

# (Mis) Perceptions and Interactions of Sleep Specialists and Generalists: Obstacles to Referrals to Sleep Specialists and the Multidisciplinary Team Management of Sleep Disorders

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SCIENTIFIC INVESTIGATIONS

**Study Objectives:** This study assessed generalists' perceptions and challenges in providing care to sleep disorders patients and the role of sleep specialists in improving gaps in care.

**Methods:** A mixed-method approach included qualitative (semi-structured interviews, discussion groups) and quantitative (online surveys) data collection techniques regarding care of patients with obstructive sleep apnea (OSA) and shift work disorder (SWD).

**Results:** *Participants:* OSA: generalists n = 165, specialists (internists, neurologists, psychiatrists, pulmonologists) n = 12; SWD: generalists n = 216, specialists n = 108. Generalists reported challenges in assessing sleep disorders and diagnosing patients with sleep complaints. Generalists lacked confidence (selected ≤ 3 on a 5-pt Likert scale) in managing polypharmacy and drug interactions (OSA: 54.2%; SWD: 62.6%), addiction (OSA: 61.8%), and continuous positive airway pressure (OSA: 66.5%). Generalists in both studies reported deficits in knowledge of monitoring sleep disorders (OSA: 57.7%; SWD:

78.7%), rather relying on patients' subjective reports; 23% of SWD generalists did not identify SWD as a medical condition. Challenges to generalist-specialist collaboration were reported, with 66% of generalists and 68% of specialists in the SWD study reporting lack of coordination as a barrier. Generalists reported lack of consistency in sleep medicine and a perceived lack of value in consulting with sleep specialists.

**Conclusions:** Knowledge and attitudinal challenges were found in primary care of patients with sleep disorders. Sleep specialists need to clarify and educate practitioners regarding primary care's approach.

**Keywords:** Sleep disorders, obstructive sleep apnea, shift work disorder, primary care, qualitative research, physician competence, multidisciplinary care

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Inadequate sleep is widespread in the United States,<sup>1,2</sup> affecting approximately 50-70 million Americans.<sup>1</sup> Chronic lack of sleep and insomnia have important physiological and health effects as well as psychological, cognitive, safety, social, and economic implications.<sup>3</sup> Obstructive sleep apnea (OSA) and shift work disorder (SWD) are two common sleep disorders with potentially serious social impact. OSA affects roughly 5% to 10% of the U.S. population or 18 million Americans,<sup>4</sup> including an estimated 11.6% of the shift work population.<sup>5</sup> Shift work disorder, interruption of the normal sleep/wake cycle by the need to work shifts, or non-traditional daytime hours, and is referred to as circadian rhythm sleep disorder, shift work type, or shift work disorder (SWD).<sup>6</sup> Approximately 20% of workers are estimated to work non-traditional schedules.<sup>7</sup> Of these, 10% have been found to experience SWD.<sup>8</sup>

In spite of their prevalence, substantial impact, and the availability of effective treatment strategies, sleep disorders are generally underdiagnosed and undertreated by healthcare providers.<sup>1,2</sup> The annual *Sleep in America* survey<sup>2</sup> reported that 86% of respondents' generalists had never discussed sleep with them. Six of ten healthcare professionals reported not having enough time to discuss sleep problems during office visits.<sup>2</sup>

## BRIEF SUMMARY

**Current Knowledge/Study Rationale:** Sleep disorders are generally under-diagnosed and undertreated by primary care providers and not optimally referred to sleep specialists. However, there has been limited in depth assessment of the etiology of barriers faced by generalists in their assessment of sleep disorders, and how to optimize the role of sleep specialists in patient care.

**Study Impact:** Knowledge, skill, and attitudinal challenges and gaps were identified among a national sample of primary care providers involved in the care of patients with sleep disorders, resulting in patients being under-diagnosed, undertreated, stigmatized, and under-prioritized. Challenges in understanding and enhancing the role and value of the sleep specialist to the primary care community, as well as incorporating them to the interdisciplinary team for optimal care, were also identified. This study reveals a deficit in generalist physician knowledge about sleep medicine and a large gap between generalist and specialist attitudes concerning the diagnosis and management of sleep disorders.

Even when patients were asked about sleep issues, providers neither managed them directly nor referred patients to specialists. In another study, 90% of generalists rated their knowledge of sleep disorders as fair or poor.<sup>9</sup> Patients of sleep specialists exhibited greater awareness of the OSA management process,

though no difference was seen in their acceptance or compliance with CPAP.<sup>10</sup> This pattern of diagnostic delay and misdiagnosis has been seen with narcolepsy as well.<sup>11</sup>

Collaboration between generalists and sleep specialists has been recommended to alleviate the gaps in primary care providers' knowledge of sleep disorders,<sup>12</sup> with guidelines for OSA recommending multidisciplinary team care.<sup>13</sup> However, true multidisciplinary, shared care—while logical—can be challenging to achieve. Specialists reported that while some primary care physicians have been receptive to sleep education in the past, they were reluctant to take the responsibility for interpreting polysomnography results and for treatment.<sup>9</sup> Further, the healthcare system as a whole has not adapted to the care of sleep disorders patients and does not provide the resources or infrastructure needed to provide effective care across the continuum of the patient experience for sleep disorders.<sup>9</sup>

