

Development of the android-based “NADA” (napas diafragma) application strategy for people of productive age towards mentally healthy Indonesia

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ABSTRACT

The pandemic that hit caused the stress level of the productive age group to increase, which would hamper the President's vision in 2024 in the health sector to create a productive Indonesian society. One inexpensive, easy, and convenient exercise to facilitate relaxation in the midst of stress is breathing exercises. However, it is necessary to explore the level of community needs and how to get breathing exercises easily. Technology is one of the means to facilitate the community in improving health. Starting from this, this study will develop an android-based diaphragmatic breathing application for people of productive age as an effort to apply technology in the health sector.

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INTRODUCTION

The vision of the President of the Republic of Indonesia, Joko Widodo, in the year 2020-2024 in the health sector is "Creating healthy, productive, independent, and just people". The Ministry of Health has established programs to support the President's vision, some of which are: Programs to improve disease prevention and control and the use of public health applications by utilizing technology. This activity demonstrates the commitment and innovation of the government in supporting and creating quality and superior Human Resources (HR) in the digital era. Superior human resources are reflected in the quality of qualified health, especially in the productive age range, which is the driving force and actor who operates the life of the nation and state. People of productive age have different demands from other categories of people in the life cycle, considering that they are starting to be required to become adults, be independent, work, and make decisions. This period makes them experience stress and need to maintain mental health to face the challenges, especially during the pandemic (Rozali et al., 2021). According to data from Suriastini, mental health disorders have increased sharply due to the pandemic, where 55% of respondents experienced high anxiety (Suriastini, Sikoki, & Listiono, 2020). This mental disorder is preceded by prolonged stress due to decreased income and fear of death. This stress leads to an increase in anxiety and depression (Ayuningtyas & Rayhani, 2018). Data shows that people in DKI Jakarta, West Java, Central Java, East

Java, South Sulawesi, and South Kalimantan experience higher anxiety than other provinces in Indonesia, which is 57%. The age group most prone to experiencing anxiety and depression is the age group of 20-30 years (65%). Prolonged stress can cause individuals to run out of energy and lead to anxiety disorders. Anxiety responses can increase the incidence of psychosomatic diseases and interfere with individual productivity. If this continues for a long time, it will delay achieving the health vision set by the President of the Republic of Indonesia in 2024.

One solution every individual can take to reduce anxiety is to do diaphragmatic breathing exercises independently. The general public does not widely know this fact due to the lack of information regarding breathing exercises and the assumption that every individual can breathe without training. This phenomenon makes people not have the awareness to do breathing exercises independently even though they know the concept of relaxation. Still, relaxation does not have a therapeutic effect in overcoming stress and anxiety. Breathing exercises sound easy, but if they are not done in the right direction, they can have the opposite effect: increased stress, shortness of breath, and even hyperventilation (R. You, 2021) (Hodzic et al., 2018).

Technology is one of the means to facilitate the community in improving health. Prudential 2021 wrote that 71% of the Asian population would use technology in the next three years to improve health and 24% will use it to manage mental health (Prudential, 2021). Application technology related to breathing exercises in Indonesian has not been able to facilitate the implementation of breathing exercises systematically, so the Indonesian people need an appropriate and easy-to-use application. The application also considers the convenience aspect so as not to cause negative complaints and can be supervised by competent professionals. Starting from what has been described above, it is necessary to apply breathing exercises that directly impact increasing diaphragmatic breathing exercises independently to improve mental health.

RESEARCH METHOD

The population in this study is the productive age group in the South Kalimantan region in the age range of 20-49 years. The research was conducted in two stages to develop a breathing exercise android application that suits the user's needs. The steps in this research are as follows:

1. Retrieval of data related to user needs from the NADA android application (Diaphragm breath).
2. NADA android application design. The stages of making the application begin with: Making an image of the function and visual appearance of the android application; creating a developer account on the google play store; application project creation; google firebase service registration for the database system; creating and implementing database design; and NADA application development.

