



VALIDITY TEST OF ACUPRESSURE DIGITAL MASSAGE TOOLS (ADMT) ON THE LEVEL OF COMFORT

Supriyadi*, Sudirman, Umi Margi Rahayu

Politeknik Kementerian Kesehatan Semarang, Jl. Tirto Agung, Pedalangan, Banyumanik, Semarang, Jawa Tengah
50268, Indonesia

*priex76@yahoo.com

ABSTRACT

Comfort is the experience a person receives from an intervention. This is a direct and comprehensive experience when physical, psychospiritual, social, and environmental needs are met. Acupressure Digital Massage Tools (ADMT) is a modified tool that can be used on acupoints. This research is to determine the effectiveness of ADMT on comfort. This research is divided into 3 stages, namely stage 1 ADMT development, and validation, second stage ADMT tool application, and third stage production development. The research design for stage 1 is R&D and the second stage now uses a quantitative pre-post test design with a control group design. Samples were taken using a purposive sampling technique. The research subjects were 40 healthy respondents grouped into two, the first group was a sample of the healthy group with ADMT totaling 20 people and the second group was a sample of the healthy group with hand acupressure totaling 20 people, data analysis used demographic characteristics and research variables, namely ADMT and pain level. Bivariate analysis uses Wilcoxon and Mean Withney. The results of the information collection concluded that the ADMT action provided a feeling of comfort with validation that the respondents stated that they were comfortable by showing a feasibility score of 70%. Using Acupressure Digital Massage Tools (ADMT) is suitable as a tool for comfort levels.

Keywords: acupressure digital massage tool (admt); comfort; chronic kidney disease (ckd)

First Received 28 March 2024	Revised 28 April 2024	Accepted 30 April 2024
Final Proof Received 18 July 2024		Published 01 October 2024
How to cite (in APA style) Supriyadi, S., Sudirman, S., & Rahayu, U. M. (2024). Validity Test of Acupressure Digital Massage Tools (ADMT) on the Level of Comfort. <i>Indonesian Journal of Global Health Research</i> , 6(6), 3659-3664. https://doi.org/10.37287/ijghr.v6i6.3628 .		

INTRODUCTION

Comfort is the experience a person receives from an intervention. This is a direct and comprehensive experience when physical, psychospiritual, social, and environmental needs are met. (Immawati, et al. 2019) The concept of comfort theory includes comfort needs, comfort interventions, intervention variables, increased comfort, health-seeking behavior, and institutional integrity. Comfort is a basic need for a holistic individual, including physical, psychospiritual, sociocultural, and environmental comfort. (Artanti ER, et al. 2018) Physical comfort is related to the body's sensation mechanisms and homeostasis, including reducing the body's ability to respond to a disease or invasive procedure. Some alternatives to meet physical needs are giving medication, changing positions, a back rub, warm or cold compresses, and therapeutic touch. Psychospiritual comfort is associated with harmony of heart and peace of mind, which can be facilitated by facilitating the client's interaction and socialization needs with those closest to him during treatment and actively involving the family in the client's healing process. Sociocultural comfort needs are related to interpersonal, family, and community relationships, including the need for discharge planning information and care that is appropriate to the client's culture. Some ways to meet sociocultural needs are

creating a therapeutic relationship with clients, respecting clients' rights regardless of social status or culture, encouraging clients to express their feelings, and facilitating teamwork that overcomes possible conflicts between the healing process and the client's culture. The final need is the need for environmental comfort which is related to maintaining the neatness and cleanliness of the environment, limiting visitors and therapy when the client is resting, and providing a safe environment for the client. (Risnah & Irwan M. 2021).