In light of these and related data, the Institute of Medicine called for efforts to expand the awareness of sleep disorders among healthcare professionals through education and training.<sup>1</sup> However, barriers to primary providers' diagnosis and management of sleep disorders remain largely unknown. Moreover, we wished to gain a better understanding of the issues and challenges *between* generalists and sleep specialists that might undermine optimal patient care. Consequently, we conducted a national applied behavioral performance needs assessment with the following goals:

1. To identify challenges, as well as educational and performance gaps of generalist primary care physicians in providing care to sleep disorders patients, focusing on OSA and SWD.
2. To assess the roles, perceptions, attitudes, and *interactions* of generalists and sleep specialists in providing care for patients with sleep disorders.
3. To provide a baseline to evaluate the impact and outcomes of future educational and performance improvement interventions.

## METHODS

Following IRB approval, we conducted educational and performance needs assessments among nationwide samples of participants that focused on challenges and gaps in the treatment and management of OSA (data collection May – August 2008) and SWD (data collection March – June 2009). Mixed-methods approach that included both qualitative and quantitative data collection techniques in a triangulated research design were employed.<sup>14,15</sup> A triangulated research design involves examination of several data sources using multiple data collection methods to examine the same phenomena,<sup>15,16</sup> enhancing the trustworthiness and validity of the findings.

### Participants

Purposive sampling was used to ensure that the sample was representative of the target audience.<sup>15,16</sup> Participants were drawn from existing subject pools and recruited via telephone, fax, and e-mail in collaboration with the American Thoracic Society (ATS, [www.thoracic.org](http://www.thoracic.org)), the New Jersey Academy of Family Physicians (NJAFP, [www.njafp.org](http://www.njafp.org)), the Office of Continuing Medical Education of the University of Virginia

School of Medicine (UVA-OCME, [www.medicine.virginia.edu/education/more/cme/home-page](http://www.medicine.virginia.edu/education/more/cme/home-page)), and the University of Wisconsin School of Medicine and Public Health Office of Continuing Professional Development (UW-SMPH-OCPD, [www.ocpd.wisc.edu](http://www.ocpd.wisc.edu)). The nature of the distribution of the invitations precluded identifying and following up with non-responders. Institutional review board approval was obtained for both studies. Financial compensation was provided to participants for their time.

Generalist participants were family physicians and internists who reported seeing at least one patient with sleep disorders (OSA or SWD) per month or whose patient population included  $\geq 2\%$  of patients who worked  $> 8$  h/day and/or outside traditional daytime hours (07:00-18:00).<sup>17</sup> Specialists (internists specializing in sleep, neurologists, psychiatrists, pulmonologists) were included who saw  $\geq 1$  patient/month with sleep disorders (OSA or SWD) or who reported having  $\geq 5\%$  of their patients who worked shifts. The inclusion criteria were determined in collaboration with faculty and a review of the literature.

### Data Collection

Best practices and challenges in the care of patients with OSA and SWD were identified through a comprehensive literature review. Key concepts provided a framework to guide the design of qualitative data collection instruments. Topics to emerge from this process included contextual issues, gaps throughout the continuum of care, inter-professional collaboration and referral gaps, and specific educational needs in sleep disorders. Based on this framework, comprehensive discussion group and semi-structured interview guides were developed to explore the practice and experiences of generalists and specialists. The discussion groups were lead by an expert-facilitator who asked participants questions related to the developed framework. Participants were encouraged by the facilitator to share their thoughts and opinions, and engage with their peers on the topics discussed. For in-depth understanding, probes consisting of open-ended questions addressing issues around knowledge, skill, attitudes, healthcare team and system, and current and desired practice were used in the discussion groups and interviews. Discussion groups were approximately 3.5 h and interviews were approximately 60 minutes. Both discussion groups and interviews were audio-recorded.

Quantitative surveys were developed based on substantive qualitative findings and key concepts identified in the literature review. The OSA survey consisted of 48 items, and the SWD survey of 75-78 items, consisting of rating statements on a 5-point scale (where 1 = low, 5 = high; see **Tables 6** and **7**). For example, participants were asked to select the number that best describes how they currently evaluate their knowledge relative to the statement presented. Next, they were asked to indicate their desired level of knowledge, defined as the level the participants would like to have or feel they need to attain.

### Analysis

Qualitative analysis was through open coding.<sup>18</sup> Coders were experienced qualitative researchers, including co-authors SH, SM, and KC. Coding categories were then grouped into related themes and subthemes, such as: Knowledge—lack of knowledge of diagnostic testing, and Attitude—lack of prioritization of sleep disorders. Themes were validated among coders

through review of selected data excerpts and discussion of coding. Discrepancies were resolved through discussion until concordance was achieved. Concordance was achieved in all cases. Selective coding was then conducted,<sup>18</sup> whereby data were systematically coded with respect to core concepts identified in the literature review and analysis of interview data.

Quantitative analysis consisted of descriptives (means, frequencies), (SPSS 12.0, SPSS, Chicago, IL). Gap analysis was carried out, in which participants provided a self-assessment of both their current level and desired level of knowledge.<sup>14</sup> The difference, or gap, between current and desired levels provides an indicator of specific areas of educational need. ANOVA validated the statistical significance of these gaps. A 5-point Likert agreement scale was used throughout each of the two surveys.

