Feasibility of Rehub Web Application as an Exercise Prescription Method for Office Workers with a Neck Muscle Spasm

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Abstract: Background: Routine home exercise will provide better benefits than just training at the health center, especially for chronic conditions. Exercise adherence and accuracy are important to achieve therapeutic goals. This study is designed to evaluate the feasibility of Rehub, a web application for personalized exercise prescription in Bahasa Indonesia. Methods: A questionnaire was asked to 10 doctors after using Rehub and 10 office workers (OW) after getting a printed prescription to evaluate Rehub's feasibility. Result: All doctors state that Rehub is easy to use and will use it: Eighty percent of doctors agree it will help them to explain, save time, and help the patient. Eighty percent of doctors agree, it has a proper description and will increase adherence. Ninety percent of doctors agree that they are satisfied and will increase health service quality. All OW agree that Rehub printed exercise (RPE) will help them to remember. Sixty percent of OW prefers to get RPE over exercise demonstration. Eighty percent of OW agree that RPE is easy to understand. Conclusion: Rehub is feasible to be used as an exercise prescription option.

1 INTRODUCTION

Based on several studies, physical exercise is the foundation in the management of musculoskeletal medical conditions (Sihawong et al., 2011; Hochberg et al., 2012; Mcalindon et al., 2014; Nelson et al., 2014; Weber and Jevsevar, 2016). Routine physical training programs and according to medical instructions for some medical conditions are considered to be an important component in rehabilitation management programs, compared to a supervised therapy session with limited time (Fokkenrood et al., 2013; Jakobsen et al., 2015; Williams et al., 2015; Gutiérrez-Espinoza et al., 2017; Minetama et al., 2019).

Prescribing physical exercises is more common using conventional methods for providing instructions for home exercise programs. Patients who need home exercise are given instructions by exemplifying some of the movements directly as well as for instructions on the frequency of exercise, the number of repetitions, sets, and length of detention adjusted to the medical condition of each patient (Williams et al., 2015). With the conventional method, it takes a long time to educate, the movements are made incorrectly and the exercise dose is not according to instructions because the patient forgets the instructions, resulting in reduced compliance.

In recent decades the use of computers has increased sharply among office workers. Computer users who spend more than 3 hours per day in front of the computer are proven to have more neck muscle spasm and develop pain (Kanchanomai et al., 2012; Liyanage, Liyanage and Khan, 2014). This is related to changes in the posture of computer and mobile phone users during sitting and doing activities in front of the computer (Kanchanomai et al., 2012; Liyanage, Liyanage and Khan, 2014; Nejati et al., 2015; Mingels et al., 2016). In-office workers, the prevalence increases to 71% or about two out of three people will experience this complaint during life (Fejer, Kyvik, and Hartvigsen, 2006; Mehrseed Sinaki, 2016).
Various studies show that long sitting (more than 3 hours) in front of the computer adds neck flexion and head tilt, reduced head movements, shortening the distance of vision, and increasing posture deviation, resulting in forward head posture (FHP) (Kanchanomai et al., 2012; Liyanage, Liyanage and Khan, 2014; Nejati et al., 2015; Mingels et al., 2016). FHP is a common finding in patients with migraines, tension-type headache, pain cervicogenic head, neck pain, myofascial syndrome, and temporomandibular dysfunction (Mingels et al., 2016). This posture will increase the burden on the musculoskeletal system due to increased dorsal vertebral kyphosis so that the head is in front of the center gravity. If this condition is not overcome, remodeling of the structure will occur the neck and continues to become permanent deformity, ie shoulder protraction (Yoo, 2013). Combined from this condition known as the upper crossed syndrome (Bae et al., 2016).

The treatment for neck pain experienced by computer users emphasizes on proper movement control and head posture to prevent improvement neck strain (Mingels et al., 2016). Posture correction is done with therapeutic exercises, including strengthening (strengthening) of the muscles that are weak and stretching (stretching) tight muscles, and posture training and education (Shih et al., 2017). Currently, there are various methods of exercise for the management of neck pain, both of which are practiced isometric, dynamic, or a combination of both (Somya, 2014).

For a chronic condition like neck problems in office workers, the adherence to doing an exercise has an important role to achieve the targeted goals.

There are available a lot of software applications for physical exercise prescribing methods nowadays, especially in English but no in Bahasa Indonesia. This exercise method is considered to help patients to remember instructions that have been given (Ortega-Martin et al., 2019). For this reason, we try to build the first web application for personalized exercise prescription in Bahasa Indonesia, Rehub. This study is designed to evaluate the feasibility of Rehub, to office workers with neck muscle spasm.