RESULTS AND DISCUSSIONS

Data needs of android application users for diaphragmatic breathing exercises

Before making the NADA Android application, researchers explored consumer needs by distributing a questionnaire containing 13 statements. Questionnaires were distributed to 25 respondents in the productive age group of 20-49 years who are already working. Once collected, respondents' answers are summarized and interpreted as consumer needs. The following are answers to consumer needs related to breathing exercise applications which can be seen in Table 1.

Table 1. Results of consumer needs for breathing exercise android applications

No	Question	Percentage of Respondents (%)			
		Strongly Agree	Agree	Disagree	Strongly Disagree

1	Breathing exercises are very necessary for individuals who work in the age range of 20-49 years to help reduce stress due to stress	84	12	0	0
2	Recognizing that the body needs conscious breathing is a good step in controlling stress and other bodily conditions.	72	28	0	0
3	Breathing exercises need to be done even if you are not experiencing stress, anxiety, and difficulty sleeping	72	28	0	0
4	Breathing exercises only need to be done by individuals who have a high workload	52	8	24	16
5	Breathing exercises need to be done regularly every day to make the body relax	68	32	0	0
6	I need a breathing exercise app to reduce the stress I'm experiencing	68	24	8	0
7	I need a breathing exercise application that can be used anytime so that it saves time doing exercises	60	36	4	0
8	I need a breathing practice app that is easy to get and use	76	20	4	0
9	I need a breathing exercise application that uses Indonesian	68	28	4	0
10	I need an app that helps me schedule and reminds me to do breathing exercises	68	28	4	0
11	I need an app that can measure my stress level	72	24	4	0
12	I need an application that can guide and provide a choice of types of breathing exercises that suit my condition	68	28	4	0
13	I need an application that provides a referral contact when I need further consultation or treatment regarding my condition	68	28	8	0

NADA android application development

Based on the results of the questionnaire that has been distributed, it can be seen that the design of the NADA android application has been made. The following is an overview / initial appearance of the application:



Figure 1. Application startup

Application is the application of system design to process data using the rules or provisions of a particular programming language (Juansyah, 2015). The android application was chosen in development because it is open source, making it easier for researchers to develop this application according to their needs (Octavia & Kurniawan, 2018). The NADA app displays the first screen with a picture of the lungs and waves from the charts to confirm the name and use it as a guide for practicing diaphragmatic breathing. After the initial display, the user will be sent to fill in their biodata consisting of Name, Gender, Date of Birth, Telephone number, occupation, and domicile. Users define their pin to log in before using the app. After the user has successfully registered, the following screen is a menu consisting of the homepage, breathing exercises, assistance, and settings.

Home menu, asking the user's stress level. This menu provides a short questionnaire to measure the user's stress level before performing breathing exercises (Figures 2 and 3). Stress is the body's response to physical, chemical, or emotional factors that cause bodily or mental tension and can be a factor in disease emergence. Factors that cause stress are called stressors. Stressors can be internal, external, or stimuli that cause stress, such as physical, biological, environmental, situational, event, and spiritual factors. The stress experienced by a person can bring up a variety of signs and symptoms. These signs and symptoms can touch aspects of cognition, emotion, behavior, physical, and social and ultimately manifested in the form of anxiety shown by behavior: worry, nervousness, restlessness, tension, and shaking, to physical disturbances such as stomach pain, nausea, and vomiting. . If this disorder has resulted in physical problems, the individual likely has a psychosomatic illness. By knowing the stress level, users can choose breathing exercises and a breathing exercise schedule to facilitate the relaxation response to deactivate parts of the brain associated with stress and tension (Gunawan, 2018).