## RESULTS

Findings revealed contextual and attitudinal barriers as well as clinical challenges across the continuum of care of patients with sleep disorders, regardless of specific diagnosis, and indicated key challenges relevant to inter-professional collaboration between generalists and sleep specialists.

### Sample (Table 1 and 2)

Five discussion groups (n = 32), 24 interviews, and 445 surveys were completed for a total sample of 401 participants. Forty physicians (7.7%) participated in both OSA and SWD studies. Seventy-three percent of physicians participating in the OSA study saw > 10 patients/month, compared to 45% of physicians in the SWD study.

### Knowledge and Skill in Care of Patient with Sleep Disorders

#### Screening and Diagnosis

One-third of generalists in the SWD and OSA studies expressed hesitancy in addressing both OSA and SWD, neither systematically nor proactively screening for sleep disorders, and were reluctant to raise the topic because they perceived sleep disorders as a complex issue to manage. Participants in the OSA study identified substantive knowledge gaps on assessment and differential diagnosis across multiple sleep disorders

(Table 3). Physicians in the SWD study identified an even greater lack of knowledge of diagnosis of SWD (Table 4), lacking knowledge of key questions to pose to make an accurate diagnosis and relying on subjective impressions and patient reports to support their diagnosis, rather than formal tools, guidelines, or criteria.

### Treatment and Management

Challenges were also identified in the treatment of sleep disorders. Generalists in both studies articulated a lack of confidence in dealing with polypharmacy and evaluation of drug interactions, describing reluctance to prescribe stimulants for daytime due to fear of addiction, and lack of knowledge of treatment cessation. Generalists in the OSA study described knowledge gaps with regard to initiating CPAP therapy (Table 3) as well as supporting patients on CPAP. Generalists in both studies reported relying on patients' subjective reports in monitoring patients and treatment outcomes. Generalists did not characterize guidelines as useful in determining their care

### Attitudes toward Sleep Disorders

Generalist participants generally did not prioritize discussing sleep disorders. They further demonstrated a lack of understanding of the impact of sleep disorders on patients' daily living and comorbid conditions. While the majority of physicians believed in SWD as a medical condition, 23% of generalists and 16% of specialists did not. Some generalists in the OSA study reported characterizing sleep disorders as a symptom rather than as a primary diagnosis.

Table 1—Sample distribution by data collection activity

	OSA		SWD	
	Generalists	Specialists	Generalists	Specialists
<b>Quantitative</b>				
Online Survey	145	N/A	200	100
<b>Qualitative</b>				
Focus Groups	20	12	N/A	N/A
Interviews	N/A	N/A	16	8

Table 2—Sample distribution of physicians participating in the online surveys

OSA		SWD		
Specialty (total n = 145)	n (%)	Specialty (total n = 300)	n (%)	
Generalists	75 (52)	Family Physicians	127 (42)	
	70 (48)	Internists	73 (24)	
		Internal Medicine with sub-specialty in sleep	11 (4)	
		Neurologists	8 (3)	
		Psychiatrists	13 (4)	
		Pulmonologists	68 (23)	
			<b>Generalists</b>	<b>Specialists</b>
<b>Patients with OSA Per Month</b>	<b>n (%)</b>	<b>Patients with Sleep Disorders Per Month</b>	<b>n (%)</b>	<b>n (%)</b>
1-5 patients	43 (30)	1-5 patients	76 (38)	38 (38)
6-10	48 (33)	6-10	32 (16)	12 (12)
11+	54 (37)	11+	89 (45)	47 (47)

**Table 3**—Gap analysis in care of patients with OSA

Generalists (n = 145)	Desired Level	Percentage of Participants					Gap $\bar{X}$ SD	T p
		1 Low	2	3	4	5 High		
<b>Diagnosis</b>								
Administer and interpret tests correctly assessing patients with sleeping disorders	Current	10.3	17.9	43.4	23.4	4.8	1.3*	-17.02
	Desired	2.1	4.2	8.5	37.3	47.9	0.93	0.000
Diagnose circadian rhythm sleep disorders	Current	8.3	23.6	36.8	27.8	3.5	1.5*	-18.00
	Desired	1.4	0.7	5.6	39.2	53.1	0.98	0.000
Diagnose narcolepsy	Current	6.9	27.1	40.3	19.4	6.3	1.4*	-16.78
	Desired	2.1	0.7	7	44.4	45.8	1.0	0.000
Diagnose substance-induced sleep issues	Current	2.1	12.5	47.2	34.7	3.5	1.3*	-18.54
	Desired	0	0.7	4.3	32.6	62.4	0.85	0.000
<b>Treatment</b>								
Evaluate and manage potential drug interactions in SD	Current	2.1	17.4	34.7	39.6	6.3	1.3*	-17.18
	Desired	0	0	4.2	30.3	65.5	0.91	0.000
Initiate CPAP treatment for OSA	Current	14.7	23.1	28.7	25.9	7.7	1.3*	-13.93
	Desired	3.5	4.3	15.6	25.5	51.1	1.1	0.000
<b>Management</b>								
Monitor OSA status and progression	Current	6.3	15.3	36.1	36.8	5.6	1.3*	-16.96
	Desired	0.7	0.7	4.9	32.9	60.8	0.94	0.000
Manage patients with OSA according to current clinical guidelines	Current	6.3	16	38.9	31.9	6.9	1.4*	-17.45
	Desired	0.7	0	4.9	28	66.4	0.98	0.000

Online survey. Gaps between current level of knowledge of appropriate care in providing care for patients with OSA and desired knowledge, rated on a 5-point Likert scale (1 = Low, 5 = High). Gray shading indicates substantive gaps (Generalists > 1.00). \*Statistically significant ( $p \leq 0.001$ ).

