Physiotherapy Practice and Delegation Policies in Oxygen Administration: A Survey of Ontario Hospitals

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ABSTRACT

Purpose: As of 2008, the Regulated Health Professions Act in Ontario stipulates that administration of oxygen is a controlled act, which physiotherapists are not authorized to perform but which may be delegated to physiotherapists by another health professional authorized to perform this act. The aims of this study were (1) to survey physiotherapy practice of oxygen administration in Ontario hospitals and (2) to determine the proportion and characteristics of hospitals with delegation policies for physiotherapists to administer oxygen.

Method: Postal surveys were sent to 208 hospitals. Data were collected on hospital characteristics; the presence of delegation policies; and the practice and training of physiotherapists, physiotherapy assistants, and students in oxygen administration. Data were described by summative statistics. Fisher's exact test and Cramer's *V* statistic were used to examine associations. Potential prognostic factors were analyzed using logistic regression.

Results: Response rate was 82.7%. Physiotherapists administered oxygen in 39% of hospitals, and 28% of hospitals had delegation policies. Larger, urban, or teaching hospitals and those with a matrix structure were most likely to have delegation policies and physiotherapists who administered oxygen. Rehabilitation hospitals were also likely to have such policies.

Conclusion: Physiotherapists administer oxygen in less than half of Ontario hospitals, very few of which have delegation policies.

Key Words: best practice, delegation policy, oxygen administration, physiotherapist, Regulated Health Professions Act, scope of practice, titration

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RÉSUMÉ

Objectif : Depuis 2008, la *Loi sur les professions de la santé réglementées de l'Ontario* stipule que l'administration d'oxygène constitue un acte autorisé, que les physiothérapeutes ne peuvent accomplir, mais que ceux-ci peuvent quand même exécuter si l'acte leur a été délégué. Les objectifs de cette étude étaient (1) d'étudier la pratique d'administration de l'oxygène en physiothérapie dans les hôpitaux de l'Ontario; et (2) d'établir la proportion et les caractéristiques des hôpitaux disposant d'une politique de délégation permettant aux physiothérapeutes d'administrer de l'oxygène.

Méthode : Des sondages ont été envoyés par la poste à 208 hôpitaux. Des données ont été recueillies sur les caractéristiques de ces établissements, sur la présence d'une politique de délégation, sur la pratique et la formation des physiothérapeutes, des assistants-physiothérapeutes et des étudiants pour l'administration d'oxygène. Des données ont été décrites par des statistiques sommatives. On a eu recours au test de Fisher et au test *V* de Cramer pour l'analyse des associations. Les facteurs pronostiques potentiels ont été analysés suivant une régression logistique.

Résultats : Le taux de réponse a été de 82,7 %. Les physiothérapeutes administrent de l'oxygène dans 39 % des hôpitaux, et 28 % des hôpitaux participants sont dotés d'une politique de délégation. Les hôpitaux de plus grande taille, en milieu urbain, ou les hôpitaux universitaires avec structure

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matricielle sont ceux qui, le plus souvent, comptent une politique de délégation et des physiothérapeutes administrant de l'oxygène. Les hôpitaux de réadaptation sont aussi ceux où les probabilités qu'ils soient dotés d'une telle politique sont les plus élevées.

Conclusion : Les physiothérapeutes administrent de l'oxygène dans moins de la moitié des hôpitaux en Ontario et, de ce nombre, bien peu d'établissements ont une politique de délégation.

Mots clés : administration d'oxygène, cadre des fonctions, Loi sur les professions de la santé réglementées, physiothérapeute, politique de délégation, pratique exemplaire, titrage

INTRODUCTION

Physiotherapists play an integral role in the management of patients with cardiorespiratory dysfunction.¹ The ability to administer oxygen is an important component of cardiorespiratory physiotherapy practice; its goals include the promotion of effective alveolar ventilation and adequate oxygenation, enhancement of exercise tolerance, and mobilization and removal of secretions.¹ Cardiorespiratory physiotherapy has been shown to benefit patients who have undergone cardiothoracic and upper-abdominal surgeries.¹ Oxygen is typically administered to these patients during the early postoperative phase to improve oxygenation and prevent pulmonary complications. Physiotherapists also treat patients with a variety of other conditions such as chronic obstructive pulmonary disease (COPD), cystic fibrosis, and lung cancer in the palliative stage. The administration of oxygen to patients with these conditions has been shown to benefit their general health status and quality of life, as well as to prevent complications from oxygen desaturation during therapeutic treatment.²⁻⁶

In addition to therapeutic exercise, physiotherapists perform suctioning to facilitate the clearance of secretions in individuals with compromised respiratory systems. Clinical practice guidelines for suctioning recommend that additional oxygen be given to patients on mechanical ventilation prior to suctioning.⁷ Furthermore, hyperoxygenation with 100% oxygen should be used during suctioning for patients on mechanical ventilation as a result of trauma, cardiac problems, or COPD.⁷

