1004 Lausanne, Switzerland.
Email: c.ortolevabucher@ecolelasource.ch

Funding information

The study was realized with the financial support of the Lausanne University Hospital (CHUV), Lausanne, Switzerland.

Abstract

Aim: To describe the nature and duration of nursing activities and how much time registered nurses allocate to the different dimensions of their scope of practice in a Swiss university hospital internal medicine ward.

Design: A single-centre observational descriptive study.

Method: Using a time and motion study, two researchers shadowed healthcare workers ($N = 21$) during 46 complete work shifts in 2018. They recorded each activity observed in real time using a tablet computer with a pre-registered list of 42 activities classified into 13 dimensions.

Results: A total of 507.5 work hours were observed. Less than one third of registered nurses' work time was spent with patients. They allocated the most time to the dimensions of 'communication and care coordination' and 'care planning', whereas 'optimizing the quality and safety of care', 'integrating and supervising staff' and 'client education' were allocated the least time.

Conclusion: This study provided a reliable description of nurses' time use at work. It highlighted suboptimal use of the full scope of nursing practice.

Impact: Both work organization and culture should be reconsidered to promote better use of nursing skills. Practice optimization should focus on the following three main areas: (1) greater involvement of registered nurses in building relationships and directly caring for patients and their families; (2) better use of registered nurses' skills in the activities required of their proper roles, including nursing clinical assessments and patient education and (3) more systematically updating registered nurses' knowledge.

KEYWORDS

internal medicine hospital, Nurses, nurses' roles, nursing care performance, nursing scope of practice, time and motion study, time management, work time use

1 | INTRODUCTION

Healthcare professionals must manage increasingly acute and complex care situations with limited resources (OMS, 2020). As the largest workforce in the healthcare system, nurses can and must meet the demands for high quality, accessible and safe care (OMS, 2020). But, faced with increasing cognitive and physical workloads, nurses are under significant pressure to allocate their time adroitly as they perform their recognized roles (Yen et al., 2018). Many studies have shown that when conditions do not allow nurses to employ their skills fully, the quality of care decreases (Aiken et al., 2012; Duffield et al., 2011; Jones et al., 2015; Smeds Alenius et al., 2014). This situation also affects RNs' job satisfaction and retention within their institution (Jones et al., 2015; Lindqvist et al., 2014). Healthcare systems must subsequently cope with longer hospital lengths of stay (Kane et al., 2007), higher care team turnover and increased absenteeism (Aiken et al., 2012; Kane et al., 2007). Therefore, optimizing the use of nurses' time and skills is critical to the future of the healthcare system (Déry et al., 2017; Meena et al., 2016). A clear description of nurses' work and roles in hospital settings, exploring how nurses allocate their time, is an essential step in identifying opportunities for improvement (Bodenheimer & Sinsky, 2014; Desjardins et al., 2008). This could lead to reconsider work organization, allocation of professional or financial resources, staffing or division of tasks. Such changes in nursing role definition and organizational culture have the potential to positively influence nursing workload (Ross-Walker et al., 2012).

2 | BACKGROUND

The studies that have attempted to measure nurses' activities in internal medicine departments organized healthcare activities into categories. The most used categories distinguished direct and indirect care. Direct care refers to all care provided directly to the patient or their family, such as assisting in the activities of daily living (ADLs) or providing treatments, communication or other forms of support (Walker et al., 2007). Yet direct care has been found to occupy a relatively small proportion of RNs' total work time, just 20%–38% (Antinaho et al., 2017; Westbrook et al., 2011). Indirect care is defined as activities that are carried out at a distance from patients, but which have a purpose for them (Walker et al., 2007). Indirect care involves paperwork and work related to the ward (Lavander et al., 2016). Some studies estimated the proportion of indirect care to take up from 11% to 25% of the working day (Antinaho et al., 2015; Farquharson et al., 2013; Westbrook et al., 2011), whereas Walker et al., (2007) reported a proportion of 40%. These results show that much nursing work is invisible to patients (Lavander et al., 2016).

Two studies chose to analyse nursing activities in relation to the concept of 'added value', distinguishing three categories: activities with added value from which patients benefit directly; necessary activities from which they benefit indirectly and activities with no added value (Antinaho et al., 2015; Upenieks et al., 2007). Value-added activities occupied from 54% to 71% of work time, necessary

tasks from 14% to 25% and activities with no added value from 15% to 21% (Upenieks et al., 2007).

Three studies also measured the proportion of work related to the unit itself. This category included various tasks such as student and staff supervision, team conferences, cooperation with other departments or reordering supplies or equipment (Lavander et al., 2016). This category was estimated to occupy from 3% to 9% of work time (Farquharson et al., 2013; Hendrich et al., 2008). Some studies have also quantified the proportion of miscellaneous nursing tasks to take up 1%–8% of their time (Battisto et al., 2009; Westbrook et al., 2011). Given the large number of short tasks and interruptions, workflows have been described as fast paced and fragmented (Cornell et al., 2010; Farquharson et al., 2013; Westbrook et al., 2011).

The scope of nursing practice (ScOP) refers to 'the range of functions and responsibilities legally assigned to nurses and for which they have the education, knowledge and skills' (Déry et al., 2017, p. 51). To measure the effective ScOP, D'Amour et al., (2012) defined six dimensions of activities that were specific to the nursing role. These were as follows: '1. assessment and care planning; 2. patient and family education; 3. communication and care coordination; 4. staff integration and supervision; 5. optimization of quality and safety of care; and 6. updating and use of knowledge' (Déry et al., 2017). When nurses are able to perform all the activities inherent to their role in their practice, their ScOP is said to be optimal (D'Amour et al., 2012; Déry, 2013). An optimal ScOP is an indicator of high-quality care (Dubois et al., 2013).

3 | THE STUDY

3.1 | Aim

This study aimed to describe the true nature and duration of nursing activities and how RNs allocated their time to the different dimensions of their scope of practice in the internal medicine department.

3.2 | Design

This was a single-centre, observational, descriptive study using a time and motion (T&M) method. T&M studies use techniques of continuous observation. This technique is the most accurate because it allows the collection of reliable, detailed field data; however, it is costly in terms of human resources because it commits one observer to each subject over extended periods (Lopetegui et al., 2014; Yen et al., 2018).

