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A survey on knowledge gaps in the assessment of pediatric obstructive sleep disordered breathing

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Abstract

Background: Pediatric obstructive sleep disordered breathing (OSDB) is on a continuum of increasing severity from snoring to hypopnea to obstructive sleep apnea. The incidence of children with OSDB is 2-11%; 25% of children with obstructive sleep apnea are misdiagnosed with attention-deficit/hyperactivity disorder. In 27-62% of pediatric obstructive sleep apnea cases, failure to thrive is reported. Children with OSDB have a higher rate of antibiotic use, 40% more hospital visits, and an overall elevation of 215% in healthcare usage. Untreated OSDB may induce non-reversible deficits if occurring during a period of physical and neuro-psychic development. Pediatric primary care providers are generally the gatekeepers to appropriate screening of OSDB. The primary goal of this survey study was to perform a needs assessment that identified any gaps of knowledge regarding at-risk characteristics and symptoms of patients for whom screening for OSDB is appropriate, according to the most recent guidelines in otolaryngology and pediatric medicine.

Methods: An online survey utilizing SurveyMonkey was created and distributed to pediatric primary care providers (family medicine doctors, pediatricians, physician assistants, nurse practitioners, pediatric dentists, and orthodontists) and specialists (otolaryngologists, pulmonologists, and sleep medicine doctors). The survey consisted of questions regarding 1) demographics; 2) exam based/clinical findings which would lead to screening; 3) basic knowledge; 4) behavioral/cognitive findings; 5) knowledge of treatment; 6) accessibility; 7) free response. The survey was anonymous.

Results: There were 197 survey respondents. Only 101 were fully completed and consisted of respondents who saw patients from the age 2-12. All other responses were excluded from the statistical analysis. There was a statistically significant difference in knowledge between specialists (otolaryngologist, pulmonologist, cardiologist, and sleep medicine doctors) and other providers (pediatricians, family medicine doctors, pediatric dentists, orthodontists, physician assistants, and nurse practitioners) regarding the signs, symptoms and treatment of pediatric OSDB and when screening is appropriate.

Discussion: Pediatric patients would benefit from pediatric primary care provider education on the signs, symptoms, diagnosis, and treatment of pediatric OSDB. This

could lead to increased identification of pediatric patients with OSDB and better treatment. The largest gap in knowledge was in the area of behavioral and cognitive characteristics associated with pediatric OSDB. Further studies are necessary to determine the effectiveness of increased education of pediatric primary care providers regarding pediatric OSDB in relation to appropriate screening and referral of patients.

Conclusion: There is a knowledge gap between pediatric primary care providers who serve as the gatekeepers to the specialist in the diagnosis and treatment of pediatric obstructive sleep disordered breathing. A new emphasis should be placed on increasing the knowledge base of pediatric primary care providers regarding pediatric obstructive sleep disordered breathing in order to appropriately screen and refer pediatric patients.

Key Words: pediatric obstructive sleep disordered breathing, knowledge gap, obstructive sleep apnea, sleep related breathing disorder

Introduction

The field of pediatric sleep medicine is rapidly evolving. As more research is conducted obstructive sleep disordered breathing (OSDB) has been linked to many comorbidities. It is important that primary care providers (PCP) stay abreast of the new information in order to adequately identify patients with signs of pediatric OSDB since they are the gatekeepers to pediatric patients receiving adequate care by a specialist.

Pediatric obstructive sleep disordered breathing is a common disorder in children. Pediatric patients at risk for OSDB must be identified, studied, and treated promptly because untreated OSDB can be responsible for future cardiovascular, metabolic, and neurocognitive morbidities and may induce non-reversible deficits if occurring during a period of physical and neuro-psychic development.