The physiotherapy entry-to-practice curriculum in all Ontario university programmes includes content related to the administration of oxygen.^{8,9} This competency is evaluated in the national Physiotherapy Competency Exam and is considered to be an entry-level skill required for obtaining registration as a physiotherapist in Canada.¹⁰

In Canada, the medical use of oxygen is regulated and must be prescribed by a physician or medical specialist.¹¹ Prescriptions of oxygen should cover the flow rate, delivery system, duration, and monitoring of treatment to ensure safe and effective treatment.^{12,13}

In Ontario, the Health Professions Regulatory Advisory Council (HPRAC) was created in 1993 under the

Regulated Health Professions Act, 1991 (RHPA), to provide advice to the government on matters related to the regulation of health professions.¹⁴ The RHPA is a legislative framework that regulates the practice of 23 health professions in the province and authorizes the performance of controlled acts by specific professions.^{15,16} Controlled acts are health care activities that carry a substantial risk of harm if performed by an unqualified person.¹⁴ Regulated health professionals who are authorized to perform a controlled act can delegate it to other regulated health professionals; a delegation is "the transfer of the legal authority to perform a controlled act or a component of a controlled act to a person . . . who is not authorized to perform the act."^{16(p.3)} The health professionals accepting the delegation must demonstrate competency in performing the act, and the act must be within their scope of practice.¹⁶ Further, the delegation may be in the form of either a direct order or a directive. A direct order is a set of written instructions that authorizes a specific health professional to perform the controlled act on a per-patient basis;^{16,17} a directive is a set of instructions outlining specific conditions and circumstances under which a controlled act may be delegated and providing authority to carry out the controlled act.¹⁶ When directives are provided by physicians, they are often termed medical directives but they can also be provided by other regulated health professionals.

Under the RHPA, oxygen administration falls under the controlled act of "administering a substance by injection or inhalation."^{18(p.6)} This controlled act is authorized to medical doctors, nurses, and respiratory therapists but not to physiotherapists. However, this act can be delegated to physiotherapists, because it is an entry-level competency and is within physiotherapists' scope of practice.^{19,20}

Phone calls and e-mails to physiotherapy jurisdictions beyond Ontario confirmed that in all other Canadian provinces and territories, physiotherapists are permitted to titrate oxygen, as it is within their scope of practice, and there are no restrictive frameworks that regulate this practice. In Ontario, although physiotherapists have long been using oxygen in their practice, professional awareness has been raised only in the last few years about the need for delegation policies for physiotherapists to administer oxygen. At the same time, the profession has

also been advocating for physiotherapists to be authorized to administer oxygen independently, without delegation. In December 2006 and January 2007 respectively, the Ontario Physiotherapy Association (OPA) and the College of Physiotherapists of Ontario (CPO) published discussion papers and lobbied for the review and revision of the RHPA and the Physiotherapy Act to more accurately reflect the clinical skills and competencies of physiotherapists in Ontario.^{21,22} The OPA and the CPO recommended amending the scope of practice statement and granting physiotherapists the authority to perform four additional controlled acts, including “administering oxygen to maintain a patient’s oxygen saturation level.”^{22(p.16)} The reasons for the recommendations were (1) that physiotherapists assess and treat patients who require the administration of oxygen to maintain adequate saturation levels during physical activities such as ambulation; and (2) that, according to clinical practice guidelines, suctioning requires the use of supplemental oxygen.²¹ Suctioning is one of the two controlled acts authorized to physiotherapists in Ontario.²⁰ The limitation of the current legislation means that while physiotherapists can perform suctioning independently, they are not permitted to independently administer oxygen during suctioning. This represents a barrier to the provision of optimal patient care in accordance with best practice guidelines.⁷

Hospital policy is influenced by many factors. The literature suggests that amalgamation—the merging of two or more hospitals into a single corporation²³—increases the likelihood that existing hospital policies will be implemented or enforced.²⁴ Amalgamation results in a larger patient population, a greater number of health care professionals, and substantial financial resources, all of which drive organization-wide changes to policies and procedures.^{25,26} Little is known about the influence of geographic location on hospital policy; however, a recent study investigating hospitals’ patient-safety programmes did find that urban hospitals are more likely than rural hospitals to adopt patient-safety systems.²⁷

Hospitals in Ontario are structured in department, programme, or matrix organizational models. In a *department structure*, staff are grouped according to specific professions into departments, each headed by a department manager.²⁸ In a *programme structure*, services and multidisciplinary health professionals are grouped into programmes by medical specialty, specific diagnosis, or population groups.^{28,29} In a *matrix structure*, both departmental and programme structures operate with balanced priority and authority, and members of the organization report to both a programme and a department manager.^{30,31} Hospital organizational structure is known to influence policy implementation.²⁸ From the limited current Canadian literature available on

this subject, it appears that the department model is more conducive to enforcing organization-wide policies. Because members of a department are practitioners of the same profession, there is a greater emphasis on advocating for the profession, maintaining standards of professional practice, and enhancing knowledge and expertise.^{28,32} On the other hand, it is suggested that although programme structures provide opportunities that allow for greater involvement in decision making and planning, the loss of professional unity typically provided by department structures results in lower visibility for professional standards.^{31,33}

An extensive review of the Scholar’s Portal, Medline, and CINAHL databases from 1995 to 2008 found no studies investigating delegation policies and physiotherapy practice in oxygen administration in Ontario hospitals. The primary objectives of this study, therefore, were (1) to survey the practice of oxygen administration in Ontario hospitals among physiotherapists, physiotherapist assistants (“assistants”), and physiotherapy students (“students”); and (2) to determine the proportion and characteristics of Ontario hospitals that have delegation policies for physiotherapists to administer oxygen. The secondary purpose was to determine the proportion of Ontario hospitals that provide training for physiotherapists, assistants, and students to maintain competency in oxygen administration.