Acupuncture is a part of Chinese medicine that involves stimulating specific points on the skin using needles, pressure, heat, etc. (M. N Ikhsan. 2019) Acupuncture is a non-pharmacological therapy modality with few side effects, carried out by stimulating certain areas in the body called acupuncture points. Stimulation of acupuncture points can be done manually, using low voltage electricity, by heating, thread implantation, laser, ultrasound, and so on. Stimulation of acupuncture points can trigger various biological reactions in the body, both at the site of stimulation, such as redness around the skin, or far from the site of stimulation, such as in the nerve pathways and brain Literature has shown that acupuncture has been proven to be a natural, safe, and legal method to use. (Waite L. 2021) Acupuncture therapy has been proven effective for increasing blood flow by significantly improving endothelial function. (Matsuzawa Y. 2018) Good blood flow will carry oxygen to the brain and the muscles will carry out aerobic metabolism thereby producing less lactic acid. (Conceicao et al. 2018) Apart from that, good blood flow will also increase the speed of elimination of lactic acid from the muscles, so that lactic acid does not accumulate. So far, acupressure has been given manually using hands, causing differences in depth and pressure. This greatly influences the quality and effect of the intervention. Acupressure Digital Massage Tools (ADMT) are possible tool modifications used at point acupoints. Researchers hope that administering acupressure through this tool will provide the same appropriate pressure with level sensitivity from each point acupoint so that can give maximum effect and comfort to respondents with Good. Objective study This namely To test the effectiveness of Acupressure Digital Massage Tools (ADMT) on comfort level. This research is a superior university research proposal that is very relevant to the excellence of the Semarang Ministry of Health Polytechnic.

METHOD

This research is divided into 3 stages, namely stage 1 ADMT development and validation, stage 2 ADMT tool application, and stage 3 production development. The research design for stage 1 is R&D and stage 2 is now *experimental* research using a *pretest-posttest control group design*. The research was carried out on healthy groups within the Semarang Ministry of Health Polytechnic campus, which was divided into 2 groups. The intervention group was given to 20 respondents at 10 acupoints and measured comfort levels. The classification of the two groups was carried out based on inclusion criteria where the researcher prioritized the intervention group to carry out ADMT procedures and assess the degree of pain before and after the intervention, then continued with the control group so that both groups were in the same condition to measure the reduction in pain. degree of pain. Before providing treatment, researchers assessed the degree of pain using the Numeric Rating Scale (NRS) in the intervention group and control group. Univariate analysis to describe the characteristics of research subjects and dependent variables. Bivariate analysis was carried out to analyze differences before and after treatment using *the t-test*. Multivariate analysis to identify the effectiveness of the ADMT tool on levels of comfort.



Figure 1. ADMT tool

RESULTS

Making *Acupressure Digital Massage Tools* (ADM Tools) at PT Fast Robotic Yogyakarta. The ADM Tools have been developed and have been tested on 20 healthy respondents in the Semarang Ministry of Health Polytechnic Campus. Test results are in Table 1.

Table 1.
Frequency distribution of ADM Tools test results (n=20)

Campus Environment 1	Comfortable		Uncomfortable	
	f	%	f	%
Midwifery	3	15	2	10
Postgraduate	4	20	1	0.5
Nursing	4	20	1	0.5
Department of Dental Health	3	15	2	10

The results of the tool trial showed that 70% of respondents felt ADM Tools comfortable.

DISCUSSION

The ADMT tool is the development of a tool using sine waves, and binary beats to produce a rubbing sensation. The sine wave was chosen in this study because based on the results of identifying the wave characteristics, the most comfortable response was a sine wave (65%). Square waves provide a more painful sensation than sine waves. A sine wave is the simplest type of wave, it does not contain harmonic tones, and the sound sounds soft or smooth. Sine waves have the characteristic of gradually increasing and then decreasing in amplitude, while square waves have the characteristic of increasing rapidly then experiencing a plateau for a certain period, and then falling suddenly. The principle of this wave is that the faster it increases in amplitude (rate rise), the greater the ability of the wave to excite neural tissue. Comfort is a basic need that every person needs, whether healthy or sick. This comfort is a positive aspect that represents positive results as the ultimate goal of nursing. The research hypothesis which states that ADMT is effective in increasing comfort has been proven to be accepted. The measurement results have an influence of 70% in increasing the comfort score.

Acupuncture causes tissue lesions or microtrauma which then stimulates the body's defense mechanisms. Mechanical stimulation from acupuncture needles heat stimulation (moxibustion) or red laser light (laserpuncture) will activate transient receptor potential vanilloid-sensitive (TRPV), especially TRPV2, and cAMP which opens Ca²⁺ ion channels

and stimulates mast cell degranulation. Mast cell degranulation is the first step in a series of acupuncture stimuli that affect the target organ. Opening of Ca²⁺ ion channels causes the release of neurotransmitters which will act at the synaptic terminal and transmit action potentials along the nerve fiber. (Kavoussi B & Ross BE. 2021) Stimulation of acupuncture points causes the transmission of impulses along the A δ nerve fibers which are transmitted to the spinal cord and hypothalamus. Several imaging studies show that acupuncture therapy activates the hypothalamic region which is the center of neuroendocrine modulation and also regulation of the autonomic nervous system. Acupuncture can calm the overactivity of the sympathetic nervous system, which in turn affects the parasympathetic nervous system, which in turn will reduce heart rate and blood pressure that are too high. (Wong MC & Shen HJ. 2020)

