Development of Educational Video to Improve Sleep Hygiene and Sleep Quality among the Elderly

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Abstract. Sleep is an undiscovered problem in elderly. It is estimated that 50-70% of global elderly experience chronic sleep disturbance, with the most affected domains are sleep latency, fragmentation, and decreased efficiency. Poor sleep quality is strongly associated with cognitive decline, dependency, and poor quality of life. Sleep hygiene as a first line nonpharmacological approach for sleep disturbances is considered to be more effective when delivered via video based, due to its availability and cost efficiency. This study is conducted to develop video-based education for sleep hygiene which is suited for elderly population. In accordance with National Institutes of Health Guideline for Clear and Simple Communication for Community Health Education Methods, we conducted these five following steps in developing the educational video: (1) Define the target audience, (2) Conduct target audience study, (3) Develop a concept for the video, (4) Develop content and visual design features, and (5) Pretest and revise draft materials. There are three videos developed in this study. The first and second videos are the animation mode for overview of sleep quality in elderly and how its impact to health. The last one is guided instruction video, consists of practical points of sleep hygiene. All videos have been entered trial pretesting phase before final revision stage with involving three elderly volunteers to watch and comment on the videos. Sleep hygiene educational videos are designed for elderly to improve sleep quality with advancing technology yet easy accessibility.

Keywords: Educational Video, Sleep Hygiene, Quality of Life, Elderly

1   Introduction

Sleep is an important function of human beings across lifespan as well as eating, drinking, working, and many more functions. Elderly population is at risk of experiencing poor sleep quality as consequences of aging process, medical and psychiatric comorbidity, medication use, psychological factors, and primary sleep problem, such as obstructive sleep apnea (OSA). As aging process, the sleep architecture of an elderly has been characterized by increasing non- rapid eye movements (NREMs) phase N1 and N2, followed with decreasing of N3 and N4. Thus insomnia in geriatric group has been included in fourteen geriatric giants.[1]

It is estimated that 40-70% older adults globally have chronic sleep problems, unfortunately up to 50% of cases are underdiagnosed and undertreated.[2] A cross sectional study in China reported that 33,8% elderly have poor sleep function, with

complaints of difficulty of initiating sleep or called as latency (39,2%), short duration of sleep (31%), dan decreased of efficiency (28,8%).[3] In Indonesia, sleep problem in elderly is not yet getting attention, that is estimated more than 10% population have chronic problems.

Sleep has vital capacity for restoring mental and metabolism function. Good sleep quality has been proved generating impact for mental and cognitive health, cardiometabolic function, decreasing fall risk and hospitalization factor, increasing independency of activity of daily living as core of elderly health goal, and overall improving quality of life. Recent study reported that elderly with fragmented sleep has 3.2 times more risk of developing mild cognitive impairment (95%CI 1,1-6,1).[1] A study of identifying limitation of participation in pre-frail elderly in China showed that poor sleep quality as main contributing factor of restricted participation of elderly.[4]

Sleep hygiene is defined as a set of behavioral and environmental recommendations to promote healthy sleep. This is recommended by American Academy of Sleep Medicine in sleep management guideline as first line approach for treating sleep problem, as medication for inducing sleep in elderly must be prevented due to several side effects such as constipation, sleep apnea, and death.[5] Though this educational content looks simply, a systematic review showed the significant effects in increasing sleep efficiency, wake after sleep onset (WASO), and total sleep time in the elderly.

Limited study reports the innovation of sleep hygiene content in the form of educational video, especially for elderly. As we know, the concept of tele-education through simple mobile phone application offers several benefits, such as cost and timely access efficiency, overcoming barriers to get healthcare in a distance, and repeatability of the information. In this paper, we describe the development of three innovative sleep hygiene educational videos particularly designed to educate older population to improve their sleep quality. This project also aims to empower elderly to familiarize with advancing yet simple technology as digitalization era growing.

2   Method

Over a seven-month period, we developed three educational videos, consisting of two animated videos and one guided instructional video to educate older adults about the importance of sleep function and how to apply good sleep hygiene. We chose an audiovisual intervention approach to develop the videos by combining the simple animation with bright color, short and clear sentences, and audio information, which was designed especially for elderly with possibility of multisensory deficit, such as visual and audio deficit.