## The Healthcare Team: Roles and Value

Healthcare team roles and responsibilities regarding OSA and SWD were described as unclear. Participants in both studies reported a lack of clarity about generalists' roles and responsibilities in regards to sleep disorders, with respect to which patients to refer to a sleep specialist, when referral was indicated, and to whom they should refer. This was particularly true of SWD, with less uncertainty related to OSA referrals (Table 5). In the SWD study, 66% of generalists and 66% of specialists described lack of role clarity as a barrier to optimal patient care (Figure 1A), as well as lack of coordination between generalists and specialists in treatment and management of SWD patients (generalists 66%, specialists 68%; Figure 1B). They described managing sleep disorders in isolation: 38.5% of generalists reported not referring to specialists for SWD.

A majority of generalists did not recognize sleep medicine as a specialty, characterizing it as a poorly defined area of expertise. Furthermore, all participant groups reported a lack of uniformity in training for sleep specialists, further hindering their full recognition of sleep medicine as a credible subspecialty.

"I don't think they [generalists] see sleep as a unifying subspecialty. Someone may have snoring, they don't see it as a referral to a sleep lab as they would for someone with insomnia or restless leg syndrome."—Specialist

A majority of participants in both studies questioned whether specialists know much more than generalists about sleep disorders; and perceived a lack of value for patients in referring to specialists and sleep centers. Thus, only a minority of generalists reported referring patients to a limited group of sleep specialists.

"I find it somewhat difficult to diagnose OSA and the experts don't do much better. I think they over-diagnose."—Generalist

Generalists further expressed reluctance to refer patients to sleep specialists because they perceived that specialists assess and diagnose but do not treat or manage OSA patients.

"It seems that the emerging group of sleep specialists are more than willing to do the test and make the diagnosis, but not to follow with the treatment, compliance, etc. Specialists make the money and leave the hard stuff for the primary care physician."—Generalist

Sleep laboratories were also viewed with some skepticism:

"And there are a lot of shabby labs, some of them run by medical device companies."—Generalist

Because of the perceived lack of value of sleep lab reports, generalists expressed reluctance to refer patients to sleep laboratories. Since generalists were not convinced of the value of

**Table 4—Gap analysis in care of patients with SWD**

Generalist/PCP (n = 200) Specialists (n = 100)	Group	Desired Level	Percentage of Participants					Gap $\bar{X}$ SD	t  p
			1 Low	2	3	4	5 High		
<b>Diagnosis</b>									
Administering and interpreting tests assessing patients with sleeping disorders	Generalists	Current	38.9	25.8	25.7	8.6	1	1.7*	-20.87
		Desired	10.2	7.1	18.8	26.9	37.1	1.1	0.000
	Specialists	Current	7.1	11.2	17.3	24.5	39.8	0.85*	-7.68
		Desired	0	4.3	6.4	16	73.4	1.1	0.000
Diagnosing shift work disorder	Generalists	Current	11.7	23.5	41.3	19.4	4.1	1.6*	-22.06
		Desired	0.5	1	10.9	32.1	55.4	1.0	0.000
	Specialists	Current	3.1	8.2	16.3	37.8	34.7	0.78*	-8.10
		Desired	0	2.2	4.3	18.3	75.3	0.92	0.000
Differentiating between shift work disorder and depression	Generalists	Current	5.6	20.8	35.5	29.9	8.1	1.4*	-20.00
		Desired	0.5	0.5	6.6	32.7	59.7	0.95	0.000
	Specialists	Current	1	8.2	33	37.1	20.6	1.1*	-11.17
		Desired	0	0	4.3	15.1	80.6	0.93	0.000
<b>Treatment</b>									
Current clinical guidelines for treating shift work disorder	Generalists	Current	24.7	27.3	37.4	9.1	1.5	2.0*	-29.29
		Desired	0.5	0	14.3	32.1	53.1	0.96	0.000
	Specialists	Current	5.1	9.2	24.5	42.9	18.4	1.1*	-11.85
		Desired	0	0	6.4	21.3	72.3	0.91	0.000
Balancing treatment for shift work disorder with treatment for other non-sleep related comorbidities (e.g., diabetes or osteoporosis)	Generalists	Current	10.6	18.2	33.8	23.7	13.6	1.3*	-17.38
		Desired	0.5	1.5	10.7	28.6	58.7	1.1	0.000
	Specialists	Current	6.1	10.2	41.8	29.6	12.2	1.2*	-11.64
		Desired	0	3.2	9.6	26.6	60.6	0.98	0.000
Providing self-management education to my patients with shift work disorder	Generalists	Current	17.2	28.3	34.8	13.6	6.1	1.7*	-20.25
		Desired	0.5	4.1	11.7	31.1	52.6	1.2	0.000
	Specialists	Current	2	11.2	35.7	30.6	20.4	1.1*	-11.13
		Desired	0	0	9.7	23.7	66.7	0.91	0.000
Monitoring shift work disorder status and progression	Generalists	Current	18.8	27.9	32	16.8	4.6	1.6*	-20.89
		Desired	1.5	2.6	14.4	34	47.4	1.1	0.000
	Specialists	Current	2	10.2	36.7	32.7	18.4	1.1*	-11.90
		Desired	0	0	8.6	22.6	68.8	0.88	0.000

