

Development and validation of educational pamphlet to prevent Obstructive Sleep Apnea (OSA)

Dr. Poongodi Ramalingam*, Dr. S. Aruna, Ms. J. Jothi, and Ms. S. Revathi

Department of Community Health Nursing, Sri Ramachandra Faculty of Nursing, Sri Ramachandra Institute of Higher Education & DU, Porur, Chennai, Tamil Nadu, India
Corresponding author: poongodimohan@sriramachandra.edu.in

Abstract

Obstructive sleep apnea (OSA) is characterized by recurrent episodes of complete (apneas) and partial (hypopneas) upper airway obstruction. During sleep, the muscles relax, causing the uvula and other soft tissues in the throat to collapse, which blocks the upper airway. The Obstructive Sleep Apnea is one of the leading risk factor for coronary heart diseases and heart failure. People with OSA snore loudly and frequently there is a misconception among villagers in the rural area as in loud and frequent snoring refers to hard work and effort. This study aims to create and validate educational pamphlet on early signs and measure to control and prevent Obstructive Sleep Apnea (OSA) in order to create awareness among rural people. A quantitative research approach was adopted. The pamphlet was developed in three phases which includes review of content, design / layout of the pamphlet and validation with expert opinion. The pamphlet have developed based on BALD (Backer Able Leaflet Design) method. The pamphlet was validated by the experts with minimum 10 years of experience (Two general physician, Two endocrinologist, Ten Nursing teaching Faculties, Two physiotherapist, Five nursing administrators, Ten Intensive Care Staff nurse and Four post-operative staff nurses. Validated by using Item level content validity index (I-CVI) and Scale level Content Validity Index (S-CVI) individual items which ranged from 0.94 – 1. Scale level Content Validity Index (S-CVI) was 0.9120. Content validation of our study showed I-CVI more than 0.97 for all the items in the questionnaire except item - 1 (I-CVI= 0.94).

Keywords: Sleep Apnea, Hypopneas, Pamphlet, Validity

Introduction

The Obstructive Sleep Apnea (OSA) is defined as repetitive episode of complete and partial obstructions of the upper airway during sleep. It is the most common type of sleep apnea characterized by effort to breathe, associated with a reduction in blood oxygen saturation. In relation to gender high prevalence found among male(24%) than female(9%)(1). The risk factors for obstructive sleep apnea are age, sex, central obesity, short physical structure, men and women with large neck size (≥ 17 inches and ≥ 16 inches), acromegaly, hypothyroidism, post menopausal women, hypothyroidism, The associated risk factors are stroke, Hypertension, coronary heart diseases (2)(3)(4). The untreated Obstractive Sleep Apnea may cause increased daytime sleep, Upper Respiratory Tract Infection, congestion, swelling of the throat, tonsillitis, increases in size of the lymphoid tissue, impairment in working memory and manipulating nonverbal information. The early clinical sign of sleep apnea are day time sleeping and snoring during sleeping. Hence people never consider those symptoms hence not faced much difficulty in their activity of daily living. A study done by Houts et al., showed that written information along with illustrations can be an effective teaching strategy for OSA high risk group especially from low literacy population(5)(6)(7)(8).

Materials and Methods

The objective of the study was to create and validate educational pamphlet on

early signs and measure to control and prevent Obstructive Sleep Apnea (OSA).A quantitative research approach was adopted in this study.This study was initiated after obtained ethical approval from institutional ethical committee and Head of the departments of the relevant field.Participants were explained clearly about the study purpose and a written informed consent was obtained from all the participants before conducting the study. Confidentiality of the responses were assured and maintained throughout the study.This study was conducted in three phases.

Phases of Pamphlet Development

An in- depth literature review and focused group discussion with experts were conducted to formulate and develop the content of education pamphlet to prevent sleep Apnea for people with high risk of developing sleep Apnea. The pamphlet have developed based on BALD (Backer Able Leaflet Design) method. The patient information pamphlet has validated for a layout and design , Item level content validity index (I-CVI) was calculated for individual items which ranged from 0.94 – 1. Scale level Content Validity Index (S-CVI) was calculated for complete nine items and it was found to be 0.9120.

Phase One

The development and validation of pamphlet on prevention of sleep Apnea has three stages. In initial stage the relevant content was gathered based on depth of literature review from text books, existing pamphlets and had discussion with endocrine medical surgical experts, paramedical personnel about their experience in their specific field.

Phase Two

Literature review on pamphlet design reveals that the design of the pamphlet (pictorial representation, colour, organization of content) influence the memory and clear understanding about the preventive techniques. The pamphlet provided

information about meaning and definition of sleep Apnea, risk factors, causes, clinical signs and preventive measures. The pamphlet fit on a two -sided sheet of paper for easy, inexpensive copying. Copies of the pamphlet and its subsequent translations was done into Tamil language also.