3.3 | Participants

The study was conducted in an internal medicine ward in a Swiss university hospital. This 21-bed ward admitted 819 patients (2018) with an average hospital length of stay of 6.63 days. It employs 14 RNs and 12 auxiliary nurses (ANs). RNs work 12.5-h day shifts (7:00 AM to 7:30 PM) or night shifts (7:00 PM to 7:30 AM). ANs work 12.5-h day shifts

TABLE 1 Observation grid with activity categories

1. Dimension 1: Patient assessment	Admission interview	7. Dimension 2: Teaching clients and families	Therapeutic education/coaching
	Consultation of the file	8. Dimension 3: Communication and care coordination	Interview/communication
	Physical clinical examination		Interview / telephone communication
	Clinical mental examination		Medical visit
2. Dimension 1 Care Planning	Tour/ bedroom passage		Coordination conference
	Use of the SOARIAN computer tool		Team conference
	Exit planning		Nurse report
3. Dimension 1: Technical gestures and medico-delegated care	Planning maintenance	9. Dimension 4: Integration and supervision of personnel	Supervision/supervision of a collaborator
	Technical care	10. Dimension 5: Optimization of the quality and safety of care	HPCI measurements
	Emergency care		Report RECI or to the person in charge
	Mortuary care		Maintaining service security
4. Dimension 1: Application of drug treatments	Constraint measures		Satisfaction / complaint
	Preparation of drugs	11. Dimension 6: Updating and use of knowledge	Professional training
	Administration of medication		Scientific consultation or documentation
5. Dimension 1: Activities of Daily Living	Disposal		Supervision received
	Body care	12. Miscellaneous/ Non-healthcare	Administrative tasks
	Nutrition/hydration		Patient/hospitality environment management
	Mobilization		Logistical tasks
6. Dimension 1: Relational care and non-medication interventions	Psychological/relational support		Patient transport
	Psychotherapeutic interventions		Travel time
	Sensory interventions		Waiting
	Environmental or occupational interventions/structured activities		Other activities
	Opposition/aggression management	13. Personal Time	Personal activities
			programmed pause

(7:00 AM to 7:30 PM), 9-h day shifts (7:00 AM to 4:00 PM) or 8.5-h evening shifts (2:30 PM to 11:00 PM). Each RN works in a dyad with an, and together they are responsible for an average of seven patients per day. In Switzerland, there are no national regulations regarding nurse-to-patient ratios and staffing but a study shows that the average in Swiss hospitals was 7.9 (Schwendimann et al., 2019).

A convenience sample of RNs and ANs was recruited. Inclusion criteria required caregivers to be working in the internal medicine department at least 50% of a full-time employment rate and to have been practicing there for at least 6 months. The month before data collection, two information sessions were held to introduce the research project to healthcare team members and to distribute an

informed consent form and a written information sheet directly to potential volunteer participants.

3.4 | Data collection

The nature and duration of nursing activities in our internal medicine ward were described using the Actual Scope of Nursing Practice (ASCOP) model developed by Déry (2013) and based on the previous work by D'Amour et al., (2012). An expert group, including research project members and clinical nurse specialists from the internal medicine department, was responsible for adapting the model to our context. The

six dimensions of nursing activity were broken down into observable activities to make the survey operational. Additional dimensions were added to the original six in the ASCOP model (D'Amour et al., 2012) to adequately cover all the caregivers' activities, including delegated medical tasks and non-clinical tasks. The final list included 42 care activities classified into 11 nursing dimensions and the 2 non-clinical dimensions of 'miscellaneous/non-healthcare' and 'personal time'. The coding grid (Table 1) was validated by all the research team members.

Data collection consisted of continuous caregiver observation over a complete work shift. It was conducted between June and August 2018 by two researchers, both RNs. Observation began when the caregiver arrived at their workstation and ended when they left. They were shadowed, without intervention or interaction, and each observed activity was timed using the NurseObserver 2® application developed specifically for the study, on a Huawei MediaPad T1 7.0 tablet computer (Android 4.4.2 operating system). The researcher selected the observed activity from a pre-registered list on the tablet and the application then automatically recorded the activity's start and end times. An additional icon was used to indicate the presence of the patient or their family during the task at hand. A questionnaire was also designed to collect participants' sociodemographic data.

3.5 | Ethical considerations

The study protocol was approved by the hospital's Research Application Review Board (no. 2018-03).

3.6 | Data analysis

Descriptive statistics were calculated using STATA® 15.0 software. The mean total duration for each dimension and activity per day were calculated. Given that an area or an activity could be absent on a given day, their frequency of occurrence in days was noted.

Given that nurses and nursing assistants could be observed several times during data collection, generalized estimating equations were systematically used to estimate the duration means, considering any correlations between repeated measurements by healthcare professionals. Corresponding robust standard errors were calculated using the Huber Sandwich estimator. However, when the use of generalized estimation equations was not possible (due to lack of data or too small clusters), classical means and standard errors were calculated. These statistics were stratified by type of shift, type of job position and by the presence or absence of the patient.

3.7 | Validity, reliability and rigor

The two observers received all the information related to the study on a training day. The coding grid was presented to them in detail, and practice sessions (on paper) were organized to help them master it. Two weeks before the start of data collection, they practiced

shadowing an RN during a roughly 3-h test observation period. A subsequent 1-h, simultaneous observation session by the two observers was conducted to calculate inter-rater reliability. The kappa coefficients calculated from these test situations were 0.84 and 0.77 for correctly identifying dimensions and activities respectively. The coefficients of variation for the duration of dimension activities ranged from 0 to 8.43. These data suggested that we would be able to ensure good reliability between the two observers.

4 | RESULTS

The study observed a total of 507.5 h of activity, representing 46 workdays and distributed across the four types of schedule on the internal medicine ward, in proportion to its typical daily staffing of RNs and ANs: 14 day shifts and 9 night shifts for RNs and 23 shifts for ANs.

4.1 | Participants and sociodemographic data

Of the ward's 26 caregivers, 21 were observed during at least one shift, 1 was ineligible, 1 refused consent and 3 were not followed due to scheduling conflicts. The participation rate was 84%. The sample consisted of 12 RNs and 9 ANs, with just 1 male RN. The average age was 32.9 years old, with an average of 8.74 years of experience, and 5.05 years of seniority in their current position. The RNs all had a bachelor's degree in nursing sciences or equivalent, and none had a postgraduate degree.