Pediatric obstructive sleep disordered breathing describes a continuum of increasing severity from snoring to hypopnea to obstructive sleep apnea. It is apparent from the literature that the terms “sleep disordered breathing”, “obstructive sleep apnea”, “sleep related breathing disorder”, and “obstructive sleep apnea” are used interchangeably.¹ Pediatric obstructive sleep disordered breathing encompasses all of those terms; it is a clinical diagnosis characterized by obstructive abnormalities of the respiratory pattern or the adequacy of oxygenation/ventilation during sleep, which include snoring, mouth breathing, and pauses in breathing.¹ Obstructive sleep apnea (OSA), also referred to as obstructive sleep apnea-hypopnea, is a sleep disorder that involves cessation or a significant decrease in airflow in the presence of breathing effort.² OSA is diagnosed when OSDB is accompanied by an abnormal polysomnography (PSG) with an obstructive apnea-hypopnea index (AHI) of > 1 .²

Children who are treated for OSA are less likely to have long term complications associated with OSA as an adult.³ The incidence of children with obstructive sleep disordered breathing is 2-11% depending on the literature source utilized.² The identification and treatment of OSDB can be multidisciplinary and may include: pediatricians, pediatric dentists, orthodontists, pulmonologists, sleep medicine doctors, otolaryngologist, family medicine doctors, and other primary care providers such as pediatric/family medicine nurse practitioners or physician assistants. The primary care

provider is normally the gatekeeper to the child being diagnosed for OSDB. Hence, it is important that the PCP is knowledgeable about the possible signs of OSDB to decrease the possibility of misdiagnosis; untreated OSDB can lead to cardiovascular, neurocognitive, and metabolic morbidities. Some of these comorbid conditions include: hypertension, growth retardation, poor school performance, poor memory, enuresis, asthma, as well as behavioral problems, inattention, and hyperactivity.^{2, 3,4,5,8} The American Sleep Apnea Association estimates that about 25% of children with obstructive sleep apnea are misdiagnosed with attention-deficit/hyperactivity disorder (ADHD).⁶ The identification of symptoms associated with OSDB is the first step to accurately diagnosing children.² This is important because the effects of OSDB can negatively impact the child's quality of life and overall health.^{1,2,4} OSDB can increase the risk of internalizing behaviors such as depression, and externalizing behaviors such as aggression or hyperactivity in some children.

Screening patients with ADHD symptoms for OSDB is important—a meta-analysis suggested that ADHD symptoms are related to OSDB and improve after adenotonsillectomy.^{6,9} The appropriate diagnosis can lead to increased healthcare utilization efficiency and decreased healthcare costs. Children with OSDB have a higher rate of antibiotic use, 40% more hospital visits, and an overall elevation of 215% in health care usage.³ In 27-62% of pediatric OSA cases, failure to thrive is reported.⁴ Signs of OSDB may include: loud snoring, mouth breathing during sleep, failure to thrive, secondary enuresis, morning headaches, pause in breathing during sleep, signs of anxiety /depression, developmental delays, nasal obstruction, hyperactivity, inattention, somatization, behavioral problems, obesity, poor school performance, hard to wake up in the morning, and trouble breathing. Other signs of OSDB can include craniofacial abnormalities such as retrognathic mandible, or narrow maxilla.^{2,3,4}

Previous studies assessing knowledge gaps between providers and patients regarding other medical diagnoses have shown that knowledge gaps can affect a patient's access to care and health outcomes. For example, in a study regarding hypertension during pregnancy and future risk for cardiovascular disease it was shown that knowledge gaps kept women from seeking assessment for cardiovascular diseases and providers from

assessing them for cardiovascular diseases postpartum.¹¹ A decrease in the knowledge gaps led to increased screening for cardiovascular risk of postpartum women who experienced hypertension during pregnancy. Similarly, this study explores whether knowledge gaps exist amongst pediatric primary care providers which may lead to a lack of screening of pediatric patients for OSDB. This is important to determine given that PCPs are the gate keepers to the specialists who are more knowledgeable of this specific subject matter. Identification of PCP's possible knowledge gaps can identify and justify the need to focus efforts on increasing the PCP's knowledge regarding OSDB.

More knowledge could lead to adequate diagnosis, referrals, and treatment of pediatric patients with OSDB. This is significant in three realms: patient quality of life, patient overall health, and health costs to patients and insurers. OSDB, left untreated, can lead to other morbidities that require more specialized health care with increased costs to patients, insurers, and society at large. Increased awareness and appropriate diagnosis and management of OSDB may decrease these morbidities and healthcare costs. If OSDB is identified and adequately treated the risk factors for the associated issues would decrease.