The authors hypothesized that (1) physiotherapists would administer oxygen in more than 60% of Ontario hospitals; (2) less than 40% of Ontario hospitals would have a policy to delegate oxygen administration to physiotherapists; (3) less than 40% of Ontario hospitals would provide training to maintain competency in oxygen administration; and (4) the presence of a delegation policy would be significantly associated with hospitals with one or more of these characteristics: (a) urban location; (b) amalgamation; (c) academic health sciences centres (teaching hospitals); (d) a greater number of beds and physiotherapist full-time equivalents (FTEs); and (e) department structure.

METHODS

Questionnaire Development

A cross-sectional postal survey was developed based on the study’s objectives. It consisted of 15 closed-ended questions and four open-ended questions, with a section for additional comments. The questionnaire was piloted to a sample of nine physiotherapists from various clinical settings in Ontario, all of whom were University of Toronto–affiliated clinical instructors experienced in cardiorespiratory care. It was revised to incorporate feedback on clarity and readability, and a question was added to address amalgamation.

A cover letter was included with the questionnaire to explain the rationale of the survey, state the eligibility criteria, and obtain participants' consent. Hospitals that declined to participate were asked to return the blank questionnaire. Each questionnaire had a unique identification number by which the investigators could identify each hospital. All collected data were compiled against the ID number only.

In the survey, oxygen administration was defined as one or both of initiation and titration. Initiation is the act of *starting* a patient on supplemental oxygen to increase his/her oxygen saturation to an optimal level; titration is the act of *adjusting* a patient's oxygen supply to maintain his/her oxygen saturation at an optimal level.

The questionnaire had four sections. Part A addressed hospital characteristics, including the presence of amalgamation, number of beds, number of physiotherapist FTEs, organizational structure, and hospital classification. Part B asked whether physiotherapists initiated and/or titrated oxygen in the hospital and whether a delegation policy existed (hospitals answering "No" to both questions were instructed to return the questionnaire without completing Parts C and D). Part C inquired into the type and frequency of oxygen administration training offered by the hospital for physiotherapists. Part D investigated the practice and training of assistants and students in oxygen administration.

Population Sampling

The target population included all 253 Ontario hospitals listed on the Ontario Hospital Association's Web site. Hospitals had to meet the following eligibility criteria: (1) offering physiotherapy services and (2) having the ability to provide supplemental oxygen to their patients. Through preliminary telephone screening, 208 of the 253 hospitals were found to meet the eligibility criteria, and questionnaires were mailed to these hospitals.

Data Collection

Once the study had received approval from the Research Ethics Boards of Mount Sinai Hospital and the University of Toronto, the questionnaires were mailed to the 208 eligible Ontario hospitals between March and May 2007, using Dillman's Total Design Method.³⁴ All letters were addressed to "Physical Therapy Services—Professional Practice Leader (PPL) / Director." The letters requested that a physiotherapist who had appropriate knowledge of oxygen practice and hospital delegation policies for oxygen administration fill out the questionnaire. Respondents were contacted up to three times via telephone and/or e-mail in an effort to clarify ambiguous responses.

Data Analysis

Responses were coded and entered into a Microsoft Excel 2003 (Microsoft Corp., Redmond, WA) spreadsheet. For the purpose of this study, hospitals were categorized as urban or rural according to Canada Post classifications.³⁵

Physiotherapy practice in oxygen initiation and titration, the presence of a delegation policy for oxygen administration, and the provision of oxygen administration training opportunities for physiotherapists, assistants, and students were examined using descriptive statistics (including percentage and frequency distribution).

Fisher's exact test was used to test the significance of potential associations between oxygen practice and certain hospital characteristics (urban vs. rural, amalgamation, academic affiliation, organizational structure, and hospital classification). Cramer's *V* statistic was used to measure the strength of the association. The same procedure was applied to examine the association between delegation policy and hospital characteristics. The association between pairs of variables was considered statistically significant if the two-sided *p*-value from Fischer's exact test was <0.05 . The Kruskal-Wallis non-parametric significance test was used to investigate whether oxygen practice and the presence of a delegation policy were associated with the two continuous variables of the study: number of hospital beds and number of physiotherapist FTEs. Associations were considered significant at $p < 0.05$.