The stimulus received by the raphe nucleus in the periaqueductal gray matter will cause the release of endogenous opioid peptides, such as β -endorphin, enkephalin, and dynorphin, which will improve endothelial dysfunction. This causes the endothelium to be able to produce NO again properly so that vasodilation is not disturbed, blood flow becomes smoother, and the availability of oxygen and nutrients also improves, so that cell metabolism becomes more aerobic. When cell metabolism becomes more aerobic, lactic acid production will also decrease. Smoother blood flow will also result in faster elimination of lactic acid from the muscles. When lactic acid production decreases and the elimination of lactic acid from muscles increases, lactic acid levels in the muscles and the blood will decrease. Decreased levels of lactic acid in the muscles result in the acidity level of muscle cells also decreasing (pH increases) so that the metabolism of glucose into energy is not disturbed and muscle energy needs can be met. This results in reduced pain. (Schwarx W & Gu QB. 2019) Acupuncture stimulation will also increase Nrf2 activity in mitochondria and the expression of Nrf2-regulated antioxidants, such as superoxide dismutase (SOD), catalase (CAT), glutathione sulfhydryl peroxidase (GSH-Px), and glutathione sulfhydryl (GSH). In addition, acupuncture stimulation will modulate the expression of p38 MAP kinase-mediated by NF- κ B which will reduce oxidants. These effects can further reduce the formation of abnormal free radicals thereby reducing oxidative/nitrosative stress which results in endothelial dysfunction, so that the resulting endothelial dysfunction can be reduced. (Cheng CY. 2018).

The mechanism of action of acupuncture is also a stress inducer which can stimulate the hypothalamus pituitary adrenal (HPA) axis. Humoral substances are secreted and flow to target organs through blood vessels by stimulating the HPA axis. Acupuncture stimulates the release of neurotransmitters, endogenous opioid-like substances, and c-FOS in the central nervous system. One component of an endogenous opioid-like substance is β -endorphin. The mechanism of action of acupuncture in inhibiting pain is by increasing β -endorphin levels, especially those that occur at the central level in the central nervous system. β -endorphins come from neuron cells of the hypothalamus and pituitary gland. This neuropeptide is the result of the breakdown of POMC which is also a precursor hormone for ACTH. In the midbrain, there are collateral branches to the periaqueductal gray matter (PAG). The PAG projects down the raphe magnus nucleus and the paragigantocellular reticularis nucleus in the medulla oblongata which will stimulate serotonergic and adrenergic fibers to the stalk cells which will then carry out inhibition in the substantia gelatinosa. (Kavoussi B & Ross BE. 2021), (Wong MC & Shen HJ. 2020), (Schwarx W & Gu QB. 2019)

The role of acupuncture as an anti-inflammatory is through the regulation of vagus nerve stimulation and Peroxisome Proliferator-Activated Receptors Gamma (PPAR γ). Acupuncture can suppress inflammatory cytokines TNF- α , IL-6, and IL-1 β , and increase IL-10 through

involvement of the vagus nerve. Stimulation of the vagus nerve specifically regulates the production of inflammatory cytokines via the cholinergic pathway, which is highly dependent on the functional and anatomical integrity of the vagus nerve. Stimulation of the vagus nerve will cause the release of acetylcholine which will bind to its receptor on macrophages which will inhibit the cytokines TNF- α and IL-1. Acupuncture can also regulate PPAR γ which plays a role in inflammation. Acupuncture stimulates PPAR γ activation thereby inhibiting the transcription of proinflammatory cytokines. PPAR γ plays a key role as a regulator of energy homeostasis and inflammation. Activation of PPAR γ will inhibit inflammatory response factor expression and human monocyte/macrophage activity by repressing NF- κ B thereby reducing the transcription of several pro-inflammatory genes, including various interleukins. (Lv E. 2020), (Cheng CY. 2018).

CONCLUSION

The ADMT action provides a feeling of comfort with a validated feasibility score of 70%, which means that the use of Acupressure Digital Massage Tools (ADMT) is suitable for use as a tool for comfort levels.

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