Objective/Hypothesis

The purpose of this study was to identify knowledge gaps that providers may have when identifying signs or symptoms of obstructive sleep disordered breathing (OSDB) to include when pediatric patients should be referred. The research aims to identify where knowledge gaps exist regarding OSDB in order to help decrease the percentage of children who are not adequately diagnosed and to improve health outcomes for children.

My null hypothesis is that there would be no knowledge gaps in the identification of possible signs or symptoms of pediatric OSDB and patients are referred appropriately for OSDB by all providers. My alternative hypothesis is that there are knowledge gaps in the identification of possible signs or symptoms of pediatric OSDB and in when to refer the pediatric patient for further evaluation of OSDB. Specifically, this project aims to identify any provider knowledge gaps that exist regarding the failed /misidentification of signs and symptoms of OSDB.

Secondarily, knowledge gaps will be categorized by provider type: family medicine doctor; pediatrician; nurse practitioner; physician assistant, specialist (sleep medicine, otolaryngologist, pulmonologist); pediatric dentist; and/or primary care provider (PCP). It is hypothesized that there is a gap in knowledge for the identification of OSDB by primary care providers and that sleep medicine doctors, otolaryngologists, and pulmonologists will be more likely to screen for OSDB than the other providers due to increased knowledge.

Methods

An online survey was created using SurveyMonkey (Appendix A). The draft of the survey was evaluated by a pediatric dentist, sleep medicine doctor, otolaryngologist, pediatrician, family medicine doctor, and nurse practitioner to identify any ambiguous questions and reasonable completion time. The finalized survey along with a description of the research was distributed by the respective Army healthcare specialty consultants via a SurveyMonkey link. The survey was available for response for 4 weeks from April 25, 2022 to May 23, 2022. Reminder emails were sent weekly. The survey was anonymous, no identifying information was collected, and the data was only accessible by members of the investigative team.

The study population who received the link included active duty military providers, contractors, and general schedule (GS) federal employees who work at a military treatment facility. Surveys which were incomplete were excluded. No compensation for response was provided.

Data was collected using a 47-question survey which primarily utilized a Likert scale. The questions on the survey were grouped as follows: 1) Demographics; 2) Exam based/Clinical Findings which would lead to screening; 3) Knowledge; 4) Behavioral/Cognitive findings; 5) Knowledge of Treatment; 6) Accessibility; 7) Free response. The primary goal of this survey study was to perform a needs assessment to identify any gaps of knowledge regarding at-risk characteristics and symptoms of patients for whom screening for OSDB is appropriate, according to the most recent guidelines in otolaryngology and pediatric medicine.

Statistical Analysis Plan

The primary factor, or independent variable, in this assessment was the medical specialty by training. The dependent variables were represented by batch-grouping of the different subsets of the survey questions into four categorical outcomes: 1) recognition of at-risk findings on physical exam necessitating screening; 2) basic knowledge of OSDB; 3) recognition of at-risk findings from a behavioral work-up; and 4) knowledge of its treatable role in co-morbidities. For each category, the survey results in a score based on the Likert scale were used to standardize the possible answers to each question. While the Likert scale technically yields non-dichotomous data on an ordinal scale, the post-survey analysis assigned a value to each possible answer, resulting in interval scale data of integers for statistical treatment. For each medical specialty, the collective scores of the cohort yielded descriptive statistical measures of mean and variance for each outcome category.

The first statistical test was an assessment of the normality, or relative symmetry, of the distribution of the data set for each combination of cohort and outcome using the Kolmogorov-Smirnov test. For data not distributed normally as indicated by the resulting test statistic, non-parametric statistics were to be used. The non-parametric statistics were to be based on the corresponding Kruskal-Wallis test in the first tier, which orders the data set by rank and otherwise disregards the actual discrete value initially generated in the analysis from a continuous measurement variable. For statistical significance, post hoc multiple comparisons were performed using the Tukey-Kramer test to determine which medical specialties differ from the others (level of significance, $\alpha=0.05$). The analysis was conducted using Microsoft Excel's software statistical program. The primary author, with assistance from CRDAMC Clinical Investigations staff, tabled/charted and examined the data.

Results

A total of 197 responses were received. Only 101 surveys were fully completed and consisted of respondents who saw patients from the age 2-12. All other responses were excluded from the statistical analysis. The sample size was not large enough to determine the difference against each medical specialty; however, it was large enough to create 3 groupings based on the medical specialty.