Online survey. Gaps between current level of knowledge of appropriate care in providing care for patients with SWD and desired knowledge, rated on a 5-point Likert scale (1 = Low, 5 = High). \*Statistically significant ( $p \leq 0.001$ ).

sleep laboratory studies, they described difficulties in convincing patients of the importance of such testing.

## DISCUSSION

Sleep disorders—including both obstructive sleep apnea and shift work disorder—were unrecognized and/or not prioritized by generalists. Few generalists reported adequate knowledge in the area, characterizing care of patients with poor sleep as not urgent, frustrating, and de-motivating—attitudes that contributed to under- and misdiagnosis, under- and mistreatment, and stigmatization of patients with these low priority conditions. In 2002, 90% of generalists surveyed evaluated their knowledge of sleep disorders as fair or poor,<sup>9</sup> as compared to 5.5% in the OSA study and 35.2% in SWD study. This study also demonstrated a shift in this knowledge gap, as only 20%

of generalists questioned sleep disorders as a real diagnosis, with large gaps identified not only by generalists but also by specialists. Findings described in the results of these two studies suggest that there have been gains in the past seven years, yet much remains to be done in primary medical, specialty, and public education.

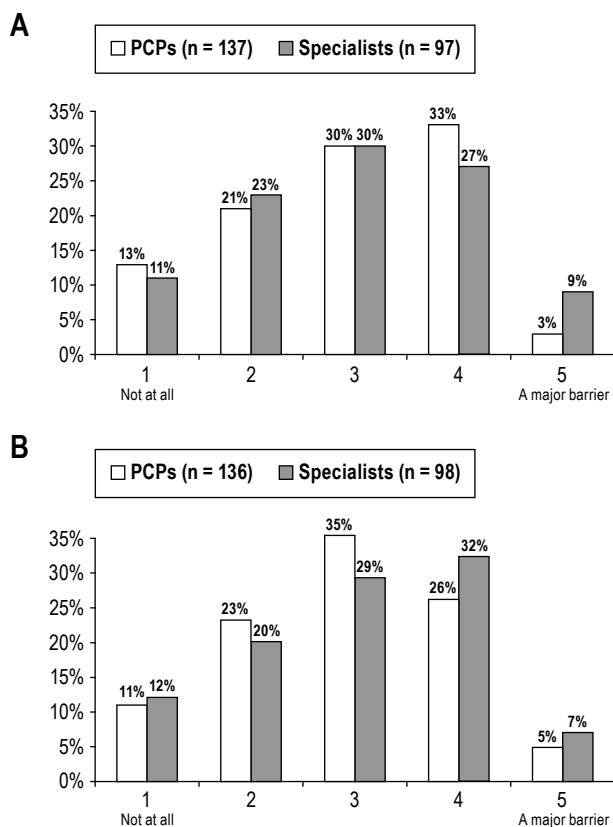
The role of specialists in sleep disorders care was questioned by generalists in these studies. This reiterates the examination of 69 qualified pulmonologists' expertise carried out in 1998,<sup>19</sup> which found poor performance when asked to evaluate non-pulmonary sleep disorder cases. At that time, chest physicians themselves expressed a need for more formal training in sleep disorders. Current findings suggest that this remains a pressing need, with lack of qualified experts resulting in lack of interdisciplinary support for generalists in the care of their sleep disorders patients as well as generating lack of credibility for the sleep disorders specialty. Yet

**Table 5—Referral of patients with sleep disorders**

Referral	Group	Desired Level	Percentage of Participants					Gap $\bar{X}$ SD	t p
			1 Low	2	3	4	5 High		
Determining when to refer patient back to generalist	Specialist (SWD)	Current	2.3	4.6	23	39.1	31	0.74	-8.53
		Desired	0	1.2	7.1	20.2	71.4	0.79*	0.000
Determining which patients with SWD should be referred to a specialist	Generalists (SWD)	Current	14.1	23.7	31.8	20.2	10.1	1.5	-16.90
		Desired	0.5	2.5	10.7	32	54.3	1.2*	0.000
Identifying which type of specialist I should refer my patient with SWD	Generalists (SWD)	Current	10.7	20.3	30.5	23.4	15.2	1.3	-14.76
		Desired	0.5	2	9.7	27	60.7	1.3*	0.000
Determining which patients with potential OSA should be referred to a specialist	Generalists (OSA)	Current	1.4	7.6	24.3	45.8	20.8	0.86	-11.32
		Desired	0	0.7	4.2	27.3	67.8	0.91*	0.000
Identifying which type of specialists I should refer my patients with OSA	Generalists (OSA)	Current	0.7	8.3	17.4	41.7	31.9	0.68	-8.52
		Desired	0	1.4	4.2	23.2	71.1	0.96*	0.000

Gap analysis. Gaps between current level of knowledge related to referring patients with sleep disorders to sleep specialists and desired knowledge, rated on a 5-point Likert scale. Gray shading indicates substantive gaps (Generalists > 1.00, Specialists > 0.75). \*Statistically significant (p ≤ 0.001).