4.2 | Time spent with the patient and relatives

For the department of internal medicine, the distribution of the average times spent by RNs on direct and indirect care was the same across their day and night shifts, with one third dedicated to direct care (234 min) and two thirds to indirect care (506 min). ANs spent more time with patients than RNs over equivalent shifts, with an average of 290.6 min with patients versus 445.73 min away from patients. On average, RNs and ANs spent fewer than 25 min per shift on activities in the presence of families, and those activities did not occur on every observation day.

4.3 | Dimensions of nursing activities

The following section focuses on four dimensions to analyse the healthcare activities that comprise them in more detail. Our analysis focuses on the day shift activities of particular interest to us (Table 2).

4.4 | Communication and coordination of care

The time devoted to communication and coordination activities was the most allocated to any dimension during RNs' day shifts.

TABLE 2 Mean time allocated to dimensions by profession and by shift in the department of internal medicine

Dimensions of nursing activities	Registered nurse		Nurse assistant	
	Day shift 7:00 AM to 7:30 PM (n = 14)	Night shift 7:00 PM to 7:30 AM (n = 9)	12-Hour day shift 7:00 AM to 7:30 PM (n = 5)	Day shift 7:00 AM to 4:00 PM (n = 9)
	'Number of days the activity occurred' Mean time in minutes (SE)	'Number of days the activity occurred' Mean time in minutes (SE)	'Number of days the activity occurred' Mean time in minutes (SE)	'Number of days the activity occurred' Mean time in minutes (SE)
Communication and coordination	14 193.95 (7.58)	9 110.95 (8.77)	5 116.55 (9.62)	9 106.12 (8.28)
Care planning	14 144.82 (18.60)	9 100.52 (8.65)	5 74.04 (8.30)	9 64.46 (5.23)
Miscellaneous/non-healthcare	14 96.95 (7.58)	9 169.13 (22.92)	5 173.33 (8.37)	9 112.98 (7.32)
Personal time	14 85.80 (6.59)	9 37.06 (10.49)	5 94.48 (3.90)	9 84.61 (1.81)
Medication	14 84.84 (6.27)	9 127.21 (28.69)	5 71.36 (13.55)	9 35.02 (2.75)
Technical procedures and delegated medical care	14 56.33 (5.75)	9 92.92 (9.68)	5 34.65 (5.65)	9 20.14 (2.85)
Activities of daily living	14 43.54 (6.34)	9 57.17 (2.88)	5 114.06 (9.53)	9 72.66 (10.71)
Patient assessment	14 38.49 (3.72)	9 53.39 (7.34)	5 41.03 (4.71)	9 33.37 (3.63)
Knowledge updating and use	12 8.72 (2.58)	6 11.58 (5.98)	1 3.33	5 8.25 (5.58)
Relational care	12 5.31 (1.16)	8 14.45 (7.72)	5 9.18 (3.50)	7 4.58 (0.37)
Client education	4 4.60 (3.36)	5 2.19 (0.52)	2 0.93 (0.08)	3 1.77 (0.94)
Staff integration and supervision	6 4.25 (1.88)	2 8.08 (2.20)	2 5.1 (0.18)	4 5.09 (0.02)
Optimization of quality and safety of care	8 1.99 (0.66)	5 4.48 (2.11)	3 4.69 (2.98)	5 5.71 (5.24)

Note: The figures in bold represent the three most invested dimensions by professional group and shift type; the figures in italics have been obtained by simple descriptive analyses and not by generalized estimating equations.

The dimension included patient interviews, attending doctors' medical visits, team conferences, nursing handovers and other activities, representing an average of 194 min of an RN's 12.5-h day shift and an average of 111 min per night shift. For ANs, this dimension represented an average of 116 min per day shift and an average of 88 min per night shift. Communication about care took up more than 1 h per nursing day shift, including 60.15 min with colleagues and 12.02 min with patients themselves. This communication consisted of exchanges of information that enabled the management of daily life on the ward and the coordination of care. This did not include purely relational discussions, which were counted in another dimension (about 3 min on average per nursing shift).

RNs spent about 52 min every day attending physician's medical visits. On average, these consisted of 21.37 min in the presence of patients and 30.33 min without them. Nursing handovers took up approximately 1 h of a nursing day shift but averaged fewer than 38 min of an AN's shift.

4.5 | Care planning

This dimension included keeping planning updated and the use of computer tools. RNs did more planning than ANs, with an average across all their shifts of 144 and 74 min respectively. Care planning was mainly carried out using the hospital's computerized tools. This activity alone represented an average of 140 min during a nursing day shift, varying between 98 and 182 min. However, keeping planning updated was not carried out often, since it was observed during only 7 of the 46 shifts.

4.6 | Miscellaneous/non-healthcare

This dimension included administrative and logistical tasks, patient transfer and transport times, time waiting and other activities. A significant portion of caregivers' time was devoted to various tasks that are not considered care activities. During a 12.5-h day shift, ANs spent significantly longer attending to this dimension of activity, with an average of 173 min per day shift compared to 97 min among RNs. Results from night shifts were almost similar, with averages for RNs and ANs of 169 and 167 min respectively. ANs spent an average of more than 76 min per 12.5-h shift on housekeeping, followed by logistics and stewardship tasks with 36 min per day each, transporting or transferring patients and then administrative tasks. The times spent on these activities by RNs were certainly shorter but still considerable since, during a 12.5-h day shift, they averaged 30 min on housekeeping, 31 min on transporting or transferring patients and 18 min on logistics. Among both RNs and ANs, individual occurrences of the activities of waiting, transporting patients and 'other activities' were not observed daily and had very short average durations.

4.7 | Patient assessment

This dimension included admission interviews, physical and mental assessments and other activities. Average times for RNs were 38 min during day shifts and 53 min during night shifts. For ANs, average times were 41 min during day shifts and 29 min during evening shifts. RNs performed an average of fewer than 30 min of physical assessment per shift. Mental assessments lasted only 2.4 min on average and were only observed eight times over 23 nursing shifts. This trend was similar among ANs, with only one, short, mental assessment observed. However, ANs seemed to take longer over physical assessments than did RNs.

