Procedure Manual Format 2

Explanatory Document for Life Sciences and Medical Research Involving Human Subjects

At our university, we strive to protect the interests and safety of individuals who cooperate in life sciences and medical research (hereinafter referred to as research subjects) and to ensure they can participate in research with peace of mind. When conducting life science and medical research, the responsible researcher or healthcare professional will thoroughly explain the research content beforehand, ensuring that all potential research subjects fully understand its purpose. If you hear the explanation and agree to participate in the research, please sign the consent form and return it to the responsible researcher or healthcare professional.

Furthermore, all potential research subjects are guaranteed the right to refuse consent for participation in life science and medical research. You will not suffer any disadvantage whatsoever if you do not consent, or if you withdraw consent, you have previously given.

Furthermore, this research plan has been reviewed and approved by the Ethics Committee for Life Science and Medical Research Involving Human Subjects (Epidemiology and General Research Division / Clinical Research Division) of the Graduate School of Life Sciences, Kumamoto University, and has received permission from the Dean of the Graduate School of Life Sciences, Kumamoto University and the Director of Kumamoto University Hospital.

Study Title:
A Study on Improving Sleep Quality in COPD Patients Through Inhalation Management Education by Nurses Using Video Conferencing Tools.

Description

1. Purpose of the Study

Patients with COPD (chronic obstructive pulmonary disease) are said to experience reduced sleep quality at night due to impaired respiratory function. Deteriorating sleep quality is a risk factor for exacerbations in COPD patients and also diminishes the effectiveness of symptom improvement. While inhaled medications are the primary treatment for COPD, it has been reported that over 40% of patients make some kind of inhalation technique error. Reasons for this include the increased variety of inhaled medications and the fact that different inhalers require different, sometimes complicated techniques. Inhalation technique errors can affect the amount of medication absorbed by the body, meaning that even with daily inhalation, patients may not be getting the full benefit.

Previous studies have implemented education to reduce such inhalation technique errors, and this education has been shown to decrease these errors. However, no reports have focused on whether improvements in inhalation technique errors lead to improvements in respiratory symptoms or sleep quality. Furthermore, these studies have only addressed inhalation technique improvements and do not mention methods for controlling symptoms using inhaled medications or coping strategies for difficulties encountered in daily life. Furthermore, while tools like online video calls and apps have become increasingly utilized in recent years, their effectiveness in inhalation management education has not been verified.

Based on the above, this study will examine whether educating COPD patients via video-conference about the circumstances in which nurses administer inhaled medications—including inhalation techniques—and about daily management strategies improves their sleep quality. By conducting this research, we expect that achieving appropriate inhalation management and obtaining the full therapeutic effect of medications will not only improve sleep quality but also promote proper medication use, reduce economic burdens such as hospitalizations, and ultimately

help maintain and enhance quality of life.

2. Outline of the Method

2-1. Research Methods

【At the time of registration】

We will ask you about yourself (your age, smoking habits, inhaler training details, and the severity of your shortness of breath). You will also complete questionnaires regarding sleep quality (such as the Pittsburgh Sleep Quality Index), anxiety and depression scales, and the COPD Assessment Test. For items you cannot answer, such as test values, we will use information from your medical records with your permission. After you provide this basic information and complete the questionnaires, we will explain how to use the Watch Pad and video conferencing equipment used in this study, as well as what data will be collected.

In this study, participants will be randomly assigned to either the standard care group or the educational intervention group, with a 50% chance of being placed in either group. Your assignment to either group will be determined entirely independently of the researchers' judgment or your preferences (i.e., “randomly”). Random assignment ensures that characteristics likely to influence outcomes, such as gender, age, or Pittsburgh Sleep Quality Index scores, are evenly distributed across groups. This allows for a fairer assessment of the effectiveness of inhaler management education.

Which group you were assigned to is not usually disclosed to healthcare professionals such as doctors or nurses at the hospital. Therefore, it will not affect the treatment or care provided to you during or after the study.

＜Standard Care Group＞

If assigned to the standard care group, you will undergo an inhalation technique check via in-person or video conference within one month of enrollment. You will also be asked to keep an inhalation log. Another inhalation technique check will be performed four weeks later. After an approximately 8-week observation period, at the study's conclusion, you will undergo an inhalation technique check and sleep assessment via video conference or during a clinic visit, and will be asked to complete questionnaires.

＜Educational Intervention Group＞

If assigned to the educational intervention group, you will receive a pamphlet (and a tablet for those who request one) within one month of registration. During the first video conference, we will check your inhalation technique. We will also use the pamphlet to discuss any difficulties you face in daily life, work together to develop strategies, and have you implement them. You will also be asked to keep an inhalation log.