To identify prognostic indicators for oxygen practice and presence of a delegation policy, multiple logistic regressions were performed. Specifically, the dependent variables were titration and delegation policy, and the independent variables were the above hospital characteristics. In the exploratory stage, all hospital characteristics and interaction terms for classifications that had the potential to be nested within one another (e.g., hospitals classified as providing both acute care and complex continuing care) were included in a Type III Analysis of Effects to find the best predictors. A Type III analysis breaks down the variation due to the model into terms corresponding to the main effects and the interaction effects. The Type III sum of squares for a particular effect is the amount of variation in the response due to that effect after correcting for all other terms in the model. Different exploratory methods were applied to justify the final model; stepwise, forward-selection, and backward-elimination models all yielded the same results. The stepwise method was then selected to identify the prognostic factors for each of the independent variables. Moreover, the Hosmer and Lemeshow test was performed to evaluate goodness of fit of the final model.³⁶ Analysis was performed using Statistical Analysis Software (SAS) version 8.2 (SAS Institute Inc., Cary, NC).

Figure 1 Flow diagram of Ontario hospital recruitment.

RESULTS

In all, 172 of 208 hospitals (82.7%) returned the questionnaire. Of these, 11 did not in fact meet the eligibility criteria and three declined to participate in the study, yielding a final sample size of 158 (76.0%) hospitals. Figure 1 illustrates the recruitment process. The number of respondents varied for each question as a result of missing or ambiguous responses.

Hospital Characteristics

Hospital characteristics are listed in Table 1. The majority of hospitals (77.2%) were located in urban settings. Hospitals were more frequently structured in a department model (56.3%) than in a programme (22.8%) or matrix (20.9%) model. More hospitals were amalgamated (56.3%) than not (43.7%).

Physiotherapist, Physiotherapist Assistant, and Physiotherapy Student Practice

Results for physiotherapist, assistant, and student practice are shown in Table 2. Physiotherapists initiated and titrated oxygen in 16 hospitals (10.1%) and titrated only in an additional 46 hospitals (29.1%). In a small proportion of hospitals, assistants (3.2%) and students (9.5%) also titrated oxygen.

The practice of oxygen titration was associated with three hospital characteristics: structure ($p < 0.001$), urban location ($p < 0.001$) and teaching classification ($p = 0.001$). The odds ratio (OR) for practising titration was 1.6 times and 6.5 times as high in hospitals with a matrix structure as in those with a programme or departmental structure respectively. The OR for titration in urban hospitals was 10.7 times that for rural hospitals, and the OR for titration in teaching hospitals was 3.8 times that in non-teaching

hospitals. There was also a significant association between the practice of oxygen titration and number of beds ($p < 0.001$) and between the practice of oxygen titration and physiotherapist FTEs ($p < 0.001$).

Table 1 Demographics of Ontario Hospitals in the Study ($N = 158$)

Hospital Characteristics	<i>n</i> (%)
Amalgamated	
Yes	89 (56.3)
No	69 (43.7)
Classification*	
Acute care	126 (79.7)
Rehabilitation	51 (32.3)
Teaching (AHSC)	30 (19.0)
Complex continuing care	70 (44.3)
Psychiatric / mental health	29 (18.4)
Number of beds	
>200	62 (39.2)
51–200	52 (32.9)
≤50	44 (27.8)
Physiotherapist FTEs	
>10	55 (34.8)
2.1–10	67 (42.4)
≤2	36 (22.8)
Location	
Urban	122 (77.2)
Rural	36 (22.8)
Organizational structure	
Department	89 (56.3)
Programme	36 (22.8)
Matrix	33 (20.9)

*Numbers do not sum to the total study sample ($N = 158$) because some hospitals represent more than one classification.

Delegation Policies

Results for delegation policies are presented in Table 2. Forty-five of 158 hospitals (28.5%) reported having delegation policies for physiotherapists to administer oxygen. Most frequently, the policy included titration only (66.7%) rather than including both initiation and titration (33.3%). The delegation policies were similarly distributed between directives (46.7%) and direct orders (42.2%). In 41 out of 45 hospitals (91.1%) with a delegation policy, the delegating health professional was a physician and/or a respiratory therapist.

There was a significant association between having a delegation policy and four hospital characteristics: structure ($p < 0.001$), teaching classification ($p < 0.001$), urban location ($p = 0.003$), and rehabilitation classification ($p = 0.014$). The OR was 2.1 times and 7.9 times as high, respectively, for hospitals with a matrix structure to have a policy than for those with a programme or departmental structure. The ORs for presence of a delegation policy were 5.7, 4.4, and 1.5 times as high, respectively, for urban, teaching, and rehabilitation hospitals as for those without these characteristics. Number of beds ($p < 0.001$) and physiotherapist FTEs ($p < 0.001$) were also significantly associated with presence of a delegation policy.