Figure 2. Home view of NADA android application



Figure 3. User stress level calculation display

The types of breathing exercises have been explained in the video contained in the application, which is directly linked to the link on youtube. The frequency, duration, and depth of breath have been described in each of the presented breathing exercises, namely breathing exercises 5-5, 4-7-8, and breathing exercises modified. Slow, deep breathing is also known as diaphragmatic breathing. Diaphragmatic breathing emphasizes using the abdominal muscles and the diaphragm to allow air to enter the lower area of the lungs. Diaphragmatic breathing focuses on adjusting the breathing pattern by decreasing the frequency of breaths, such as using a count when taking a deep breath, holding your breath, and exhaling slowly. Diaphragmatic breathing can activate the parasympathetic nerves to remain relaxed (J.K. Hooper, 2019) (Ma et al., 2017) (Hamasaki, 2020). In western culture, breathing techniques developed independently of religious influences and spiritual beliefs. Today, it is used for various types of therapy, especially to make the individual's body

relaxed and healthy. This is associated with a slow breathing rhythm, whereas fast breathing rhythms are often associated with stressful events, anxiety attacks, and sleep disturbances. A breathing exercise that can be used as a reference in overcoming psychological disorders is diaphragmatic breathing. The study by Xiao Ma et al. reported that 40 participants who performed diaphragmatic breathing for 30 minutes/per day experienced a decrease in the level of cortisol (stress hormone) in the blood (Ma et al., 2017). Diaphragmatic breathing also plays a role in the success of reducing anxiety rates by 40% in patients who will undergo surgery. In addition to dealing with mental disorders, this form of diaphragmatic breathing exercise can also increase heart resistance and improve sleep quality. Here are the types of diaphragmatic breathing exercises that can be done in reference to dealing with mental disorders:

Modified Breathing Exercise: 6 seconds inhale using the left nose; hold for 6 seconds; exhale for a count of 6 seconds with the correct nose; Inhale 6 seconds using the right nose; hold for 6 seconds; Exhale again from the left nose while counting 6 seconds. This exercise can be done for 30 minutes/per day for 12 weeks. In 1 week, individuals can do exercises at least five times (Naik et al., 2018).

5-5 breaths (5 seconds of inspiration and 5 seconds of expiration). This breathing exercise is also known as six breaths per minute. Steffen et al. confirmed that 5-5 breaths have a significant impact on increasing the work of the heart and reducing depression due to sudden panic attacks (Steffen et al., 2021). Heart rate has a close relationship with mood and mental disorders in individuals. The effect of this breathing exercise can be felt when done for 60 minutes/per week for six weeks.

Breathe 4-7-8 (4 counts of inspiration, seven counts of holding your breath, and eight counts of expiration with a hissing sound to the count of 8). This type of breathing exercise can provide a calming effect, reduce tension due to daily activities, fatigue, and discomfort, help relieve stress and difficulty sleeping, and improve sleep quality. 4-7-8 breathing exercises can be done twice daily with four cycles of each exercise (McNair, 2020).

The next application display is a guide for breathing exercises with an image of the lungs expanding and contracting following the seconds or counts set according to the selected breathing exercise (Figure 4). The homepage option also provides a contact that users can contact if they need psychological assistance.

The NADA android application is technology development in the health sector. Technology is one option to improve health, especially smartphones that all levels of society can access. Productive age or young adult age (18-49) is the majority age group using smartphones, around 74%-83%. The data shows a great opportunity to integrate healthcare applications into smartphone technology to increase the accessibility of people of productive age in increasing their productivity and managing mental health.



Figure 4. The display of the application with a picture of the lungs when doing breathing exercises.

CONCLUSION

People of productive age expressed their need for an android application for diaphragmatic breathing exercises. The application is easy to use in Indonesian, has a breathing exercise reminder schedule, has a score to measure stress levels, has varied breathing exercises, and has contact information for the intended referral if needed. The development of the NADA android application follows the majority of respondents' needs. On the homepage, there is a score to calculate stress levels, and three diaphragmatic breathing exercises can be selected according to the user's comfort level. The app also connects users directly with breathing exercise videos. Users can schedule breathing exercises and find referral contacts if they experience further psychological complications.

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