Group 1 consisted of 18 specialty doctors who are non-primary care and may receive pediatric referrals to include Otolaryngologists (11), sleep medicine doctors (4), pulmonologists (2), and a pediatric cardiologist (1). Group 2 consisted of 27 mid-level providers including physician assistants (18) and nurse practitioners (9). Group 3 consisted of 56 doctors who are primary care providers including pediatricians (16), family medicine doctors (21) as well as pediatric dentists (7) and orthodontists (12).

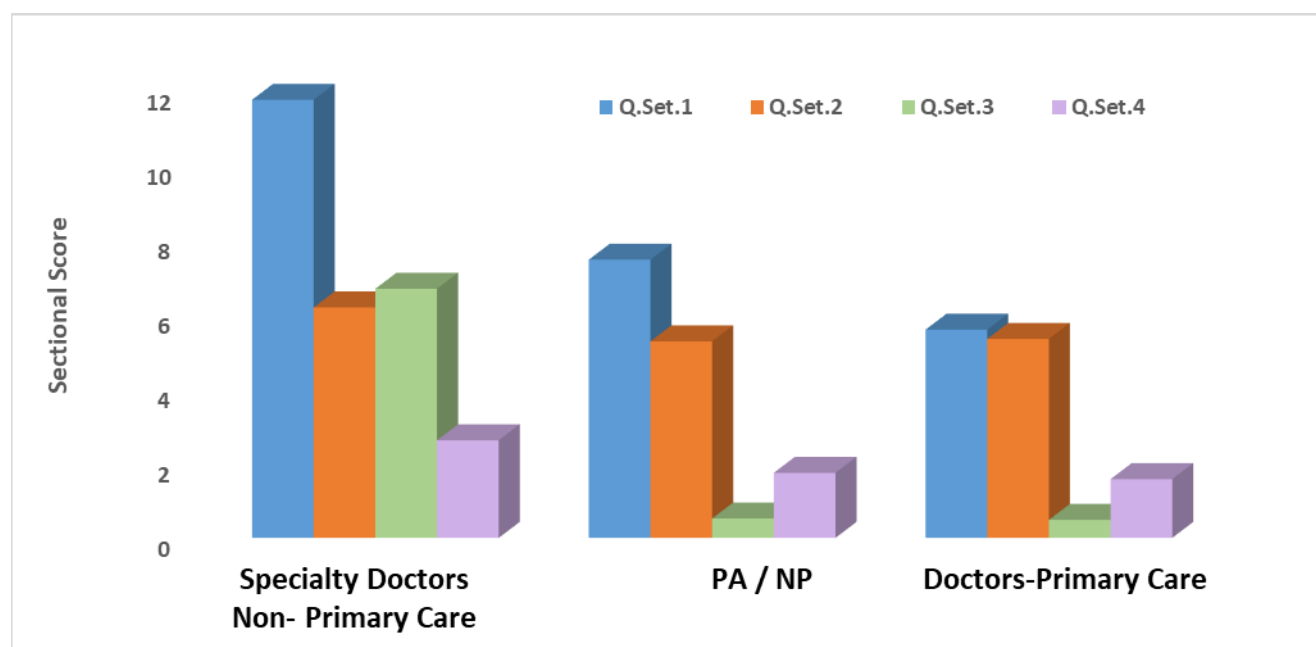


Figure 1. Q Set 1: Propensity to screen based on clinical/exam findings; Q. Set 2: Basic didactic knowledge; Q Set 3: Behavioral/cognitive findings which would lead to screening; Q Set 4: Knowledge of possible treatment outcomes.

It was found that differences in basic didactic knowledge was negligible, however there was a large difference amongst specialty doctors verses physician assistants, nurse practitioners, and primary care providers in knowledge of behavior/cognitive findings

which may be related to OSDB. The mean difference between the medical specialists who receive pediatric referrals and the other providers was statistically significant. The findings highlighted gaps in knowledge that would differentially characterize the efficacy for each specialty in identifying the possibility of, screening for, and treating OSDB in pediatric patients.