Overall, the dimensions allocated the most amount of time by RNs during day shifts were 'communication and care coordination', 'care planning' and 'miscellaneous/non-health-care', followed by 'personal time' and 'medication'. 'Patient assessment' ranked as only the eighth dimension, with little less than 40 min per shift.

Among ANs, regardless of the shift, the 'miscellaneous/non-health-care' dimension was allocated the most time, followed by 'communication and care coordination'. ANs appeared to spend more time assisting in the 'ADLs' and 'miscellaneous/non-health-care' dimensions than RNs. For example, during the same 12.5-h shift, ANs spent an average of 114 min on the 'ADLs' versus 43 min for RNs.

5 | DISCUSSION

This study aimed to describe the use of caregivers' work time on an internal medicine ward and how much time RNs allocated to the different dimensions of their potential ScOP. We will compare our results with the international literature (Table 3). However, because of the many different categories and the diversity of the definitions used, comparisons between research results are difficult.

5.1 | Comparison with the international literature

5.1.1 | Time spent with patients and families

The time RNs spent in the presence of their patients only represented less than one third of their total work time (about 32%). This result was nevertheless within the norms revealed by previous research, which estimated that direct care occupied from 20% to 38% of RNs' work time. Studies have shown that RNs' involvement in direct care was related to their satisfaction and retention in the workplace (Lindqvist et al., 2014), as well as to patient safety (Smets et al., 2014). The trend towards ANs spending a higher proportion of their time on direct care has also been described in the literature, which could be explained because they spend more time assisting with patients' ADLs (Antinaho et al., 2015; Walker et al., 2007). The very short time spent with patients' relatives suggests their lack of integration in care processes.

5.1.2 | Patient assessment and care planning

RNs allocated this dimension a lot of time, and it was included in their daily practice. However, looking in more detail, we see that the activities making up this dimension received very uneven attention. RNs devoted much time to technical aspects and medical care, as well as to care planning and the application of medication treatments. Conversely, RNs devoted less time to physical assessments and relational care. Nursing assessments, including the collection and analysis of patients' physical and mental clinical parameters, as well as their personal medical history, is a primary nursing activity and an indispensable step in the nursing care process (Doyon & Longpré, 2016). However, the present study indicated that nursing assessment activities accounted for only 38 min of an average 12.5-h day shift, that is, only about 5% of total work time. This result was below the proportions described by Battisto et al., (2009), Hendrich et al., (2008) and Schenk et al., (2017), but it was similar to the results of McNair et al., (2016). The practice of physical clinical examinations carried out by RNs is a fairly recent one in Switzerland, but it is now taught in basic nursing education courses. It nevertheless appears not to have yet become a well-established practice. Our study showed very short durations for physical assessments and very short and rarely performed mental assessments.

5.1.3 | Communication and care coordination

This was the other dimension in the study to which RNs allocated lots of time. This can be explained by their systematic and complete participation in the activities of physicians' medical visits and long nursing shift handovers. The activity durations described matched those in the literature (Cornell et al., 2010; Westbrook et al., 2011). In this dimension, RNs displayed their inter-disciplinary and intra-disciplinary roles through the activities of attending physicians' medical visits, meetings and communication with the rest of the care team. However, communication with patients themselves was devoted very little time. Relational care was also practiced very little, with proportions of work time well below those described in the literature for the relational part of work (Battisto et al., 2009; Furåker, 2009).

5.1.4 | Miscellaneous and non-healthcare

These activities occupied an average of more than 90 min of nursing time per 12.5-h shift, consistent with the results of Hendrich et al., (2008). Housekeeping tasks were the most time-consuming activity in this dimension for RNs. These results showed that nursing resources were sometimes misused for activities that did not require their high level of expertise. A detailed analysis of their non-clinical activities suggests, however, that little time was lost on miscellaneous activities, merely waiting for the next activity or stewardship. Furthermore, the time spent on administrative tasks was lower

in our study than in Furåker's (2009). Personal time was less than 90 min per nursing day, within the range of results described in the literature. This indicated that fewer than 15 min were devoted to personal activities outside of official breaks.

5.1.5 | Client and family education

This dimension of activity was rarely practiced by RNs and then only very briefly. Our results for durations were well below those of Furåker (2009) and Schenk et al., (2017).

5.1.6 | Integration and supervision of staff

This aspect of the nursing role was rarely practiced. It should be noted, however, that data collection took place during the summer and that no students were interning during this period.

5.1.7 | Optimization of the quality and safety of care

Our results showed that RNs allocated little time to this dimension and on few occasions. However, that time was probably underestimated due to limitations in the methodology and activity categorizations used. Indeed, a large proportion of the tasks carried out in relation to quality and safety were integrated into the practice of other activities and were, thus, included in the time devoted to other areas.

5.1.8 | Updating and using knowledge

This dimension's activities were noted in 18 of the 23 RN shifts observed. However, occurrences of updating knowledge remained brief and informal. We have no data from other T&M studies with which to compare this dimension or the two immediately preceding it.

5.2 | Using the full scope of nursing practice

The present study obtained partially similar results to those of D'Amour et al., (2012), who measured the use of nurses' ScOP in 22 Canadian medical departments. Like D'Amour et al., (2012), we found a suboptimal use of nurses' ScOP, with only two of Déry's six dimensions (2013) devoted time daily. However, our study showed a greater allocation of time for the dimension of 'communication and care coordination' and a lower allocation for the dimension of 'client education'. These disparities in results may be related to methodological differences since the Canadian study was based on a self-administered questionnaire.

TABLE 3 Study results in perspective with the results from the literature review

Authors, year	Antinaho et al. (2015)	Cornell et al. (2010)	Battisto et al. (2009)	Farquharson et al. (2013)	Furåker (2009)	Hendrich et al. (2008)	Lavander et al. (2016)
Methods	Self-reported work sampling	Work sampling by observer	Work sampling by observer	Self-reported work sampling	Self-reported work sampling	Self-reported work sampling	Literature review
Units	Medicine – surgery	Medicine – surgery	Medicine – surgery	Medicine – surgery	Surgery	Medicine surgery	All units
Measure	Average percentage of total working time (%)			Median%	Average percentage of total working time (%)		
Surveillance/ assessment	7.8			5.5			
Medication	21.2		11.1	13.2			
ADL							
Hygiene							
Nutrition/ elimination							
Mobilization							
Social				7.7			
Documentation	16	10.1	25.2	10	13	27.2	13–21
Communication	12		7.2	7.1			
Coordination						15.9	
Shift report					15		
Education/counselling					3		
Non-clinical activities						12.6	
Administrative tasks					25		
Stewardship	1.6						
Travel	8.1		6.1	0			
Other activity	8	5.2		6.6		4–9	
Personal time	7	11.4	13		12–22		

According to the nursing performance framework developed by Dubois et al., (2013), nursing processes depend on the resources of basic organization. Their ScOP may, therefore, be influenced by factors such as nurse staffing levels and the mix of skills available on wards, work conditions (workload, material resources, work schedules, etc.) or even economic stability (Dubois et al., 2013). These factors should, therefore, be continuously assessed to provide nurses with the conditions in which they can apply their skills fully.