Phase Three

The printed pamphlet was validated by the experts with minimum 10 years of experience (Two general physician, Two endocrinologist, Ten Nursing teaching Faculties, Two physiotherapist, Five nursing administrators, Ten Intensive Care Staff nurse and Four post-operative staff nurses.Process of Development of educational pamphlet for prevention and treatment of sleep Apnea

Educational Pamphlet Design

Page I- Introduction

In this page general information about sleep Apnea, prevalence rate, definitions and types of OSA were mentioned with pictorial diagram for easy understanding of the rural villagers

Page II-Clinical Sign

This page explains clinical signs of OSA (snoring, insomnia,early morning headache, Restless Legs Syndrome, Day time sleeping & Sleep Hypoventilation) with proper illustrations.

Page III-Risk factors

This page views the risk factors of OSA with outline of pathological changes in specific organs.(Smoking, Alcoholism and Obesity)

Page IV-Risk factors

Page IV illustrates the preventive measures and home based simple treatment strategies explained with appropriate pictures. Treatment strategies which includes Tongue exercises, Breathing techniques and pursed lip breathing etc. Preventive measures which includes components of Mediterranean diet, yoga techniques, sleeping positions etc.

Experts validation
- Physician
- Nursing Faculties
- Icu staff Nurses
- Nursing Administrators

First draft of information pamphlet on prevention of OSA
Prevention of sleep

Obtained opinion for important domains from Expert review

Assessment of Content Validity

This pre -final draft was sent for content validity to experts. It was a two -stage process requiring validation in the developmental and judgment-quantification stages(9). During the developmental stage, a panel of four experts including two physiotherapists, general physicians and a endocrinologist validated the accuracy of information presented and ability to comprehend according to high risk group

point of view. Judgment-quantification stage of content validation involved validation of both the content of the items and the entire instrument(10). Rating scales were sent to 34 validators. The panel of experts were having the relevant training, experience and qualification for this validation. Experts were selected from different fields to make the educational material more user friendly and to cater the needs of highrisk groups. The panel received specific instructions to determine the content relevance of specific items and of the leaflet as a whole (Table 1 and 2).

Validation was done through a questionnaire consisting of 10 items pertaining to completeness, understand ability, legibility, clarity and utility of educational material for high risk groups and a section for comments. Questionnaire was distributed to - 34 validators (Two general physician, Two endocrinologist, Ten Nursing teaching Faculties, Two physiotherapist, Five nursing administrators. Ten Intensive Care Staff nurse and Four post-operative staff nurses.), along with a covering letter stating the purpose of this educational material, the reason why they have been chosen for validation and the importance of their participation in validating the educational material. Scoring was based on 5 pointlikert scale. Results were quantified by applying the

Table 1: Items and content validation of an educational pamphlet on prevention and control of Sleep Apnea

S. No	Q. No	Items Item Level Content Validity	Index(I-CVI)
1.	Q1	Evaluate the appearnace of the pamphlet	0.94
2.	Q2	The pamphlet is presented in a simple and understandable lauguage	0.97
3.	Q3	The pamphlet provides information on prevention of sleep apnea	1
4.	Q4	The pamphlet provides information on risk factors of sleep apnea	0.97
5.	Q5	The pamphlet provides clear definition of sleepapnea	0.97
6.	Q6	The clinical signs of sleep apneais relevant and undersatndable	1
7.	Q7	The pictures of breathing techniques assist to perform breathing techniques independently	0.97
8.	Q8	The pictures of tongue exercise assist to perform tongue exercise independently	0.97
9.	Q9	The mediterrenean diet and Therir purposes are clearly understandable	1
10.	Q10	I would like to use this pamphlet to educatehigh risk groups to prevent sleep apnea	0.97
Scale Content Validity Index (S-CVI) = Average of I-CI			9.76/10=0.97

Ramalingam et al.

		Table: 2: Validation of experts in agreement of an educational pamphlet on prevention and control of Sleep Apnea																																			
Q. NO		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	Average
1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33
2		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34
3		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	35
4		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	35
5		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	34	
6		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	35
7		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34
8		1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34
9		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	35
10		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34

Experts in agreement of each items was calculated based on sum up the relevant rating provided by all experts for each item.

Content Validity Index (CVI)(11)(12). Translation & parallel back translation: Standard procedure was followed for translation into local language to enhance its utility and acceptability by local population(11)(6). After completing the content validity, this leaflet was translated into local language (Tamil) by two independent persons with fluency in both the languages i.e., Tamil and 23 English. Both the versions were discussed with the involvement of third person with bilingual expertise to resolve any identified discrepancies or ambiguity of words. After reaching the final consensus, one single version was prepared. This final copy was sent to another person who was completely blinded for the study to translate it back to English (original language). Once parallel back translation was done, an expert committee meeting consisting of translators, language experts, physiotherapist and general physician and endocrinologist were held to consolidate the final form with equivalence in both the versions i.e., English and Tamil.

Discussion

The objective of the present study was to develop and validate an educational pamphlet on prevention and control of OSA.