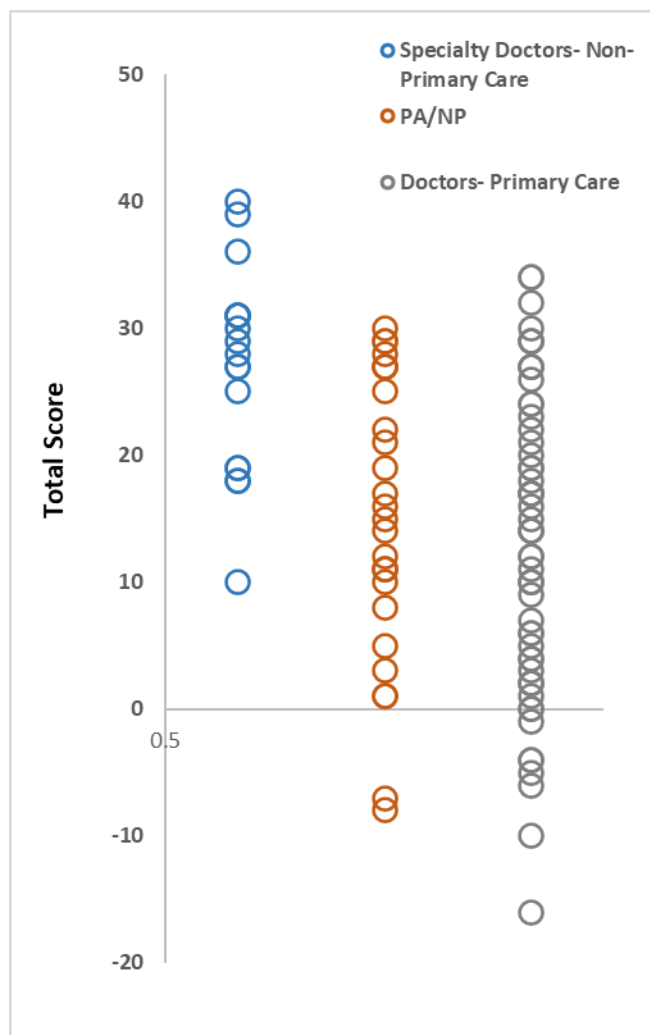


Figure 2. Based on this figure, specialty non-primary care doctors were more knowledgeable overall regarding the signs, symptoms, and treatment of pediatric obstructive sleep disordered breathing.