**Figure 1—Generalist-specialist barriers to coordinated, interprofessional care**



**(A)** Lack of role clarity as a barrier. **(B)** Lack of coordination as a barrier.

the value of this approach is not evident to the generalists who are often the first contact of patients with sleep disorders.

There is evidence of positive impact of a functional inter-professional healthcare team upon patient healthcare outcomes and system processes.<sup>20</sup> Inter-professional collaboration (IPC) requires shared purpose, responsibility and goals, coordinated

efforts, interdependency, and recognition of the value of each team members and commitment to the value of team-based care.<sup>21,22</sup> The Institute of Medicine 2003 report on education in the health professions<sup>23</sup> identifies the need for cooperation, communication, and integration of healthcare. Inter-professional education provides promise for development of such interdisciplinary care.<sup>24,25</sup> Findings of these studies suggest the fundamental importance of addressing issues around interdependency and recognition of inter-professional value.

The importance of addressing the perception of sleep medicine is recognized within the sleep medicine community, in terms of credibility in demonstrating added value of sleep medicine within the larger medical community, and in terms of increasingly competitive and scarce funding for graduate medical education positions in sleep medicine.<sup>26</sup> The Adult Obstructive Sleep Apnea Task Force of the American Academy of Sleep Medicine recommended a multidisciplinary approach to the care of OSA, including primary and specialist care, as well as other sleep resources.<sup>13</sup> The American Thoracic Society has identified core competencies to guide sleep disorder competencies in pulmonary fellowship training programs. The American Academy of Sleep Medicine has identified the importance of addressing these challenges in the medical community as a whole, to better establish the subspecialty of sleep medicine, particularly in the face of challenges posed by sleep therapists who might further impact the credibility of sleep physicians.<sup>27</sup>

Performance improvement initiatives are required that will address not only knowledge and skill in diagnosing and managing sleep disorders, but also attitudinal and team issues. Such initiatives would need to be clinically based in order to result in translation of information into actual practice, and would need to be iterative in order to continue to build and improve care of patients with sleep disorders.

- Challenges have been identified in the interdisciplinary care of patients with sleep disorders
- Educational programs on sleep medicine should be designed and provided to primary care generalist physi-

**Table 6**—Excerpt of questionnaire on obstructive sleep apnea completed by generalists

Using the scale provided (where 1 = Low and 5 = High), please indicate your current and desired level of knowledge concerning each issue in sleeping disorders.

	My CURRENT Level of Knowledge					My DESIRED Level of Knowledge				
	Low				High	Low				High
Administer and interpret tests correctly assessing patients with sleeping disorders	1	2	3	4	5	1	2	3	4	5
Identify co-morbid conditions in patients with sleeping disorders	1	2	3	4	5	1	2	3	4	5
Differentiate between OSA and insomnia	1	2	3	4	5	1	2	3	4	5
Diagnose insomnia	1	2	3	4	5	1	2	3	4	5
Diagnose OSA	1	2	3	4	5	1	2	3	4	5
Diagnose narcolepsy	1	2	3	4	5	1	2	3	4	5
Diagnose circadian rhythm sleep disorders	1	2	3	4	5	1	2	3	4	5
Diagnose restless leg syndrome	1	2	3	4	5	1	2	3	4	5
Diagnose sleep issues secondary to mental health issues	1	2	3	4	5	1	2	3	4	5
Diagnose sleep issues secondary to physical conditions	1	2	3	4	5	1	2	3	4	5
Diagnose substance-induced sleep issues	1	2	3	4	5	1	2	3	4	5
Determine which patients with potential OSA should be referred to a specialist	1	2	3	4	5	1	2	3	4	5
Identify to which type of specialist I should refer my patient with OSA	1	2	3	4	5	1	2	3	4	5
Initiate CPAP treatment for OSA	1	2	3	4	5	1	2	3	4	5
Initiate and manage <b>sedative</b> pharmacological treatment for SD	1	2	3	4	5	1	2	3	4	5
Initiate and manage <b>stimulant</b> pharmacological treatment for SD	1	2	3	4	5	1	2	3	4	5
Evaluate and manage potential drug interactions in SD	1	2	3	4	5	1	2	3	4	5
Provide lifestyle changes recommendation for patients with OSA	1	2	3	4	5	1	2	3	4	5
Monitor OSA status and progression	1	2	3	4	5	1	2	3	4	5
Manage patients with OSA according to current clinical guidelines	1	2	3	4	5	1	2	3	4	5

Using the scale provided (where 1 = Not a barrier at all and 5 = A major barrier, and N/A = Not applicable to my practice), please indicate to what extent you think each of the following is a barrier for you in seeking to provide optimal care to patients with OSA.