The overall development process was guided by *Clear and Simple* principles for clear communication by National Institutes of Health (NIH).[6] This guide is naturally designed for developing audience-appropriate information for limited health literacy

skills people, whereby this principle was suitable to adopt for our target audience, that is older people.

2.1   Define the target audience

Defining the target audience is an important part in developing educational video, in order the message get through the audience. Elderly has some common characteristics with people with limited health literacy skills, especially how they interpret and process the new information. The target audience in this study has been defined by age above 60 years old, sex, marital status, educational level, occupation, medical condition, lifestyle, having private bedroom, having smartphone, able to operate basic function of smartphone, stage of change status, and sleep quality.

We targeted the elderly with poor sleep quality, which was defined with global score of The Pittsburgh Sleep Quality Index (PSQI) more than 6. Elderly with poor PSQI score have several possibilities of sleep disturbances, such as prolonged sleep latency, short sleep duration, and decline of sleep efficiency. All these characteristics will influence the process of developing video materials. We were targeting audiences in physical medicine and rehabilitation (PMR) polyclinic in Cipto Mangunkusumo, The National Referral Hospital in Jakarta.

2.2 Conduct target audience research

This second part is essential to understand relevant physical, behavioral, and demographic of the audience. The information that has been gathered will play a crucial role in developing culturally relevant materials. The first task is exploring existing sources of information, including latest data from current studies, what elderly may already know about sleep hygiene, what misinformation exists, and how elderly may feel about the topic.

For the method, we prefered audience interview rather than survey or focus group discussion. The advantage of this method is getting more in-depth information rather than focus groups. The interview occurred in locations frequented by elderly, such as geriatric, musculoskeletal and neuromuscular clinic division in PMR department. They may be arranged by appointment or on the spot for participation.

The information that has been gathered:

- Sex, age, income, educational level, occupation, and cultural identification
- Health behaviors, such as alcohol or caffeine consumption, smoking habit, routine exercise. The sedentary lifestyle was assessed with IPAQ-SF
- Medical history, such as obstructive sleep apnea, hypertension, diabetes mellitus, etc
- Psychological factors, such as marital status, loss of family members, and some other family problems

2.3   Develop a concept for the video

After collecting the information, we outlined the objectives, style, and format of the video that will carry our message. The concept has been discussed in an expert group, consisting of two senior geriatric consultants from physical medicine and rehabilitation department, a health communication expert, and a physical medicine and rehabilitation resident.

New and emerging format with internet-based option was chosen, that is educational video. All the videos will be delivered via *what's app* application, due to its simplicity and easy-to-access. This internet-based format is rarely used in older population, but the digitalization era drives the researches to expand this method to elderly, due to its cost and time efficiency. We developed three section videos to prevent information overload. Each videos are estimated with 3 to 6 minutes duration.

We decided to choose animation video for first and second video, because animation could communicate a complex knowledge into simple information, better than static images, words alone, or graphics. Animation can also help to overcome language and cultural barriers and educate audiences with limited literacy skills. Meanwhile for the last video, we choose guided instructional video because we hope that practical points of sleep hygiene can be delivered directly by one of the expert group member.

2.4 Develop content and visual design features

The educational content is compiled from various evidence-based sources with adjustment with the audience's information we gathered before. The first video begins with the definition of sleep, the importance of sleep, and the characteristics of healthy sleep for elderly. The second video is straightforward to the causes of poor sleep quality in elderly and the effects of bad quality of sleep itself. The last video is practical points of sleep hygiene. Sleep hygiene is delivered in four aspects; sleep behavioral, sleep environment, diet aspect, and physical exercise.

After writing the draft, the next most crucial part is tailoring the content, layout, photograph, illustrations, and audio into the appropriate educational video. We collaborate with the social communication student for the tailoring process. The collaboration is basically to enrich the products from a social science perspective. The video itself is simply designed using a free video maker application by production team. The production team consists of a physical medicine and rehabilitation resident and a social communication student. All the messages are delivered in *Bahasa*, so that the voiceover, which was filled by the communication student.