Predictive Factors

The initial p -values from the Type III analysis of effects that included all possible hospital characteristics

Table 2 Hospital Characteristics, Presence/Absence of a Delegation Policy, and Physiotherapy Practice in Oxygen Administration

Characteristics	Hospitals with a Delegation Policy ($n = 45$)	Hospitals without a Delegation Policy ($n = 113$)	Physiotherapists Titrating Oxygen ($n = 46$)	Physiotherapists Titrating and Initiating Oxygen ($n = 16$)	No Supplemental Oxygen Use ($n = 96$)
Amalgamated					
Yes	28 (62.2)	61 (54.0)	25 (54.3)	12 (75.0)	52 (54.2)
No	17 (37.8)	52 (46.0)	21 (45.7)	4 (25.0)	44 (45.8)
Classification*					
Acute Care	32 (71.1)	94 (83.2)	35 (76.1)	11 (68.8)	80 (83.3)
Rehabilitation [†]	18 (40.0)	33 (29.2)	14 (30.4)	10 (62.5)	27 (28.1)
Teaching ^{†,‡}	16 (35.6)	14 (12.4)	14 (30.4)	5 (31.3)	11 (11.5)
Complex Continuing Care	23 (51.1)	47 (41.6)	21 (45.7)	8 (50.0)	41 (42.7)
Psychiatric/Mental Health	10 (22.2)	19 (16.8)	9 (19.6)	5 (31.3)	15 (15.6)
Number of beds ^{†,‡}					
>200	27 (60.0)	35 (31.0)	29 (63.0)	10 (62.5)	23 (24.0)
51–200	14 (31.1)	38 (33.6)	12 (26.1)	6 (37.5)	34 (35.4)
≤50	4 (8.9)	40 (35.4)	5 (10.9)	0 (0.0)	39 (40.6)
Physiotherapist FTEs ^{†,‡}					
> 10	26 (57.8)	29 (25.7)	26 (56.5)	11 (68.7)	18 (18.8)
2.1–10	16 (35.6)	51 (45.1)	17 (40.0)	5 (31.3)	45 (46.9)
≤2	3 (6.7)	33 (29.2)	3 (6.5)	0 (0.0)	33 (34.3)
Location					
Urban ^{†,‡}	42 (93.3)	80 (70.8)	43 (93.5)	16 (100.0)	63 (65.6)
Rural	3 (6.7)	33 (29.2)	3 (6.5)	0 (0.0)	33 (34.4)
Organizational Structure ^{†,‡}					
Department	13 (28.9)	76 (67.3)	19 (41.3)	2 (12.5)	68 (70.8)
Programme	13 (28.9)	23 (20.4)	14 (30.4)	5 (31.3)	17 (17.7)
Matrix	19 (42.2)	14 (12.4)	13 (28.3)	9 (56.3)	11 (11.5)

*Each hospital may have more than one type of classification.

[†]Indicates hospital characteristics associated with physiotherapists titrating oxygen ($p < 0.05$).

[‡]Indicates hospital characteristics associated with the presence of a delegation policy ($p < 0.05$).

Table 3 Probability Values from Type III Analysis of Effects with All Possible Hospital Characteristics and Interaction Terms Included in the Model

Dependent Variable	Independent Variables*									
	Physiotherapist FTEs	Beds	Urban	Amalgamation	Acute Care	Rehabilitation	Psychiatric	Complex Continuing Care	Teaching	Structure
Titration	0.30	0.05	0.19	0.52	0.44	0.68	0.31	0.16	0.49	0.09
Delegation Policy	0.24	0.92	0.56	0.75	0.93	0.40	0.80	0.08	0.07	0.001

*Results for interaction terms are not shown (all $p > 0.05$).

Table 4 Probability Values for the Final Model Type III Analysis of Effects

Dependent variable	Independent variables	p	Hosmer and Lemeshow Test
Titration	Beds	< 0.001	0.30
	Structure	0.01	
Policy	Structure	< 0.001	(not applied because response had > 2 levels)
	Physiotherapist FTEs	0.04	

Table 5 Odds Ratio (OR) Estimates, p -values, and Confidence Intervals (CI) from the Final Models

Independent Variable	Effect	Estimate	95% CI	p	Unit	Adjusted ORs for Continuous Variables Estimate (95% CI)
Titration	Beds	1.005	(1.002, 1.008)	< 0.001	100	1.681 (1.283, 2.203)
	Matrix vs. Department	4.069	(1.597, 10.371)	0.003		
	Programme vs. Department	2.099	(0.855, 5.151)	0.11		
Policy	Physiotherapist FTEs	1.046	(1.002, 1.092)	0.04	10	1.57 (1.018, 2.419)
	Matrix vs. Department	6.712	(2.645, 17.033)	< 0.001		
	Programme vs. Department	2.019	(0.701, 5.811)	0.19		

and interaction terms in the model are given in Table 3; the final results are shown in Tables 4 and 5. Results of the Hosmer and Lemeshow goodness-of-fit test³⁶ are shown in Table 4; the p -value indicates that the final model fits the data well. Bed number and organizational structure were significant predictors of the practice of titration. Specifically, when number of beds increased by 100, the OR of physiotherapists titrating oxygen increased by 68%. The OR of physiotherapists titrating oxygen in hospitals with a matrix structure was approximately four times that of those with a department structure.