	Not a barrier at all				A major barrier	Not applicable
Sleeping disorders assessment is not a priority during regular physical exams	1	2	3	4	5	N/A
Patients lack of awareness and tendency to ignore sleeping problems	1	2	3	4	5	N/A
Fear of opening up a “can or worms” when asking questions about sleep to patients	1	2	3	4	5	N/A
Difficulty asking targeted questions to accurately assess patients regarding OSA	1	2	3	4	5	N/A
Differentiating between OSA and insomnia	1	2	3	4	5	N/A
Concerns over legal repercussions when diagnosing patients with sleeping disorders	1	2	3	4	5	N/A
Patient refusal to accept diagnosis of sleeping disorders	1	2	3	4	5	N/A
Identifying and ruling out alternative underlying conditions for sleep issues	1	2	3	4	5	N/A
Lack of quality standardization of sleep labs	1	2	3	4	5	N/A
Cost of medication and patient’s lack of insurance coverage	1	2	3	4	5	N/A
Patients not complying with the CPAP therapy	1	2	3	4	5	N/A
Getting patient to change their lifestyles	1	2	3	4	5	N/A
Concerns over addiction issues related to sleep medication	1	2	3	4	5	N/A
Providing education and self-management skills to my patients with SD	1	2	3	4	5	N/A
Lack of tools to monitor sleeping disorder progression and response to treatment	1	2	3	4	5	N/A
Lack of clarity of the roles and responsibilities of PCPs dealing with sleeping disorders	1	2	3	4	5	N/A
Current clinical guidelines in SD not relevant nor useful to PCPs	1	2	3	4	5	N/A

Demographic questions and questions relating to educational format preferences have been removed. Survey was deployed online, therefore format presented does not reflect actual.

cians. These should include information about when referral to sleep specialists may be of benefit and the reasons for this.

- Sleep medicine training programs should include methods of integrating care with and providing useful consultation to primary care generalists.

**Table 7**—Excerpt of questionnaire on obstructive sleep apnea completed by generalists and specialists

In the context of your clinical practice, how do you define shift work disorder (SWD)?

Using the scale provided (where 1 = I completely disagree, 5 = I completely agree, and N/A = Not applicable to my practice), please indicate to what extent you agree or disagree with the statements provided.

	I completely disagree		I somewhat agree		I completely agree	Not applicable
Assessing patients' sleep is not a priority during regular physical exams	1	2	3	4	5	N/A
I believe in shift work disorder as a medical condition	1	2	3	4	5	N/A
I see it as my responsibility to treat and manage patients for shift work disorder	1	2	3	4	5	N/A
I find it motivating to treat and manage patients with shift work disorder	1	2	3	4	5	N/A
Achieving positive health outcomes for patients with shift work disorder is something I can control	1	2	3	4	5	N/A
I think shift work disorder is a label used to promote pharmacotherapy	1	2	3	4	5	N/A
I see value in patients with shift work disorder doing a sleep study	1	2	3	4	5	N/A

Who do you think should be involved in treating and managing patients with shift work disorder? (Please select all that apply.)

Family Physician  Internist  Psychiatrist  Psychologist  Neurologist  Pulmonologist  Other (please specify):

Who should be involved in providing care to patients with shift work disorder? Please select all that apply, for each activity.

	Primary Care Physician	Sleep Specialist (physician)	Other Allied Health Provider	Not Applicable
Initiating testing for suspected shift work disorder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnosing shift work disorder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recommending non-pharmacological treatment for shift work disorder (e.g. sleep hygiene measures)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recommending pharmacological treatment for shift work disorder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Managing shift-work disorder patients long term	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Providing counseling for shift work disorder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Providing patient education about shift work disorder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

To whom do you refer patients with shift work disorder? (Please select all that apply.)

I do not refer patients with shift work disorder  Family Physician  Internist  Psychiatrist  Psychologist  Neurologist  Pulmonologist  Other (please specify):

Demographic questions and questions relating to educational format preferences have been removed. Survey was deployed online, therefore format presented does not reflect actual. Not all questions were answered by specialists and generalists.

Table 7 continues on the following page

- Since sleep disorders such as OSA and SWD are chronic diseases requiring long-term follow-up and management, the importance of continuing care must be part of the educational process for patients, generalists and sleep specialists.
- Performance improvement initiatives that address attitudes and team roles and responsibilities are needed.
- Development of a recognized, credible, competent, specialist pool is required to support excellent primary care.

### Limitations

Our study has several limitations. Results are based on self-report, introducing the possibility of bias due to erroneous self-assessment. However, the objective of this research was to assess subjects' perceptions of gaps, barriers, and attitudes, which can only be gathered through self-report. In this study, triangulation of findings across two disorders, two subject groups, focus groups, interviews, and survey data was used to strengthen the trustworthiness of the findings. In addition, it is possible that those who participated in our surveys may differ systematically from those who did not respond.