A second video conference will be held approximately four weeks later. During this second meeting, we will again check the suctioning technique. We will discuss whether the measures discussed during the first meeting were implemented over the four-week period, how they worked, and whether further improvements are needed.

Following an approximately 8-week observation period, participants will undergo inhalation technique checks and sleep assessments at the study's conclusion and complete questionnaires.

【Equipment Used】

＊Regarding Sleep Assessment (Using Watch Pad)＊

The Watch Pad can be taken home today or will be mailed to you within one week. Please wear it overnight while sleeping. Place it in the Letter Pack provided (if mailed to you, it will be enclosed) and drop it in a mailbox or take it to a post office.

☛How to Use Watch Pad

Once you are ready for bed, remove the Watch Pad from its pouch, place it on your index finger, and pull the tab from the probe. It will apply gentle pressure and adhere snugly to your finger. Also, peel off the tape and attach the sensor to the center of your chest. **Please keep it on even if you wake up during the night, such as to use the restroom, and do not remove it until you get up in the morning.**

＊Regarding Video Conferences＊

If you wish to conduct the meeting using your own iPhone or computer, we will ask for your Skype ID if you prefer Skype and perform a connection test before the meeting. If you prefer Zoom, we will provide you with a sheet containing the ID and passcode. We will ask for an email address accessible from the computer or tablet you will use and send you the URL by the day of the meeting.

If you wish to borrow an iPad, please sign the loan agreement, and we will lend you an iPad. Instructions for use will be provided on a separate sheet. For your first meeting, please have the iPad and brochure ready and wait for the meeting to begin.

【Research Schedule】

Regardless of which group you are assigned to, we will conduct the research while paying close attention to your physical condition. For this study, we have scheduled the following examinations and tests:

	within 6weeks	registration	Initial intervention	Second intervention	At the completion of the research	Cancellation
Pulmonary Function Test	○					
Patient Basic Attributes		○				
QOL（Quality of life）		○		○	○	△
PSQI・JESS （Sleep quality）		○		○	○	△
Sleep Assessment （Sleep study）		○			○	△
Check of inhalation technique		○※	○※	○	○	△
HADS (Anxiety and Depressive Tendencies)		○		○	○	△
Unplanned medical visits or hospitalizations					○	△
Observation of adverse events			◄	―	►	△
Inhalation Management Log					○	△

“○” indicates required items; “△” indicates optional items;
“※” indicates items to be completed during registration or around the time of the first intervention.

【Report on Achievements Obtained】

We will not provide you with a separate explanation of the results from each test obtained from you through your participation in this study. However, the results of the tests conducted in this

study may reveal information that could potentially affect your health, such as nocturnal sleep apnea. In such cases, we will promptly report this to your primary physician to ensure you receive appropriate testing and treatment.

Furthermore, we plan to compile the results of this study and present them or submit them for publication at conferences such as the Japanese Respiratory Society and Respiratory Investigation, as well as other relevant academic societies.

【Research Implementation System】

We are seeking COPD patients to participate in a study at Kumamoto University Hospital, Kōnan Hospital, and Iwakuni City Nishiki Central Hospital. Hospitals will provide regular medical care as usual, even during the study.