Structure and physiotherapist FTEs predicted the presence of a delegation policy; specifically, the OR of having a policy was 6.7 times as high in hospitals with a matrix structure as in those with a department structure. Hospitals with larger numbers of physiotherapist FTEs were also more likely to have a delegation policy: when physiotherapist FTEs increased by 10, the OR of having a policy increased by 57%.

Training in Supplemental Oxygen Administration

As Table 6 shows, in 27 of the 45 hospitals (60.0%) with a delegation policy, training in oxygen administration was provided for physiotherapists, usually once per

Table 6 Training of Physiotherapists in Oxygen Administration in Hospitals with a Delegation Policy ($n = 45$)

Training	% (n)
Training offered	
Yes	27 (60.0)
No	18 (40.0)
Provided by ($n = 27$)*	
Respiratory therapist	22 (81.5)
Physiotherapist	13 (48.2)
Other	6 (22.2)
Frequency ($n = 27$)	
One time only	3 (11.1)
Once per year	13 (48.2)
Every 2 years	6 (22.2)
Other	5 (18.5)

*Training is provided by both respiratory therapists and physiotherapists in some hospitals.

year. Few assistants (5.7%) or students (5.1%) received training, and such training was typically offered only once. The training was usually conducted by respiratory therapists (81.5%) or by other physiotherapists (48.2%).

DISCUSSION

The present study was the first to investigate physiotherapy practice and delegation policies for oxygen

administration in Ontario hospitals. The response rate of 82.7% was consistent with the expected response using the Dillman method.³⁴ The proportions of respondents and non-respondents were similarly distributed with respect to urban versus rural settings; the authors believe, therefore, that the study sample was representative of Ontario hospitals in general.

As hypothesized, the results indicate that only a small proportion of Ontario hospitals (28.5%) had a delegation policy. This was expected, because the issue of physiotherapists requiring delegation to administer oxygen has come to the forefront only recently. However, physiotherapists awareness of the importance of obtaining delegation is apparently increasing, as demonstrated by the fact that approximately 11% of respondents indicated that their hospitals were in the process of developing a delegation policy. This need was echoed by one respondent who stated that

the delegation of oxygen titration to physiotherapists is lacking in our facility ... management of our client's oxygen needs are not being monitored as closely as they should be and subsequently their care/health is affected.

Others mentioned a need for a change in professional regulations. For instance, another respondent stated that "oxygen titration plays an important role in physiotherapy treatment ... Titration should not have to be delegated to physiotherapists."

There is evidence that hospitals with a larger patient population and greater financial and human resources are more advanced at implementing policies.^{25,26} As anticipated, hospitals with more beds and physiotherapist FTEs were more likely to have a delegation policy. Hospitals located in urban areas, where larger populations are served, demonstrated similar characteristics and were thus more likely to have a delegation policy. It was surprising, however, that there was no association between amalgamation and the presence of a delegation policy, even when an amalgamation merged patient populations, services, and resources.

The study found that teaching hospitals were more likely to have a delegation policy. Because teaching hospitals are the training grounds for future health professionals, it was hypothesized that such hospitals would be obligated to develop and implement policies to comply with professional regulations in order to set an example for their students. Interestingly, although physiotherapists in rehabilitation hospitals were not likely to practice oxygen titration, such hospitals proved more likely to have a delegation policy in place. This may reflect their preparatory efforts at developing policies for potential situations in which physiotherapists would need to administer oxygen.

There was a strong association between having a matrix structure and the presence of a delegation

policy. Since a matrix model contains elements of both department and programme structures, physiotherapists practising in this environment may benefit from strong professional support to maintain practice standards. In addition, a programme model promotes an interdisciplinary approach to patient care in which roles tend to be defined by skills rather than by disciplinary boundaries, which may allow a profession to function to the fullest capacity within its scope of practice.²⁸ One's practice may also be more open to scrutiny by other professions in a programme structure, driving timely development of required policies.

Only 39.2% of hospitals reported that physiotherapists administer oxygen in their facility. This unexpected finding may be due to the fact that even though physiotherapists routinely use oxygen in patient care, some may not have officially received delegation to do so at their facility. The sensitive nature of the question may have reduced the accuracy of responses, even though respondents' anonymity was guaranteed.

A limitation of this study is that although the survey packages were addressed to the physiotherapy department with a request that the physiotherapist with the most appropriate knowledge complete the questionnaire, there is no certainty that the most appropriate physiotherapist did complete it, especially in hospitals with a programme structure where no physiotherapy department exists.

Since the completion of this study, there have been new developments in Ontario with respect to physiotherapy's scope of practice. The HPRAC completed a physiotherapy scope of practice review in September 2008, with submissions from both the OPA and the CPO, to "ensure that there are no legislative, regulatory, structural or process barriers to members of the profession working to the maximum of their scope of practice or to working in interprofessional settings or teams."^{37(p.155-86)} Following the review, the HPRAC recently released its recommendation that physiotherapists be authorized to administer oxygen that has been ordered by a person authorized to do so.^{37(p.155-86)} It is hoped that this will bring about increased efficiency in health care delivery by eliminating the need for alternative mechanisms of authority, such as medical directives and delegation, where these are not warranted. Such a policy will also enable physiotherapists to function to their fullest professional competency as stronger inter-professional collaborative partners. The HPRAC recommendation is an important step forward for the physiotherapy profession.