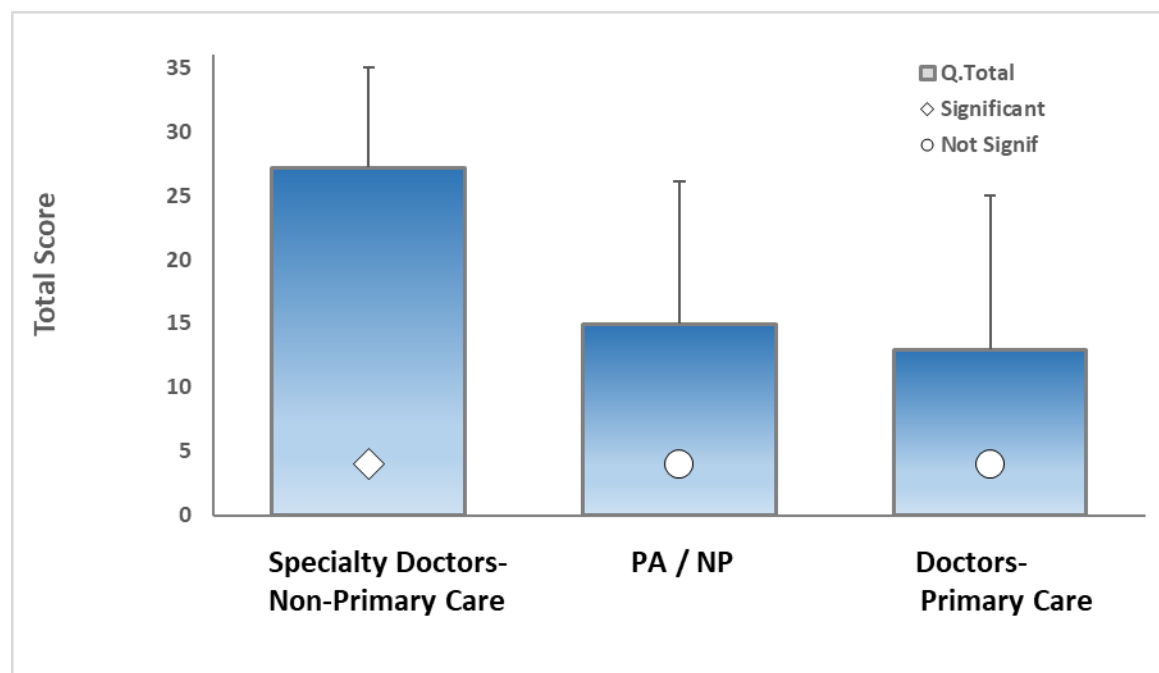


Figure 3. Composite score of all questions for each group. Statistically significant difference between non-primary care doctors and the other providers.

The p-values utilizing the t-test; 2-tail ANOVA; unequal variance for Group 1 versus Group 2 was 0.000094; the p-value for Group 1 versus Group 3 was 0.000002; and the p-value for Group 2 versus Group 3 was 0.45388. Hence, there is a statistically significant difference in knowledge between Group 1 and Groups 2 and 3. There was not a statistically significant difference in knowledge between Group 2 and Group 3. Therefore, the null hypothesis was rejected and the alternative hypothesis was accepted—the mean difference between the medical specialists who receive pediatric referrals and the other providers was statistically significant. The findings highlighted gaps in knowledge that would differentially characterize the efficacy for each specialty in identifying the possibility of, screening for, and treating OSDB in pediatric patients.

Discussion

The results conclude that there is a statistically significant difference in knowledge regarding pediatric OSDB between specialists and primary care providers (nurse practitioner, physician assistants, family medicine doctors, pediatricians, pediatric dentists, and orthodontists). Based on the scattergram (Figure 2), it is apparent that the specialty doctors have a greater understanding of the signs and symptoms of pediatric OSDB. The specialists were more likely to identify the signs and symptoms and hence, screen for OSDB. Unfortunately, there does seem to be a disconnect between those who treat OSDB and those who screen for OSDB. If the specialists were able to educate the primary care providers on when to screen, there would likely be an increase in screening for pediatric OSDB and less incorrectly diagnosed or missed diagnosed pediatric patients with OSDB.

It was speculated that there would be a difference based on level of training among PCPs, but there was not a statistically significant difference between the knowledge of the nurse practitioner, physician assistants, pediatricians, and family medicine doctors. However, there was a physician assistant who specialized in otolaryngology who knew much less than the otolaryngologists; this highlights the fact that specialists should ensure that their mid-level providers are up to date on screening and treatment practices within their clinics.

Another finding within the data was that the pediatric pulmonologist was very knowledgeable about the signs/symptoms of pediatric OSDB, whereas the adult pulmonologist was not as knowledgeable. In addition, those who did not see pediatric patients generally had wide knowledge gaps. This is significant because it proves the need for education of all providers who are not familiar with pediatric patients. While deployed and/or stationed overseas, providers will likely be required to see pediatric patients. Based on this study, it would be beneficial for a pre-deployment briefing on the signs/symptoms of pediatric OSDB, when to screen, and to whom to refer for PCPs. Many providers were unaware that adult polysomnographs are interpreted differently than pediatric polysomnographs. This can lead to incorrect referrals and/or evaluations. It was also found that 79% of providers stated that there was not a pediatric

polysomnography center accessible to their patients either due to location or lack of availability.

It is recommended based on the findings of this study, that all pediatric primary care providers be given a short course on pediatric OSDB to include signs, symptoms, treatment, and when to screen. In addition, any provider who will be deployed and/or stationed overseas should be required to take the short course as well. If the recommendation is followed, it will likely lead to improved patient screening, referrals, and overall healthcare outcomes.

The benefit from this study is that it identified a knowledge gap which providers can utilize to expand their knowledge of OSDB. The identification of knowledge gaps that primary care providers have is important given that PCPs are the gate keepers to the specialists who are more knowledgeable of this specific subject matter. This evidence-based study justifies the need to focus efforts on increasing the PCPs knowledge regarding OSDB. As a result of increased provider knowledge of symptoms of OSDB and when to refer, patients will be better served. In addition, insurers will incur less overall cost if pediatric patients are identified and treated for OSDB because they will likely not experience the comorbid diseases which require more healthcare utilization over a lifetime as pediatric and /or adult patients.