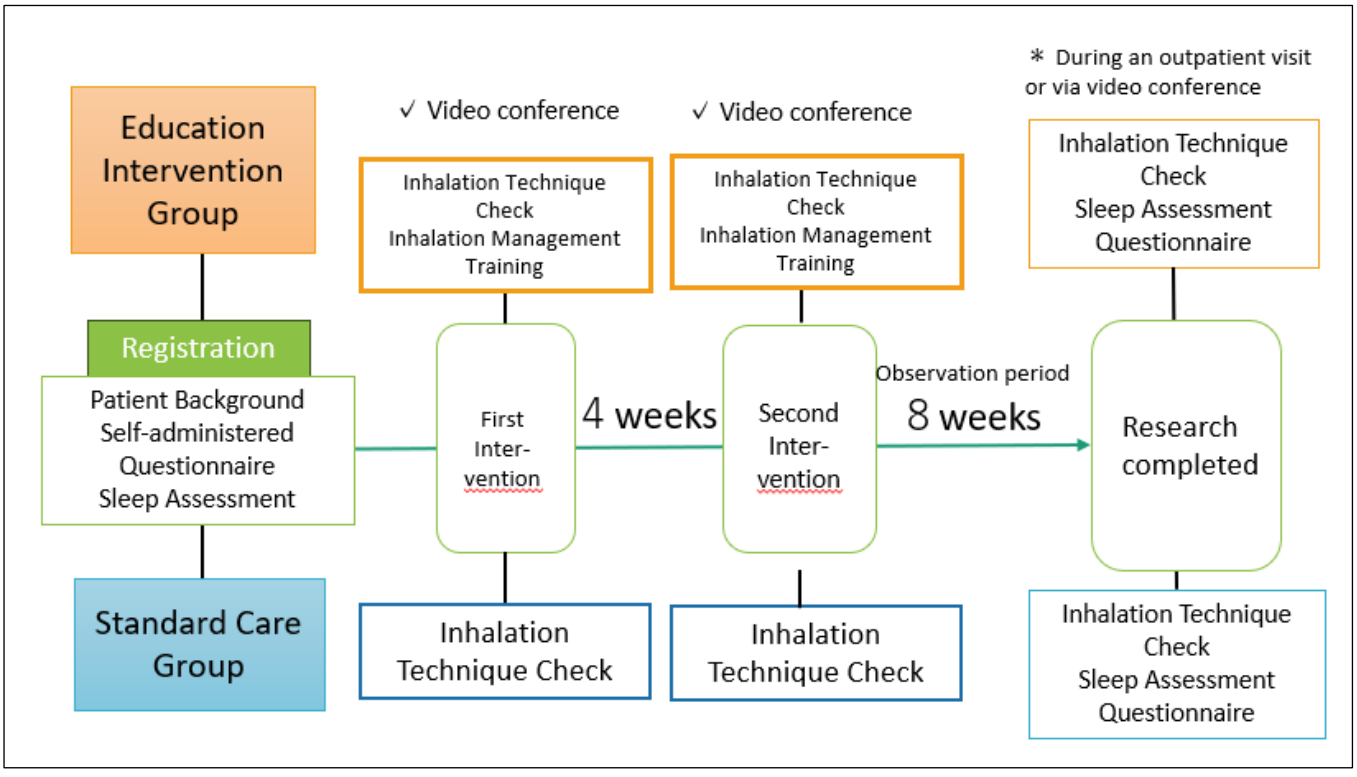
Information obtained will be analyzed at Kumamoto University, where Principal Investigator Hashino is affiliated, and at Hiroshima University, a collaborating institution. Findings will be presented at academic conferences and published in research papers.

【Research Ethics Guidelines】

This research will be conducted in compliance with the World Medical Association's "Declaration of Helsinki (latest version)" and the "Ethical Guidelines for Life Science and Medical Research Involving Human Subjects" issued by the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Health, Laboure and Welfare, and the Ministry of Economy, Trade and Industry.

2-2. Research period

Regardless of whether you are assigned to the educational intervention group or the usual care group, the study period will be approximately 3 months. The overall flow of this study is illustrated in the diagram below.



2-3. Reasons for Selection as a Study Participant

Participants in this study must meet all of the following criteria:

- Adult patients with stable COPD who are receiving care at a hospital or clinic specializing in respiratory medicine
- Patients who have been prescribed inhaled medications and have used them continuously for at least one month
- Experience with inhalation instruction is not required
- Patients who have not been hospitalized within one month prior to study participation due to a COPD exacerbation
- Patients with obstructive sleep apnea syndrome (OSAS) overlap syndrome (OVS) who are receiving treatment with nasal continuous positive airway pressure (CPAP), provided their primary physician confirms their symptoms have stabilized since CPAP initiation
- Patients capable of operating devices such as Android phones, iPads, or computers. However, if a caregiver can operate the device, the patient's own ability to operate it is not required
- Patients who have obtained physician approval
- Patients for whom a recent disease assessment (respiratory function test) within the past six months is possible

Individuals meeting any of the following criteria are ineligible to participate in this study.

- Patients with other respiratory diseases such as asthma or interstitial pneumonia
- Patients with advanced cancer, including lung cancer
- Patients with restricted chest movement during breathing due to conditions like chest deformity or trauma
- Patients with diseases causing dyspnea, such as heart disease
- Patients with sleep-disordered breathing where central apnea or hypopnea occurs in more than half of the breaths
- Patients diagnosed with dementia or psychiatric disorders

3. Benefits of Participating in the Study:

We believe that by participating in this study, regardless of which group you are assigned to, you will receive treatment that is at least as effective as, or more effective than, the treatment you have received previously. Even if you are assigned to the usual care group, you can still receive a check of your inhalation technique and education after the study ends if you wish, allowing you to learn the correct inhalation technique. We believe this will help you maximize the effectiveness of your inhaled medication treatment, achieve appropriate symptom control, and improve your sleep quality. Furthermore, if your symptoms are controlled, you can prevent emergency hospitalizations due to symptom worsening, reducing both time and financial burdens. We also expect benefits such as reduced distress from symptoms like shortness of breath.