CONCLUSIONS

This study shows that physiotherapists are administering oxygen in less than half of Ontario hospitals and that not all of these hospitals have delegation policies.

The practice of oxygen administration and the presence of a delegation policy are more likely in urban or teaching hospitals and in hospitals with a matrix structure, greater numbers of beds, and more physiotherapist FTE positions. Rehabilitation hospitals are also likely to have delegation policies. The study illustrates that physiotherapists in Ontario are currently not practising to their maximum scope and competencies, despite evidence that oxygen administration is a physiotherapy entry-to-practice competency and that it is important to the practice of physiotherapy interventions aimed at maintaining or improving cardiorespiratory function. The legislative framework in Ontario at the time the study was conducted may not have taken full advantage of physiotherapists' ability to deliver safe patient care and to perform the authorized act of suctioning according to best practice guidelines. Future research should examine physiotherapy practice of oxygen administration in hospitals throughout Canada.

KEY MESSAGES

What Is Already Known on This Subject

Physiotherapists' ability to administer oxygen is beneficial to the treatment of patients with cardiorespiratory conditions. In Ontario, the administration of oxygen is a controlled act that can be delegated to physiotherapists, since it is an entry-level competency within the physiotherapy scope of practice.

What This Study Adds

A large number of Ontario hospitals do not currently have the necessary delegation policies in place for physiotherapists to administer oxygen. Physiotherapists in these hospitals are not practising to their full scope of practice, which may compromise their ability to deliver efficient patient care according to best practice guidelines.

REFERENCES

- Brooks D, Crowe J, Kelsey CJ, Lacy JB, Parsons J, Solway S. A clinical practice guideline in peri-operative cardiorespiratory physical therapy. *Physiother Can.* 2001;53:9-25.
- O'Donnell DE, Aaron S, Bourbeau J, Hernandez P, Marciniuk D, Balter M, *et al.* State of the art compendium: Canadian Thoracic Society recommendations for the management of chronic obstructive pulmonary disease. *Can Resp J.* 2004;11:7B-59B.
- Bradley JM, O'Neill B. Short-term ambulatory oxygen for chronic obstructive pulmonary disease. *Cochrane Db Syst Rev.* 2005;(4):CD004356.
- Emtner M, Porszasz J, Burns M, Somfay A, Casaburi R. Benefits of supplemental oxygen in exercise training in nonhypoxemic chronic obstructive pulmonary disease patients. *Am J Resp Crit Care Med.* 2003;168:1034-42.
- Fraser KL, Tullis DE, Sasson Z, Hyland RH, Thronley KS, Hanly PJ. Pulmonary hypertension and cardiac function in adult cystic fibrosis: role of hypoxemia. *Chest.* 1999;115:1321-8.
- Kvale PA, Simoff M, Prakash UB. Lung cancer: palliative care. *Chest.* 2003;123:S284-311.
- Brooks D, Anderson CM, Carter MA, Downes LA, Keenan SP, Kelsey CJ, *et al.* Clinical practice guidelines for suctioning the airway of the intubated and nonintubated patient. *Can Resp J.* 2001; 8:163-81.
- Ontario Physiotherapy Association, College of Physiotherapists of Ontario. Strategic solutions: optimizing physiotherapists' capacity in Ontario's health care system (physiotherapy scope of practice review 2008) [document on the Internet]. N.p.: The Association; 2008 [cited 2008 Nov 7]. Available from: http://www.opa.on.ca/pdfs/HPRAC_Scope062708.pdf.
- Canadian Universities Physical Therapy Programs. Entry to practice physiotherapy curriculum: content guidelines for Canadian academic programs (draft approved May 2008).
- Canadian Alliance of Physiotherapy Regulators. Physiotherapy competency examination blueprint 2005 [document on the Internet]. N.p.: The Alliance; 2005 [cited 2008 Dec 5]. Available from: http://www.alliancept.org/pdfs/exams_resources_blueprint_05.pdf.
- Health Canada. Medical supplies and equipment oxygen therapy benefits and criteria [document on the Internet]. Ottawa: Health Canada; 2007 [updated 2007 Oct 11; cited 2008 Apr 9]. Available from: http://www.hc-sc.gc.ca/fnih-spni/nihb-ssna/provide-fournir/med-equip/criter/oxygen_e.html.
- Dodd ME, Kellet F, Davis A, Simpson JC, Webb AK, Haworth CS, *et al.* Audit of oxygen prescribing before and after the introduction of a prescription chart. *Brit Med J.* 2000;321:864-5.
- Bateman N, Leach, R. ABC of oxygen: acute oxygen therapy. *Brit Med J.* 1998;317:798-801.
- Health Professions Regulatory Advisory Council [homepage on the Internet]. Toronto: The Council; 2007 [updated 2007 Oct 22; cited 2009 May 15]. About HPRAC [1 screen]. Available from: http://www.hprac.org/en/about/mandate.asp?_mid_=2247.
- Regulated Health Professions Act, Schedule 2: Health Professions Procedural Code [cited 2009 Jan 26]. Available from: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_91r18_e.htm.
- College of Physiotherapists of Ontario. Guide to the Standard for Professional Practice: Performing Controlled Acts [document on the Internet]. N.p.: The College; 2008 [cited 2009 May 15]. Available at: http://www.collegept.org/_literature_25338/437Guide_-_Performing_Controlled_Acts_-_May_2008_-_T3-437.
- College of Physicians and Surgeons of Ontario [homepage on the Internet]. Toronto: The College; 2008 [updated 2007 Feb; cited 2009 Jan 26]. Delegation of controlled acts [about 14 screens]. Available from: <http://www.cpsos.on.ca/policies/policies/default.aspx?ID=1554>.
- Preparing for change: how proposed legislation could impact the profession. Communiqué [College of Physiotherapists of Ontario]. 2006 Fall;5-7.
- College of Physiotherapists of Ontario. College of Physiotherapists of Ontario standards for professional practice: guide to the standard for accepting the delegation of a controlled act [document on the Internet]. N.p.: The College; 2005 [cited 2006 Nov 24]. Available from: <http://www.collegept.org/college/content/pdf/en/guide/B.GUIDEdelegation.pdf>.
- Physiotherapy Act, O.Reg. 532/98 [cited 2008 May 18]. Available from: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_980532_e.htm.
- College of Physiotherapists of Ontario. Proposed changes to physiotherapists' practice authority rules [document on the Internet]. N.p.: The College; 2007 [cited 2007 Jul 25]. Available from: <http://www.collegept.org/college/default.aspx?xml=publications/evolving/default.xml&bct=6.9>.