Déry's model emphasized the need for a better distribution of roles and responsibilities, not only between individuals and throughout organizations but also at the sociopolitical level (Déry et al., 2017). In the present study, the distribution of tasks among professionals was quite marked. ANs spent more time on the dimensions 'ADL' and 'non-clinical tasks' than did RNs. Conversely, RNs devoted more time to the dimensions of 'care planning', 'application of drug treatments', 'technical procedures and delegated medical tasks' and 'communication and coordination of care'. This finding showed that there is a differentiated distribution of tasks between these two professions, which seems justified in terms of a judicious allocation

of resources and skills. ANs are, therefore, fulfilling their role of assistants well, and this should enable RNs to use their skills and fulfil their designated roles entirely. However, RNs were not using the full scope of their nursing practice. The authors believe that this is, therefore, not a question of a misdirected distribution of roles. The ScOP, particularly autonomous nursing activities, is under pressure from demanding work environments subject to numerous demands and constraints, particularly financial and time constraints (Dallaire & Dallaire, 2008).

5.3 | Interpretations and understanding for the nursing profession

The fact that RNs are not using the full ScOP autonomously, as part of their designated role in the healthcare system, may be understood by looking at the organization of healthcare services as well as the profession's history and epistemology. But before discussing the possible reasons why nurses do not make full use of their scope of

McNair et al. (2016)	Schenk et al. (2017)	Upenieks et al. (2007)	Walker et al. (2007)	Westbrook et al. (2011)	Yen et al. (2017)	Results of the study		
Time and motion study	Time and motion study	Self-reported work sampling	Work sampling by observer	Time and motion study	Time and motion study	Time and Motion Study		
Oncology-Medicine - surgery	Medicine - surgery	Medicine - surgery	Medicine - surgery	Medicine - surgery	Medicine - surgery	Medicine		
Min./ hour	Average percentage of total working time (%)				Mean duration (min)/4 hours	Min/ shift	n/14	Corresponding Dimensions/Activity
3-5	13.7					38.49	14	Patient assessment
	11.1		12.1	20.9	15.7	84.84	14	Medication
1-1.6			4.7			43.91	14	ADL
			1.7			16.4	13	Body care
			1.7			13.80	13	Nutrition+elimination
				10.4		17.75	14	mobilization
					10.4	5.04	12	Relational care
12.6-15	41.1	23		7.3	31.63	121.05	14	Documentation
				19.2	26.68	72.17	14	Communication
						120.83	14	Care coordination
						60.57	14	Shift report
	13					4.6	4	Client education
					13.52	96.95	14	Miscellaneous/ non-clinical
						9	9	Administrative tasks
						17.58	14	Stewardship
				4.6		25.21	14	Travel
		1.5		0.9		7.08	6	Other activity
						85.65	14	Personal time

practice, it is important to highlight the needs of the patients they care for. People hospitalized in a medicine ward are mainly old and multimorbid people who present complex care situations combining physical, mental, social and relational issues, requiring person-centred care. To provide person-centred care, nurses need not only high-level skills but also working conditions (Bahrami et al., 2019; Bail & Grealish, 2016).

However, several factors related to the current hospital care context prevent nurses from fully playing their role. First, we can mention factors associated with the work environment such as nurse and caregiver staffing, skill mix and available resources (Twigg et al., 2015). It is also important to note that nurses perform an average of 72.3 tasks per hour, multitask 34% of the time and are interrupted by colleagues or patients every 6 min (Kalisch & Aebersold, 2010). It is, therefore, hardly surprising that nurses struggle to engage in deep reflection and critical analysis (Cornell et al., 2010). In terms of the broader organization of the hospital, departments are organized according to medical specialties. Thus, nurses acquire high but very specific skills, while complex multimorbidity situations require high

skills in several areas (Nobili et al., 2011). Furthermore, documentation takes up a significant amount of nursing time. Documentation is very important for patient safety, but it reduces nursing time with patients (Krichbaum et al., 2007).

The historical and traditional identity aspects of nursing are preventing a move away from simplistic visions of their skills and their ability to practice autonomously (Dallaire, 2008; Nadot, 2012; Piguet, 2008). Indeed, the nursing profession still sometimes seems to carry clichéd baggage inherited from its past, whether that is from its religious foundations (notions of abnegation, devotion and vocation) or involves its perceived role as a subordinate profession to doctors (Dallaire, 2008; Laurent, 2013; Nadot, 2008). Although nurses' professional identities are evolving and they are asserting themselves, the required paradigm shift in practice is still incomplete. Current models of care retain the stigmas of the past, with a focus on delegated medical tasks rather than the promotion of a holistic approach to care. Because current systems still favour a medical conceptualization of care, autonomous nursing care is struggling for recognition (Dallaire, 2008; Piguet, 2008).

In Switzerland, for instance, nurses' autonomy in activities such as basic care or physical assessment, giving advice and the coordination of services is still not legally recognized in federal health insurance law, following the political rejection of a parliamentary initiative on this issue in 2015 (Parliamentary Initiative, 2015). To avoid the profession becoming the performance of a series of isolated acts orchestrated through a system focused on illnesses and hospital productivity, nurses should refer to models of their discipline that express their own traditions (Nadot et al., 2013). Kim's work (2012) emphasized that theoretical conceptualizations and philosophical perspectives of nursing have an important influence on nurses' clinical deliberations and decision-making. However, if future institutional or even national policies give nurses little space or recognition, then their ScOP will be reduced to merely following patterns and instructions that are a poor partial reflection of the nursing profession's knowledge and perspectives (Kim, 2012).