Recommendations for future study include: conducting a similar study within the civilian sector; including education of primary care providers and then determining their likelihood to screen for OSDB after the briefing; following screening behaviors of primary care providers at military treatment facilities prior to the continuing education course on pediatric OSDB and after the course, or a review of medical records to determine whether there is an increase in pediatric patients being screened for OSDB and/or referred for pediatric polysomnographs after the course.

Conclusion

There is a gap in knowledge regarding the identification of signs and symptoms of possible pediatric obstructive sleep disordered breathing. This gap in knowledge could lead to a decreased propensity to screen for pediatric obstructive sleep disordered breathing by primary care providers. Hence, pediatric patients who may have OSDB might be misdiagnosed or not diagnosed at all. As a result of the lack of screening, untreated OSDB may be leading to unnecessary suffering from associated comorbidities. Pediatric primary care providers should be educated on the signs, symptoms, and treatment of OSDB in order to appropriately screen and refer pediatric patients.

Abbreviations:

OSDB: obstructive sleep disordered breathing

PSG: polysomnography

PCP: primary care provider

OSA: obstructive sleep apnea

AHI: apnea-hypopnea index

ADHD: attention deficit hyperactivity disorder

ANOVA: analysis of variance

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Appendix A. Survey Questions

Demographics

Survey of Provider Knowledge Regarding Pediatric Obstructive Sleep Disordered Breathing

Consent

1. Thank you for your participation! This survey will takes approximately 6 minutes to complete. It is completely anonymous with no identifying information; data is stored on a secured, password-protected site with minimal risk for potential breach of confidentiality. By selecting I agree you consent to using your responses. By selecting I disagree you will end your survey.

- I have read and **agree** to continue
- I **disagree** and do not wish to continue

Survey of Provider Knowledge Regarding Pediatric Obstructive Sleep Disordered Breathing

Provider info

2. Are you male or female?

- Male
- Female

3. What is your age?

- 18-30
- 31-40
- 41-50
- 51 or older

4. Are you a

- Doctor of Medicine
- Doctor of Osteopathic Medicine
- Nurse Practitioner
- Other (please specify)
- Physician Assistant
- Dentist

5. What is your specialty?

- | | |
|--|---|
| <input type="radio"/> Family Medicine | <input type="radio"/> Otolaryngology |
| <input type="radio"/> Pediatrics | <input type="radio"/> Pediatric Dentistry |
| <input type="radio"/> Pulmonology | <input type="radio"/> Orthodontist |
| <input type="radio"/> Sleep Medicine | |
| <input type="radio"/> Other (please specify) | |

6. How long have you been practicing in your current specialty?

- | | |
|-------------------------------------|-------------------------------------|
| <input type="radio"/> < 5 years | <input type="radio"/> 21 - 29 years |
| <input type="radio"/> 5 - 10 years | <input type="radio"/> 30+ years |
| <input type="radio"/> 11 - 20 years | |

7. Did you complete your residency training in the United States?

- Yes
 No

8. Which region of the United States?

- Northeast
 Southeast
 Midwest
 West

9. Which country did you complete your residency training?

10. Are you in the United States Military?

- Yes
 No

11. Which branch of the United States military are you in?

- Army
- Marine Corps
- Navy
- Air Force
- Coast Guard
- Civilian
- Contractor

12. Which option best describes your employment/affiliation with the United States military are you in?

- Army
- Marine Corps
- Navy
- Air Force
- Coast Guard
- Civilian
- Contractor

13. Do you practice independently or under the supervision of an M.D or D.O?

- Practice independently
- under the supervision of an M.D. or D.O.

14. Do you have patients between the age of 2-12?

- Yes
- No

15. Have you ever referred a patient for a Polysomnograph(PSG)?

- Yes
 - No
-

Exam/Clinical Findings which lead to screening

16. A polysomnograph should be considered if the clinical presentation does not match up with the reported signs or symptoms indicative of pediatric obstructive sleep disordered breathing.