2 METHOD

This study of a web application physical exercise Rehub that develop by Exinio is aimed to evaluate the feasibility of the physical exercise prescription method. The authors of this study proposed a hypothesis that printed exercise prescription can replace the conventional methods in Indonesian patients. They want to determine the doctor's experience and the patient's acceptability while using it. The progress of this study’s step is illustrated in Figure 1.

We ask the doctors to prescribe neck muscle stretching exercises using Rehub. Doctors were asked to try it from the login page, patient data page, patient diagnosis, choosing exercise type, and exercise dosage (Appendix 1). After doctors exposed in a trial and patients get the printed prescription (Appendix 2). The prescription consists of static photos of movement step, movement sequence instruction, and individual notes. Doctors will answer ten questions to describe their assumption in Rehub's applicability during prescribing exercise, doctor's expectation to patient's adherence to exercise, and its impact on health service treatment quality.

Patients will answer five questions to describe their interpretation is the exercise prescription easy to understand, their preference to get a printed exercise prescription or live demonstration, their expectation in the effect of exercise adherence, and their eagerness to prescribed using Rehub. All of the questions are arranged in 5 points Likert scale using an online survey. The results are analyzed by descriptive methods.

All of the subjects are not blinded and chosen consecutively. Inclusion criteria for doctors are general practitioners, Physical Medicine and Rehabilitation (PMR) senior residents and PMR attending that competent and regularly prescribing physical exercise to patients using Bahasa Indonesia. The patient's inclusion criteria are office workers with neck muscle spasm without any prior neck injury, deformities, or surgery and able to read in Bahasa Indonesia. Subject’s demographics are described in Table 1.
Table 1: Participant's characteristics.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Doctors (n=10)</th>
<th>Patiens (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women, n</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Level of education, n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bachelor’s degree or above</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Level of competency, n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMR resident</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>PMR attending</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Steps of data collection until data analysis.
3 RESULTS

From the results of surveys and interpretations that have been done, both doctors and patients give a good impression for Rehub application. Most doctors and patients who use Rehub feel this method can help in prescribing physical exercise and adherence.

All users state that Rehub is easy to use and they will use it in their daily practice. Eighty percent of users agree that it will help them in prescribing exercise, save time during exercise explanation, and will help the patient to understand the prescribed exercise. Eighty percent of users agree that it has a proper exercise description, and will increase patient's adherence to exercise. Ninety percent of users agree that they are satisfied with Rehub and it will increase health service quality in their daily practice. All patients agree that Rehub printed exercise prescription will help them to remember the prescribed exercise. Sixty percent of patients prefer to get Rehub printed exercise prescriptions over exercise demonstration. Eighty percent of patients agree that they are more motivated to do exercise after getting Rehub printed exercise and will ask their doctor to get Rehub printed exercise. Eighty percent of patients agree that Rehub printed exercise is easy to understand.

4 DISCUSSION

A printed document as an exercise prescription for home program exercise is commonly used in several countries. Printed or written instructions were good reminders and improve patient's adherence. (Escolar-Reina et al., 2010; Smaerup et al., 2016; Gutiérrez-Espinoza et al., 2017). Not so many medical professionals choose this kind of prescribing method because they don’t know a lot of free home exercise programs and not so familiar with it. There is still no study about written or printed exercise prescription in Bahasa Indonesia.

Rehub is the first electronic, web-based application for exercise prescription in Bahasa Indonesia that used by medical professionals for their patients. We build it in a web application platform so that it can be accessed from a computer or smartphone browser. One of the shortcomings of using web applications is it needs the internet to be used.

This study could serve as a prototype exercise method for other conditions, such as muscle strengthening, muscle endurance, and cardiorespiratory rehabilitation in Bahasa Indonesia. The Rehub web application is still in the development stage, that is why in this study limited in neck stretching exercise options and printed prescription only.

Office workers as patients are included in this study found that it is helpful to have prescribed exercises in written form and guided with movement sequence pictures. It is hoped that getting printed instructions for home exercise can help improve their adherence. From the hypothesis of this study shows that not all of the patients want to get only printed exercise prescription, but also want to be given a direct example at the first time.

With this initial study, positive expectations were obtained by both doctors and patients. Further studies are needed that assess the effectiveness in terms of accuracy of movement, exercise adherence between patients who get conventional training instructions, in printed form only, and a combination of both.

5 CONCLUSION

Rehub is feasible to be used as an exercise prescription option for neck muscle spasm. Further study is needed to evaluate Rehub applicability and effectiveness.

REFERENCES


Hochberg, M. C. et al., 2012. American College of Rheumatology 2012 Recommendations for the Use of Nonpharmacologic and Pharmacologic Therapies in


**APPENDIX**

**Rehub prescription flow**

Rehub printed prescription