Moreover, the current organization of care is mainly oriented towards 'tasks' programmed within a predefined schedule. However, according to Dallaire and Dallaire (2008), to make the most of a nurse's time and skills, it is necessary to adopt a holistic vision of the patient and a holistic vision of health. They suggested, therefore, that nurses should develop their clinical judgment skills based on nursing assessments that would make it possible for them to define the actions to be undertaken and provide patient-centred care themselves (Dallaire & Dallaire, 2008).

Clear descriptions of the hospital work expected of nurses and exploring how they allocate their time are essential steps in identifying opportunities for improvement (Bodenheimer & Sinsky, 2014; Hendrich et al., 2008). This information would help to initiate in-depth reflections on nursing care, work organization, the allocation of professional or financial resources, the division of tasks and staffing levels (Antinaho et al., 2015; Cornell et al., 2010; Desjardins et al., 2008; Farquharson et al., 2013; Lavander et al., 2016).

5.4 | Strengths and limitations

This T&M study used a reliable methodology based on the continuous external observation and recording of caregivers' activities. The measurement instrument developed for the study, with its validated, robust inter-rater reliability, could serve as a basis for future research on the subject. Nevertheless, several limitations should be considered. The external observation required of a T&M study may have generated a Hawthorne effect: knowing that they were observed, the caregivers may have changed their behaviour. However, this effect tends to decrease over time, and the observers tried to minimize risks of this bias through their thoughtful and discreet attitude. T&M methods are also limited to describing activity durations and do not consider their quality or speed. Another limitation to this study was the inability to code for double tasking. During observations, therefore, the researcher had to determine the main activity being observed at the risk of obscuring certain tasks occurring simultaneously. Finally, considering the study's particular context (internal

medicine ward of a university hospital), any generalization of specific results should be made with great care.

6 | CONCLUSION

Optimizing nurse' ScOP should aim at three main areas: (1) the greater involvement of RNs in building care relationships and the direct care of patients and relatives; (2) better use of their skills in their autonomous nursing role, including making clinical nursing assessments and providing therapeutic education, and (3) more systematically updating nurses' knowledge.

The present paper provides comprehensive and robust data on the allocation of caregivers' time between different work activities and provides information on the real use of the ScOP in an internal medicine ward. Changes in how nursing skills are applied, the allocation of resources and the organizational culture of care together have the potential to reduce nursing workloads. The optimal use of nursing skills is also essential to meet the challenges of quality and safety of care while meeting the healthcare system's broader requirements for efficiency.

ACKNOWLEDGMENTS

The authors would like to thank the nurses of the internal medical ward for participating in the study and for their warm reception, Jean-Sébastien Lamothe for his participation to the data collection, Marc-André Bucher for developing the Nurse Observer 2 application and Maryline Abt for her careful reading.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

AUTHOR CONTRIBUTIONS

Study design: COB, OL and AJGM; Data collection: OL and AJGM data: OL, JP and COB; Study supervision: COB; Manuscript writing: OL, COB, JP and AJGM.

PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/jan.14935>.

ORCID

Jérôme Pasquier  <https://orcid.org/0000-0002-5554-2988>

Claudia Ortoleva Bucher  <https://orcid.org/0000-0002-8411-4181>

REFERENCES

- Aiken, L. H., Sermeus, W., Van den Heede, K., Sloane, D. M., Busse, R., McKee, M., Bruyneel, L., Rafferty, A. M., Griffiths, P., Moreno-Casbas, M. T., Tishelman, C., Scott, A., Brzostek, T., Kinnunen, J., Schwendimann, R., Heinen, M., Zikos, D., Sjetne, I. S., Smith, H. L., & Kutney-Lee, A. (2012). Patient safety, satisfaction, and quality of hospital care: Cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *British Medical Journal*, 344, 1–14. <https://doi.org/10.1136/bmj.e1717>