- I Agree I Disagree I Don't Know

17. The absence of snoring is sufficient to exclude pediatric sleep disordered breathing.

- I Agree I Disagree I Don't know

18. How likely are you to screen for obstructive sleep disordered breathing if a pediatric presents with: mouth breathing while sleeping

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

19. How likely are you to screen for obstructive sleep disordered breathing if a pediatric presents with: Abnormal sleep positions, such as neck hyperextended?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

20. How likely are you to screen for obstructive sleep disordered breathing if a pediatric presents with: secondary enuresis?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

21. How likely are you to screen for Obstructive Sleep disordered breathing if a pediatric patient presents with snoring?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

22. How likely are you to screen for Obstructive Sleep disordered breathing if a pediatric patient presents with witnessed apneic events?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

23. How likely are you to screen for obstructive sleep disordered breathing if a pediatric patient presents with bruxism?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

24. How likely are you to screen for obstructive sleep disordered breathing if a pediatric patient presents with a narrow palate?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

25. How likely are you to screen for obstructive sleep disordered breathing if a pediatric patient is obese?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

Knowledge

26. Tonsillar size alone correlates with the severity of obstructive sleep disordered breathing

- I Agree I Disagree I Don't Know

27. Pediatric polysomnographs are interpreted using the same guidelines as Adult polysomnographs.

- I Agree I Disagree I Don't Know

28. Tongue size and position can contribute to obstructive sleep disordered breathing.

- I Agree I Disagree I Don't Know

29. Polysomnographys (PSG) are necessary to diagnose obstructive sleep disordered breathing.

- I Agree I Disagree I Don't Know

30. All pediatric patients with obstructive sleep disordered breathing also have obstructive sleep apnea.

- I Agree I Disagree I Don't Know

31. Pediatric obstructive sleep disordered breathing is a spectrum which ranges from primary snoring to obstructive sleep apnea.

- I Agree I Disagree I Don't Know

32. Some dentist are knowledgeable regarding obstructive sleep disordered breathing.

- I Agree I Disagree I Don't Know

33. If I receive a referral from a pediatric dentist regarding possible obstructive sleep disordered breathing, I feel it is _____ that the patient needs to be evaluated and may have obstructive sleep disordered breathing

- Very likely Likely Unlikely Very unlikely

Behavioral/Cognitive Findings

34. A patient presents to your clinic with signs of inattention, inability to focus, and hyperactivity. How likely are you to screen the patient for obstructive sleep disordered breathing?

- Very likely Likely Unlikely Very unlikely

35. The patient has poor performance at school. How likely are you to screen for obstructive sleep disordered breathing?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

36. How likely are you to screen for obstructive sleep disordered breathing if a pediatric patient presents with: Aggressive behavior?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

37. How likely are to screen for obstructive sleep disordered breathing if a pediatric patient present with depression?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

38. How likely are you to screen for obstructive sleep disordered breathing if a pediatric patient presents with developmental delays?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

39. How likely are you to screen for obstructive sleep disordered breathing if a pediatric patient has attention deficit/hyperactivity disorder?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

40. How likely are you to screen for obstructive sleep disordered breathing if a pediatric patient has memory impairment?

- Very likely Likely Neither likely nor unlikely Unlikely Very unlikely

Knowledge of Treatment

41. Treatment of obstructive sleep apnea may resolve the symptoms of Attention Deficit Hyperactivity Disorder.

- I Agree I Disagree I Don't Know

42. Treatment of obstructive sleep disordered breathing may resolve the symptoms of failure to thrive.

- I Agree I Disagree I Don't Know

43. Treatment of obstructive sleep disordered breathing may resolve secondary enuresis.

- I Agree I Disagree I Don't Know

Accessibility

44. Pediatric polysomnography is easily accessible for my patients. (availability of appointments and location is reasonable)

- Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

Free response

45. Is there anything you would like to add regarding how you evaluate pediatric patients for obstructive sleep disordered breathing? (Please do not include any personally identifiable information.)

- No
 Yes

46. Is there anything you would like to add regarding referrals you receive from other providers? (Please do not include any personally identifiable information.)

- No
 Yes

47. Please share any other comments you have below. (Please do not include any personally identifiable information.)