After this study ends, you will continue your treatment as before, in consultation with your primary physician. Participants in the standard care group can receive inhalation management education after the 12-week study period if desired. Please request this from the study principal investigator.

4. Burden, Risks, and Complications Arising from the Study

The anticipated disadvantage of participating in this study is that communication fees may be incurred for video conferencing if you use your own device. The researcher will cover the communication fees associated with video conferencing. Additionally, if you have already acquired the necessary skills, the time constraints imposed by video conferencing may be burdensome.

The Watch Pad examination used in this study is covered by research funds and will not incur any financial burden. Even if you choose not to participate in this study, you will not experience

any disadvantage in your regular medical examinations or treatments.

※Regarding Side Effects※

Mastering the correct inhalation technique may increase the proportion of medication reaching the alveoli, even at the same dose. This could elevate blood concentrations of the drug and potentially cause side effects such as dizziness or palpitations. Not all patients will experience this. If you experience any symptoms or discomfort during or after participating in this study, please contact the principal investigator or study coordinator immediately. Depending on the symptoms, we will report them to your primary physician and take appropriate action.

It cannot be ruled out that unknown adverse events may occur beyond those described here. If you obtain new information during your participation in this study that could affect your decision to continue, please inform us immediately. Furthermore, if important new information about this study becomes available after you have started participating, we will confirm your wish to continue the study and obtain your renewed consent.

Please be aware that even after you have agreed to participate in this research, we may need to discontinue your participation in the following circumstances:

- If your illness worsens to the point that continuing this research becomes difficult
- If you withdraw your consent
- If, after the study begins, it is determined that you no longer meet the participation criteria
- If we are unable to contact you due to reasons such as a hospital transfer
- If you are administered (or take) medication prohibited by this study

Furthermore, should your participation in this study be discontinued, we will explain the reason for discontinuation. Thereafter, your attending physician will consult with you to provide the best possible treatment. Please note that even after discontinuation, we will continue to monitor your health condition as necessary. The records collected up to the point of discontinuation are valuable data that may be useful for future research; we kindly ask for your understanding regarding their potential use.

5. Alternative Measures and Their Expected Effects, Risks, and Complications

We believe there are no other alternative studies in this research.

6. If You Do Not Participate in This Study:

Even if you do not participate in this study, your treatment will continue as before, based on the effects of your medication and other factors.

7. Other:

7-1. Financial Burden and Compensation for Research Participants

This section explains the costs you may incur by participating in this study. In this study, you will receive suction technique checks and education via video conference using your smartphone or computer. Each session is expected to last 30 to 60 minutes. If you use your own computer or tablet, data usage will be approximately 300-600MB. Regardless of your carrier, this may incur an additional data charge of about 1GB (approximately ¥1,100). Therefore, we will provide compensation that accounts for this data cost. We believe there will be no significant out-of-pocket expense for you at this time.

Please note that the Watch Pad used for sleep evaluation is not covered by health insurance. However, this portion will be covered by the 'Grant-in-Aid for Scientific Research, Kumamoto University Diversity Project Support Fund, and Mitsubishi Foundation Research Grant,' so there will be no out-of-pocket cost for you. However, costs for any other medications used or follow-up visit fees will be treated as insurance-covered medical care, so the usual out-of-pocket costs

equivalent to regular medical care will apply.

Additionally, for participating in this study, you will receive a QUO card or Amazon gift card worth ¥10,000 (communication fees will be added separately) at your final visit or upon completion of the study.

7-2. Withdrawal of Consent

Even after agreeing to participate, you may withdraw from the study at any time. Withdrawing from the study, or even if you do not participate, will not disadvantage you in future treatment. However, even if you withdraw, you may be asked to undergo tests to monitor your health status in some cases.

7-3. Method of Public Disclosure Regarding the Study

Information is publicly disclosed on the ClinicalTrials.gov database (https://clinicaltrials.gov/).

7-4. Handling of Personal Information (Including Methods for Anonymization)

Information obtained in this research will be compiled without including any personally identifiable information (such as name, address, phone number, etc.).