### CONCLUSION

Knowledge, skill, and attitudinal challenges and gaps have been identified in primary care of patients with sleep disorders, resulting in sleep disorders being underdiagnosed, undertreated, stigmatized, and under-prioritized. Challenges in understanding and incorporation of the interdisciplinary team, and in

particular, enhancing the role and value of the sleep specialist to the primary care community, for optimal care were also identified, impeding the contribution of sleep specialists to patient outcomes. Performance improvement initiatives are needed that address generalist knowledge and competence in providing care of patients with sleep disorders as well as competence in collaborating in an interdisciplinary team. Sleep medicine itself must also address gaps in its own training and practice as well as misconceptions of others.

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**Table 7 (continued)**—Excerpt of questionnaire on obstructive sleep apnea completed by generalists and specialists

Please consider each issue on sleeping disorders listed in the table below. First, using the scale provided (where 1 = Low and 5 = High), select the number that best describes how you currently evaluate your level of knowledge concerning each issue. Next, please indicate your desired level of knowledge concerning each issue in sleeping disorders.

	My CURRENT Level of Knowledge					My DESIRED Level of Knowledge				
	Low				High	Low				High
Current clinical guidelines for treating shift work disorder	1	2	3	4	5	1	2	3	4	5
Administering and interpreting tests assessing patients with sleeping disorders	1	2	3	4	5	1	2	3	4	5
Diagnosing shift work disorder	1	2	3	4	5	1	2	3	4	5
Differentiating between shift work disorder and other types of insomnia	1	2	3	4	5	1	2	3	4	5
Differentiating between shift work disorder and obstructive sleep apnea	1	2	3	4	5	1	2	3	4	5
Differentiating between shift work disorder and narcolepsy	1	2	3	4	5	1	2	3	4	5
Differentiating between shift work disorder and depression	1	2	3	4	5	1	2	3	4	5
Differentiating between shift work disorder and anxiety disorder	1	2	3	4	5	1	2	3	4	5
Providing lifestyle change recommendations for patients with shift work disorder (e.g. sleep hygiene)	1	2	3	4	5	1	2	3	4	5
Initiating and managing <b>sedative</b> pharmacological treatment for shift work disorder	1	2	3	4	5	1	2	3	4	5
Initiating and managing <b>stimulant</b> pharmacological treatment for shift work disorder	1	2	3	4	5	1	2	3	4	5
Initiating and managing <b>anti-depressant</b> pharmacological treatment for shift work disorder	1	2	3	4	5	1	2	3	4	5
Balancing treatment for shift work disorder with treatment for other non-sleep related co-morbidities (e.g. diabetes or osteoporosis)	1	2	3	4	5	1	2	3	4	5
Providing self-management education to my patients with shift work disorder	1	2	3	4	5	1	2	3	4	5
Monitoring shift work disorder status and progression	1	2	3	4	5	1	2	3	4	5
Determining which patients with shift work disorder should be referred to a specialist	1	2	3	4	5	1	2	3	4	5
Identifying which type of specialist I should refer my patient with shift work disorder to	1	2	3	4	5	1	2	3	4	5
Determining when to refer patients back to their primary care provider	1	2	3	4	5	1	2	3	4	5

Using the scale provided (where 1 = Not a barrier at all, 5 = A major barrier, and N/A = Not applicable to my practice), please indicate to what extent you think each of the following is a barrier for you in seeking to provide optimal care to patients with shift work disorder.

	Not a barrier at all				A major barrier	Not applicable
Patients' lack of awareness and tendency to ignore sleeping problems	1	2	3	4	5	N/A
Fear of opening up a "can of worms" when asking patients questions about sleep	1	2	3	4	5	N/A
Difficulty asking targeted questions to accurately assess patients regarding shift work disorder	1	2	3	4	5	N/A
Difficulty in defining shift work disorder	1	2	3	4	5	N/A
Concerns over legal repercussions when diagnosing patients with shift work disorder	1	2	3	4	5	N/A
Patient lack of understanding of shift work disorder diagnosis	1	2	3	4	5	N/A
Patient refusal to accept diagnosis of shift work disorder	1	2	3	4	5	N/A
Identifying and ruling out alternative underlying conditions for sleep issues	1	2	3	4	5	N/A
Lack of objective criteria to diagnose shift work disorder	1	2	3	4	5	N/A
My skill in helping patients change their lifestyles	1	2	3	4	5	N/A
Addiction issues related to sleep medication	1	2	3	4	5	N/A
My level of confidence in prescribing stimulants	1	2	3	4	5	N/A
My level of confidence in prescribing sedatives	1	2	3	4	5	N/A
My level of confidence in prescribing anti-depressants	1	2	3	4	5	N/A
Providing self-management education to my patients with shift work disorder	1	2	3	4	5	N/A
Lack of tools to monitor shift work disorder progression and response to treatment	1	2	3	4	5	N/A
Coordination between primary care providers and specialists for shift work disorder treatment and management	1	2	3	4	5	N/A
Lack of clarity of the roles and responsibilities of Primary Care Providers in dealing with shift work disorder	1	2	3	4	5	N/A
Relevance of current clinical guidelines pertaining to shift work disorder	1	2	3	4	5	N/A
Coding for reimbursement for shift work disorder	1	2	3	4	5	N/A

Demographic questions and questions relating to educational format preferences have been removed. Survey was deployed online, therefore format presented does not reflect actual. Not all questions were answered by specialists and generalists.

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