Literature has reported that educating high risk groups and providing them with structured written information pamphlet can enhance the probability that important information will be better attended to, understood, accepted and recalled(13). The present study involved validators from different specialties and while selecting the panel of experts their qualification, training, experience, publication, presentations and research interests were taken into consideration. This was done in consensus with American Psychological Association guidelines which emphasize that these aspects should be considered to make the material more authenticated and operational for target population(14). Content validation of our study showed I-CVI more than 0.97 for all the items in the questionnaire except item - 1 (I-CVI= 0.94). The I-CVI -0.94 value is acceptable level even though the least I-CVI in this study was taken in to the consideration and the overall appearance of the pamphlet was modified once again before pre final format of the pamphlets. Maximum number of validators found inadequacy and expressed their views to add a section on dietary management to prevent OSA. Therefore, a table was added on the last page to provide information about the Mediterranean diet

Obstructive Sleep Apnea (OSA)

same in the educational pamphlet. This was done in line with previous studies which states that awareness of caregivers/parents about their child development is very crucial and it influences their expectations and interactions with their child (15).

Conclusion

The pamphlet on prevention of sleep OSA is an educational and interventional tool to prevent and control the OSA among people in high risk. It is very simple tool and it is available in English as well in local language of Tamilnadu (Tamil). People can able to use this pamphlet without medical professionals Guidance. Hence, an educational pamphlet covering information regarding the definition, causes, high risk, clinical sign and prevention of OSA.

References

1. US Preventive Services Task Force. Screening for Obstructive Sleep Apnea in Adults: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2017 Jan 24;317(4):407–14.
2. Osman AM, Carter SG, Carberry JC, Eckert DJ. Obstructive sleep apnea: current perspectives. *Nat Sci Sleep*. 2018 Jan;Volume 10:21–34.
3. Pataka A, Riha RL. The obstructive sleep apnoea/hypopnoea syndrome – An overview. *Respir Med CME*. 2009 Jan 1;2(3):111–7.
4. Qureshi A, Ballard RD, Nelson HS. Obstructive sleep apnea. *J Allergy Clin Immunol*. 2003 Oct 1;112(4):643–51.
5. Ranji Varghese, Nathan G. Adams, Nancy L. Slocumb, Christopher F. Viozzi, Kannan Ramar, Eric J. Olson. Maxillomandibular Advancement in the Management of Obstructive Sleep Apnea. *Int J Otolaryngol* [Internet]. 2012 Jan 29 [cited 2025 Jul 30]; Available from: <https://onlinelibrary.wiley.com/doi/full/10.1155/2012/373025>
6. Gupta MA, Simpson FC. Obstructive Sleep Apnea and Psychiatric Disorders: A Systematic Review. *J Clin Sleep Med*. 2015 Feb 15;11(02):165–75.
7. Campbell CD, Sulaiman I. The role of the WatchPAT device in the diagnosis and management of obstructive sleep apnea. *Front Sleep* [Internet]. 2023 Aug 16 [cited 2025 Jul 30];2. Available from: <https://www.frontiersin.org/journals/sleep/articles/10.3389/frsle.2023.1148316/full>
8. Ho ML, Brass SD. Obstructive sleep apnea. *Neurol Int*. 2011 Dec 2;3(3):e15.
9. Kadian K, Khurana AK, Goyal A, Agarwal P. A case of unusually long apnoea in a young man with obstructive sleep apnoea. *Lung India*. 2024 Oct;41(5):381.
10. Kordbagheri M, Kordbagheri A, Tayim N, Davoudi M. Evaluation of the psychometric indicators of the Comprehensive Autistic Trait Inventory in Iranian adults. *Asian J Psychiatry*. 2024 Jan 1;91:103885.
11. Popević MB, Milovanović A, Nagorni-Obradović L, Nešić D, Milovanović J, Milovanović APS. Screening commercial drivers for obstructive sleep apnea: translation and validation of Serbian version of Berlin Questionnaire. *Qual Life Res*. 2016 Feb 1;25(2):343–9.
12. Mariscal NL. Management of Postoperative Obstructive Sleep Apnea. 2017 [cited 2025 Jul 30]; Available from: <https://repository.arizona.edu/handle/10150/624558>
13. Development and validation of educational pamphlet to prevent sleepapnea - ProQuest [Internet]. [cited 2025 Jul 30]. Available from: <https://www.proquest.com/openview/0f397080558a3d0eab09dbe6cbaf77c0/1?pq-origsite=gscholar&cbl=2045095>
14. Khurana S, Soda N, Shiddiky MJA, Nayak R, Bose S. Current and future strategies for diagnostic and management of obstructive sleep apnea. *Expert Rev Mol Diagn*. 2021 Dec 2;21(12):1287–301.
15. Haentjens P, Van Meerhaeghe A, Moscariello A, De Weerdt S, Poppe K, Dupont A, et al. The Impact of Continuous Positive Airway Pressure on Blood Pressure in Patients With Obstructive Sleep Apnea Syndrome: Evidence From a Meta-analysis of Placebo-Controlled Randomized Trials. *Arch Intern Med*. 2007 Apr 23;167(8):757–64.