- Antinaho, T., Kivinen, T., Turunen, H., & Partanen, P. (2015). Nurses' working time use — how value adding it is? *Journal of Nursing Management*, 23(8), 1094–1105. <https://doi.org/10.1111/jonm.12258>
- Bahrami, M., Purfarzad, Z., Keshvari, M., & Rafiei, M. (2019). The components of nursing competence in caring for older people in Iranian hospitals: A qualitative study. *Iranian Journal of Nursing and Midwifery Research*, 24(2), 124–130. https://doi.org/10.4103/ijnmr.IJNMR_83_18
- Bail, K., & Grealish, L. (2016). 'Failure to Maintain': A theoretical proposition for a new quality indicator of nurse care rationing for complex older people in hospital. *International Journal of Nursing Studies*, 63, 146–161. <https://doi.org/10.1016/j.ijnurstu.2016.08.001>
- Battisto, D., Pak, R., Vander Wood, M. A., & Pilcher, J. J. (2009). Using a task analysis to describe nursing work in acute care patient environments. *The Journal of Nursing Administration*, 39(12), 537–547. <https://doi.org/10.1097/NNA.0b013e3181c1806d>
- Bodenheimer, T., & Sinsky, C. (2014). From triple to quadruple aim: Care of the patient requires care of the provider. *Annals of Family Medicine*, 12(6), 573–576. <https://doi.org/10.1370/afm.1713>
- Cornell, P., Herrin-Griffith, D., Keim, C., Petschonek, S., Sanders, A. M., D'Mello, S., Golden, T. W., & Shepherd, G. (2010). Transforming nursing workflow, part 1: The chaotic nature of nurse activities. *Journal of Nursing Administration*, 40(9), 366–373. <https://doi.org/10.1097/NNA.0b013e3181ee4261>
- Dallaire, C. (2008). *Le savoir infirmier: au cœur de la discipline et de la profession*. G. Morin.
- Dallaire, C., & Dallaire, M. (2008). *Le savoir infirmier dans les fonctions infirmières*. Dans: *Le savoir infirmier: au cœur de la discipline et de la profession*. G. Morin.
- D'Amour, D., Dubois, C.-A., Déry, J., Clarke, S. P., Tchouaket, E., Blais, R., & Rivard, M. (2012). Measuring actual scope of nursing practice: A new tool for nurse leaders. *Journal of Nursing Administration*, 42(5), 248–255. <https://doi.org/10.1097/NNA.0b013e31824337f4>
- Déry, J. (2013). *L'étendue effective de la pratique d'infirmières en pédiatrie: ses déterminants et son influence sur la satisfaction professionnelle*. Université de Montréal. [cité le 19 avril 2018]. Disponible: https://papyrus.bib.umontreal.ca/xmlui/bitstream/handle/1866/10843/Dery_Johanne_2013_these.pdf;sequence=2
- Déry, J., d'Amour, D., & Roy, C. (2017). L'étendue optimale de la pratique infirmière. *Perspective Infirmière: Revue Officielle De L'ordre Des Infirmières Et Infirmiers Du Québec*, 14(1), 51–55.
- Desjardins, F., Cardinal, L., Belzile, E., & McCusker, J. (2008). Reorganizing nursing work on surgical units: a time-and-motion study. *Nursing Leadership (Toronto, Ont.)*, 21(3), 26–38. <https://doi.org/10.12927/cjnl.2008.20057>
- Doyon, O., & Longpré, S. (2016). *Évaluation clinique d'une personne symptomatique*. Pearson ERPI.
- Dubois, C. A., D'Amour, D., Pomey, M. P., Girard, F., & Brault, I. (2013). Conceptualizing performance of nursing care as a prerequisite for better measurement: A systematic and interpretive review. *BMC Nursing*, 12, 7. <https://doi.org/10.1186/1472-6955-12-7>
- Duffield, C., Diers, D., O'Brien-Pallas, L., Aisbett, C., Roche, M., King, M., & Aisbett, K. (2011). Nursing staffing, nursing workload, the work environment and patient outcomes. *Applied Nursing Research: ANR*, 24(4), 244–255. <https://doi.org/10.1016/j.apnr.2009.12.004>
- Farquharson, B., Bell, C., Johnston, D., Jones, M., Schofield, P., Allan, J., Ricketts, I., Morrison, K., & Johnston, M. (2013). Frequency of nursing tasks in medical and surgical wards. *Journal of Nursing Management*, 21(6), 860–866. <https://doi.org/10.1111/jonm.12110>
- Furåker, C. (2009). Nurses' everyday activities in hospital care. *Journal of Nursing Management*, 17(3), 269–277. <https://doi.org/10.1111/j.1365-2934.2007.00832.x>
- Hendrich, A., Chow, M. P., Skierczynski, B. A., & Lu, Z. (2008). A 36-hospital time and motion study: How do medical-surgical nurses spend their time? *Permanente Journal*, 12(3), 25–34.
- Jones, T. L., Hamilton, P., & Murry, N. (2015). Unfinished nursing care, missed care, and implicitly rationed care: State of the science review. *International Journal of Nursing Studies*, 52(6), 1121–1137. <https://doi.org/10.1016/j.ijnurstu.2015.02.012>
- Kalisch, B. J., & Aebbersold, M. (2010). Interruptions and multitasking in nursing care. *Joint Commission Journal on Quality and Patient Safety*, 36(3), 126–132. [https://doi.org/10.1016/S1553-7250\(10\)36021-1](https://doi.org/10.1016/S1553-7250(10)36021-1)
- Kane, R. L., Shamliyan, T. A., Mueller, C., Duval, S., & Wilt, T. J. (2007). The association of registered nurse staffing levels and patient outcomes: Systematic review and meta-analysis. *Medical Care*, 45(12), 1195–1204. <https://doi.org/10.1097/MLR.0b013e3181468ca3>
- Kim, H. S. (2012). The role of theory in clinical nursing practice. *Klinisk Sygepleje*, 2, 16–29. <https://doi.org/10.18261/ISSN1903-2285-2012-02-03>
- Krichbaum, K., Diemert, C., Jacox, L., Jones, A., Koenig, P., Mueller, C., & Disch, J. (2007). Complexity compression: Nurses under fire. *Nursing Forum*, 42(2), 86–94. <https://doi.org/10.1111/j.1744-6198.2007.00071.x>
- Laurent, R.-M. (2013). Le combat des infirmiers en regard de leur histoire: Analyse. *Santé Conjuguée*, 1(64), 50–54.
- Lavander, P., Meriläinen, M., & Turkki, L. (2016). Working time use and division of labour among nurses and health-care workers in hospitals — a systematic review. *Journal of Nursing Management*, 24(8), 1027–1040. <https://doi.org/10.1111/jonm.12423>
- Lindqvist, R., Smeds Alenius, L., Runesdotter, S., Ensio, A., Jylhä, V., Kinnunen, J., Strømseng Sjetne, I., Tvedt, C., Wiberg Tjønnfjord, M., & Tishelman, C. (2014). Organization of nursing care in three Nordic countries: relationships between nurses' workload, level of involvement in direct patient care, job satisfaction, and intention to leave. *BMC Nursing*, 13, 27. <https://doi.org/10.1186/1472-6955-13-27>
- Lopetegui, M., Yen, P. Y., Lai, A., Jeffries, J., Embi, P., & Payne, P. (2014). Time motion studies in healthcare: what are we talking about? *Journal of Biomedical Informatics*, 49, 292–299. <https://doi.org/10.1016/j.jbi.2014.02.017>
- McNair, N., Baird, J., Grogan, T. R., Walsh, C. M., Liang, L.-J., Worobel-Luk, P., Needleman, J., & Nuckols, T. K. (2016). Is spending more time associated with less missed care?: A comparison of time use and missed care across 15 nursing units at 2 hospitals. *Journal of Nursing Administration*, 46(9), 428–437. <https://doi.org/10.1097/NNA.0000000000000371>
- Meena, S., Sadan, V., & Nidagundi, S. A. (2016). Time and motion study on the activities of the staff nurses and health centre auxiliaries of a secondary hospital in Vellore District. *International Journal of Nursing Education*, 8(1), 29–34. <https://doi.org/10.5958/0974-9357.2016.00006.4>
- Nadot, M. (2008). *Prendre soin: aux sources de l'activité professionnelle*. Dans: *Le savoir infirmier: au cœur de la discipline et de la profession* (p. 27–51). G. Morin.
- Nadot, M. (2012). Recherche fondamentale en science infirmière la recherche historique sur les fondements d'une discipline [Fundamental research in nursing sciences. Historical research on the foundations of a discipline]. *Recherche En Soins Infirmiers*, 109, 57–68. <https://doi.org/10.3917/rsi.109.0057>
- Nadot, M., Busset, F., & Gross, J. (2013). *L'activité infirmière: Le modèle d'intermédiaire culturel, une réalité incontournable*. De Boeck-Estern.
- Nobili, A., Licata, G., Salerno, F., Pasina, L., Tettamanti, M., Franchi, C., De Vittorio, L., Marengoni, A., Corrao, S., Iorio, A., Marcucci, M., & Mannucci, P. M. (2011). Polypharmacy, length of hospital stay, and in-hospital mortality among elderly patients in internal medicine wards. The REPOSI study. *European Journal of Clinical Pharmacology*, 67(5), 507–519. <https://doi.org/10.1007/s00228-010-0977-0>
- Organisation mondiale de la Santé. (2020). *La situation du personnel infirmier dans le monde 2020: Investir dans la formation, l'emploi et le leadership [State of the world's nursing 2020: Investing in education, jobs and leadership]*. (Licence: CC BY-NC-SA 3.0 IGO). Organisation mondiale de la Santé.