Several key principles are adopted when creating the materials. For the content, words must be familiar to elderly, sentences are simple, specific point by point, and using concrete examples rather than abstract concepts. For the layout, background color is balancing with sentences and illustration and the font selection (design and size) are easy-to-read. For the audiovisual, it is relevant to text and meaningful to the audience.

The illustrations are simple, familiar images, illustrative, age-appropriate and directly related to the message. Audio need to point out the key information, not just repeating the text. The audio is also completed with soft back sound.

2.5 Pretest and revise draft materials

Elderly's understanding and acceptance is critical for ensuring that videos are relevant to the needs and concerns about sleep quality in its population. Pretesting is a qualitative measure of elderly response to the videos so that we can measure comprehension and their personal feelings. We were pretesting the videos to three elderly who have same characteristics as defined in the target audience. By pretesting these videos, we hope that we get some insight or feedback to make the videos more acceptable to the target audience.

All the subjects have been sent the video gradually week per week in total three consecutive weeks, then we added two more weeks to give period of information retention. After five weeks, every subject was interviewed and assessed the sleep quality, to know the improvement of sleep quality. The sleep quality was measured with Pittsburgh Sleep Quality Index (PSQI). We also asked about the content and format of the video whether they have some suggestions or recommendations toward the videos. The subjects commented that overall videos are good and easy to understand, but they suggested minor revisions should be made regarding the font size, color background, speed of video transition, and some new terms.

3   Result and Discussion

There are three final videos created in this project, consisted of two animation videos and a guided instructional video, with duration of 3 to 6 minutes. These videos are first pioneer of sleep hygiene educational video for elderly in *bahasa* version in Indonesia. The videos also have been entering the pretesting trial during production phase.

Formal educational videos of sleep hygiene is not yet available globally. There are several online sleep hygiene courses that can be followed by English spoken participant. The course is a group discussion course with one instructor and some participants. This method allowed the two-way communication between instructor and participants. Compared to this method, the educational video has advantage of repeatable access video that can help elderly to re-watch the knowledge as much as they want.

This media is also more appropriate for Indonesian culture, which elderly is not used to follow focus group discussion, sharing their private experience, and the other related issues such as different of educational level and social status.

A total of three elderly provided feedback on videos at PMR clinics. The feedback and suggestions included suggestion of improvement such as simplifying the language and

improving the video quality, especially the brighter color background, the more age-appropriate animation, and more familiar new terms, such as flip-flop phenomenon and sleep fragmentation. The future use of these videos can be applied for health service in clinical settings and research project.

4   Conclusion

Sleep hygiene educational videos based on animation and guided instructional for elderly are innovatively providing important sleep hygiene information which is particularly designed for older population. Future studies are needed to examine how the effect of these three videos to improve sleep function for greater scope older population.

References

1. Mander BA et al. Sleep and human aging. Neuron. 2017;94(1):19–36.
2. Bhaskar S, Hemavathy D, Prasad S. Prevalence of chronic insomnia in adult patients and its correlation with medical comorbidities. J Fam Med Prim care. 2016;5(4):780
3. Wang P, Song L, Wang K, Han X, Cong L, Wang Y, et al. Prevalence and associated factors of poor sleep quality among Chinese older adults living in a rural area: a population-based study. Aging Clin Exp Res [Internet]. 2020;32(1):125–31. Available from: https://doi.org/10.1007/s40520-019-01171-0
4. Liu YWJ. The severity and associated factors of participation restriction among community-dwelling frail older people: an application of the International Classification of Functioning, Disability and Health (WHO-ICF). BMC Geriatr. 2017;17(1):1–11.
5. The American academy of sleep medicine. Sleep hygiene guidelines. Available from: http://cdn.redmondpie.com/wp-content/uploads/2014/11/Sleep-Better.png
6. https://www.nih.gov/institutes-nih/nih-office-director/office-communications-public-liaison/clear-communication/clear-simple)