Clinical information obtained through this research will be stored with assigned personal identification numbers to prevent the identification of individuals through details like medical case numbers or names. The personal number will be a random 4-digit number unrelated to you. The person responsible for managing personal information is Makiko Yamamoto, Department of Basic Nursing Science, Graduate School of Life Sciences, Kumamoto University.

Furthermore, the results of this research will be summarized and published as conference presentations or academic papers. In either case, your personal information, such as your name, will not be disclosed at all, so your personal information will be protected.

7-5. Methods for Storing and Disposing of Samples and Information

Samples and information will be stored in a lockable cabinet in Room 405, Building E, Faculty of Health Sciences, Kumamoto University. Analysis and interpretation will also be conducted in this room. Obtained data will be saved on a locked USB drive. Access to this drive is restricted to the Principal Investigator, Co-Investigators, and Research Assistants only. Dedicated computers will be used for data viewing and analysis, and data will not be removed from Room 405, Building E.

Clinical information will be stored until the later of either 5 years after data analysis and study completion or 3 years after the final publication of the research results. After the retention period ends, the data will be completely deleted from the USB drive and the computers used, while maintaining anonymity. Paper data will be disposed of appropriately, such as by shredding.

7-6. Feedback on Research Findings Concerning the Health of Research Participants and Their Descendants

We will report the results of each test obtained from you through your participation in this research to your primary physician before and after the research period. However, we will not provide you with a separate explanation of these results. Please note that the test results from this study may reveal information that could have a significant impact on your health, such as nocturnal sleep apnea. Should this occur, we will promptly notify your primary care physician to ensure you receive appropriate testing and treatment.

7-7. Conflict of Interest

This research is conducted using grants from the Japan Society for the Promotion of Science (Grant-in-Aid for Scientific Research, Grant Number 24K14058), Kumamoto University's Diversity Initiative, and the Mitsubishi Foundation.

In clinical research, conflict of interest refers to “a situation where impartial and appropriate judgment may be distorted, or could be perceived as distorted, primarily due to financial interests.” Specifically, this includes honoraria, research funds, stocks, services, intellectual property rights, etc., provided to researchers by pharmaceutical companies or medical device manufacturers. It is stipulated that such economic activities must be managed to prevent the results of clinical research

from being distorted in a direction favorable to specific companies or individuals.

This study has not received any financial benefits or other related benefits from companies or organizations where conflicts of interest might be anticipated. Therefore, these relationships will not influence the conduct of this research. Furthermore, any potential conflicts of interest have been reviewed by our university's Conflict of Interest Management Committee. We will appropriately manage conflicts of interest, conduct fair and sound research, and prioritize the interests of research subjects.

7-8. Response and Compensation for Health Issues Arising from This Study

If you experience any abnormalities during the study period, please do not hesitate to immediately report them to the Principal Investigator or a member of the research team, regardless of the nature of the issue. Should any adverse events occur, we will promptly provide appropriate treatment and care, even after the study concludes. Please note that this study does not include enrollment in clinical research insurance. Therefore, any medical treatment costs incurred will be your out-of-pocket expense covered by your health insurance.

7-9. Potential Use of Provided Samples and Information in Future Research

The test data and other information you provide may be used in future research unrelated to this study. This is called secondary use. When secondary use occurs, we will obtain separate approval from the Ethics Review Committee, disclose the details of the use, provide an opportunity to opt out, and use the information in a form that does not identify individuals.

After this study concludes, we may conduct follow-up investigations, such as examining how long the effects of the educational intervention persist, or verifying the educational impact on patients with obstructive sleep apnea syndrome.

7-10. Monitoring and Auditing

Monitoring and auditing will not be conducted in this study.

7-11. Contact Information for Inquiries Regarding This Study (24-Hour Contact) and Responsible Personnel

The overall responsible person and contact point for this study are as follows. For any questions or consultations regarding the study, please contact the following:

【Principal Investigator / Contact】

Institution/Affiliation: Department of Practical Nursing Development, Graduate School of Life Sciences, Kumamoto University
Address: 4-24-1 Kuhonji, Chuo-ku, Kumamoto City, 862-0976
Position: Assistant Professor　　Name: Asuka Hashino
Phone Number: 096-373-5479 (Laboratory)
(Mobile)
(9:00 AM - 5:00 PM ※Excluding Saturdays, Sundays, and holidays)

Within the scope that does not compromise the originality of research or the protection of other subjects' personal information, information about the research can be obtained and viewed on websites such as the Grant-in-Aid for Scientific Research and ClinicalTrials.gov. Please note that not all information may be disclosed due to considerations such as the protection of personal information and researchers' intellectual property.