- Parliamentary Initiative. (2015). Parliamentary Initiative: LAMal. Accorder plus d'autonomie au personnel soignant [En ligne]. Commission de la sécurité sociale et de la santé publique du Conseil national; 15 avril 2015 [cité le 29 avril 2019]. Rapport no 11.428. Disponible: https://www.admin.ch/ch/f/gg/pc/documents/2656/11.418-lv.pa.-LAMal-personnel-soignant_Rapport-expl_fr.pdf
- Piguet, C. (2008). *Autonomie dans les pratiques infirmières hospitalières, contribution à une théorie agentique du développement professionnel*. Université de Nanterre. Disponible: <https://tel.archives-ouvertes.fr/tel-00331476>
- Ross-Walker, C., Rogers-Clark, C., & Pearce, S. (2012). A systematic review of Registered Nurses; experiences of the influence of workplace culture and climatic factors on nursing workloads. *JBI Library of Systematic Reviews*, 10(49), 3080–3145. <https://doi.org/10.11124/jbisrir-2012-22>
- Schenk, E., Schleyer, R., Jones, C. R., Fincham, S., Daratha, K. B., & Monsen, K. A. (2017). Time motion analysis of nursing work in ICU, telemetry and medical-surgical units. *Journal of Nursing Management*, 25(8), 640–646. <https://doi.org/10.1111/jonm.12502>
- Schwendimann, R., Ausserhofer, D., & Schubert, M. (2019). Switzerland. In A. M. Rafferty, R. Busse, B. Zander-Jentsch, W. Sermeus, & L. Bruyneel (Eds.), *Strengthening health systems through nursing: Evidence from 14 European countries*, No. 52, Vol. 14. European Observatory on Health Systems and Policies.
- Smeds Alenius, L., Tishelman, C., Runesdotter, S., & Lindqvist, R. (2014). Staffing and resource adequacy strongly related to RNs' assessment of patient safety: A national study of RNs working in acute-care hospitals in Sweden. *BMJ Quality & Safety*, 23(3), 242–249. <https://doi.org/10.1136/bmjqs-2012-001734>
- Twigg, D. E., Gelder, L., & Myers, H. (2015). The impact of understaffed shifts on nurse-sensitive outcomes. *Journal of Advanced Nursing*, 71(7), 1564–1572. <https://doi.org/10.1111/jan.12616>
- Upenieks, V. V., Akhavan, J., Kotlerman, J., Esser, J., & Ngo, M. J. (2007). Value-added care: A new way of assessing nursing staffing ratios and workload variability. *The Journal of Nursing Administration*, 37(5), 243–252. <https://doi.org/10.1097/01.NNA.0000269744.17266.47>
- Walker, K., Donoghue, J., & Mitten-Lewis, S. (2007). Measuring the impact of a team model of nursing practice using work sampling. *Australian Health Review : a Publication of the Australian Hospital Association*, 31(1), 98–107. <https://doi.org/10.1071/ah070098>
- Westbrook, J. I., Duffield, C., Li, L., & Creswick, N. J. (2011). How much time do nurses have for patients? A longitudinal study quantifying hospital nurses' patterns of task time distribution and interactions with health professionals. *BMC Health Services Research*, 11, 319. <https://doi.org/10.1186/1472-6963-11-319>
- Yen, P. Y., Kellye, M., Lopetegui, M., Saha, A., Loversidge, J., Chipps, E. M., & Buck, J. (2018). Nurses' time allocation and multitasking of nursing activities: a time motion study. *AMIA Annual Symposium Proceedings, 2018*, 1137–1146.

How to cite this article: Michel, O., Garcia Manjon, A.-J., Pasquier, J., & Ortoleva Bucher, C. (2021). How do nurses spend their time? A time and motion analysis of nursing activities in an internal medicine unit. *Journal of Advanced Nursing*, 77, 4459–4470. <https://doi.org/10.1111/jan.14935>

The *Journal of Advanced Nursing (JAN)* is an international, peer-reviewed, scientific journal. *JAN* contributes to the advancement of evidence-based nursing, midwifery and health care by disseminating high quality research and scholarship of contemporary relevance and with potential to advance knowledge for practice, education, management or policy. *JAN* publishes research reviews, original research reports and methodological and theoretical papers.

For further information, please visit *JAN* on the Wiley Online Library website: www.wileyonlinelibrary.com/journal/jan

Reasons to publish your work in *JAN*:

- High-impact forum: the world's most cited nursing journal, with an Impact Factor of 2.561 – ranked 6/123 in the 2019 ISI Journal Citation Reports © (Nursing; Social Science).
- Most read nursing journal in the world: over 3 million articles downloaded online per year and accessible in over 10,000 libraries worldwide (including over 6,000 in developing countries with free or low cost access).
- Fast and easy online submission: online submission at <http://mc.manuscriptcentral.com/jan>.
- Positive publishing experience: rapid double-blind peer review with constructive feedback.
- Rapid online publication in five weeks: average time from final manuscript arriving in production to online publication.
- Online Open: the option to pay to make your article freely and openly accessible to non-subscribers upon publication on Wiley Online Library, as well as the option to deposit the article in your own or your funding agency's preferred archive (e.g. PubMed).