22. Woodhouse L. Advanced practice physiotherapy in Ontario [discussion paper]. Toronto: Ontario Physiotherapy Association; 2006. p. 1–30.
23. Health Services Restructuring Commission. Rural and northern hospital network report: Network 18—Dufferin—Northwest GTA [document on the Internet]. Toronto: The Commission; 1999 [cited 2008 Dec 5]. Available from: http://www.health.gov.on.ca/hsrc/rhn/rhn18_rr_0399.doc.
24. Hikmet N, Bhattacharjee A, Menachemi N, Kayhan VO, Brooks RG. The role of organizational factors in the adoption of healthcare information technology in Florida hospitals. *Health Care Manage Sci*. 2008;11:1–9.
25. Watcharasriroj B, Tang JCS. The effects of size and information technology on hospital efficiency. *J High Tech Manage Res*. 2004;15:1–16.
26. Montgomery K, Lewis CE. Responses to AIDS: large urban and small rural hospitals (variations and similarities in care of AIDS patients). *Hosp Health Serv Admin*. 1991;36:525–36.
27. Longo DR, Hewett JE, Ge B, Schubert S. Hospital patient safety: characteristics of best-performing hospitals. *J Health Manage*. 2007; 52:188–204.
28. Charns M, Tewksbury L. Collaborative management in health care: implementing the integrative organization. San Francisco: Jossey-Bass; 1993.
29. Smith DL, Klopfer HE, Paras A, Au A. Structure in health agencies. In: Hibberd JM, Smith DL, editors. *Nursing leadership and management in Canada*. 3rd edn. Toronto: Elsevier. 2006. p. 186–7.
30. Burns LR. Matrix management in hospitals: testing theories of matrix structure and development. *Admin Sci Quart*. 1989;34: 349–68.
31. Baker GR. The implications of program management for professional and managerial roles. *Physiother Can*. 1993;45:221–4.
32. Ferguson-Paré M, Mitchell GJ, Perkin K, Stevenson L. Academy of Canadian Executive Nurses: background paper on leadership. *Can J Nurs Leadersh*. 2002;15(3):4–8.
33. Miller PA, Solomon P. The influence of a move to program management on physical therapist practice. *Phys Ther*. 2002;82: 449–58.
34. Dillman DA. Mail and Internet surveys: the tailored design method. 2nd edn. New York: Wiley; 2000.
35. Canada Postal Guide Part B—Section 6. 2009 [document on the Internet]. Canada Post; 2009 [cited 2009 Jan 26]. Available from: <http://www.canadapost.ca/tools/PG/manual/PGaddress-e.asp#1380891>.
36. Hosmer DW, Lemeshow S. *Applied logistic regression*. 2nd edn. New York: Wiley; 2000.
37. Health Professions Regulatory Advisory Council. An interim report to the Minister of Health and Long-Term Care on mechanisms to facilitate and support interprofessional collaboration among health colleges and regulated health professionals: phase II, part 1 [document on the Internet]. Toronto: The Council; 2008 [cited 2008 Dec 5]. Available from: http://www.health.gov.on.ca/english/public/pub/ministry_reports/hprac_08/3_hprac_interpro_p2_20080900.pdf.