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Wet Cupping Therapy to The Arterial Baroreflex Sensitivity on Hypertensive Elderly

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Abstract

Wet cupping therapy can remove toxins and prevent atherosclerosis. This process will stimulate the sensitivity of the arterial baroreflex which will stimulate a decrease in blood pressure. This is to determine the impact of cupping therapy on the sensitivity of arterial baroreflex with blood pressure indicators in the elderly suffering from hypertension. Quasi-experimental research using pre and post-test and group control design approaches. The sampling technique was simple random sampling, consisting of 21 respondents which was carried out from January to April 2020. The statistics used the General Linear Model Repeated Measures (GLM-RM) test. There was a significant difference between the sensitivity of arterial baroreflex on blood pressure measurement indicators before and after 2 weeks of follow-up period at systolic BP p-value = 0.000 (24.29 ± 8.11 mmHg) and diastolic BP p-value = 0.001 (5.24 ± 6.02); between 2 weeks and 4 weeks at systolic BP p-value = 0.000 (10.95 ± 6.25 mmHg) and diastolic BP p-value = 0.000 (9.05 ± 6.25 mmHg); Between 4 weeks and 6 weeks there was no significant difference in the sensitivity of arterial baroreflex on the measurement indicator systolic BP p-value = 0.267 (-1.43 ± 5.73) and BP diastole p-value = 0.771 (-0.48 ± 7.40). Wet cupping therapy effectively increases the sensitivity of arterial baroreflex with an indicator of decreasing blood pressure in the elderly suffering from hypertension to a limit of 4 weeks after therapy and measurement after 6 weeks of having increased blood pressure.

Introduction

Hypertension is one of the causes of the risk of increasing the prevalence of diseases in cardiovascular system disorders (Nurdiantami et al., 2018). This disease can be experienced by young to old age groups, both rich and poor (Utaminingsih, 2015). Another term for hypertension is the silent killer because sufferers often feel a disorder/symptom without knowing the cause (Qureshi et al., 2017). From various studies, it has been found that adults over 50 years of age have a risk of developing hypertension reaching 90% (Kementerian Kesehatan RI, 2018). Therefore, the elderly age group is more at risk of suffering from hypertension.

Based on Basic Health Research (Riskesdas) in 2018, the prevalence of hypertension according to age classification is the age group 35-44 years (31.6%), 45-54 years (45.3%), 55-64 years (55.2%), and> 65 years (69.5%). Meanwhile, the prevalence based on gender was mostly women (36.85%). The highest hypertension was in the province of South Kalimantan (44.13%). And the lowest was in Papua (22.22%), while for the region of South Sulawesi (31.68%). By 2025, estimated there are 63.3 million people will suffer from hypertension (Kementerian Kesehatan RI, 2018). So the prevalence of hypertension in Indonesia is potentially higher than the available data.

The risk factor for hypertension that can't be modified is age (Islam et al., 2020). People with old age or the elderly will experience stiffness in the blood vessels which can cause

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the heart to pump stronger. It results in hypertension (Gasowski and Piotrowicz, 2017). Hypertension in the elderly is characterized by an increase in systolic blood pressure of more than 140 mmHg and diastolic blood pressure of more than 90 mmHg (Beddhu et al., 2018). According to previous research, the elderly ≥ 50 years with a systolic blood pressure of 130-180 mmHg require early treatment (Pareek et al., 2019). Hypertension can cause various damages affecting the quality of life so that the damage that occurs is in the arterial baroreflex (Qureshi et al., 2017). The arterial baroreflex is an autoregulatory system regulating blood pressure. It is located in the carotid sinuses in the aorta stimulating efferent autonomic nerve activity to the heart and other blood vessels (Lohmeier and Iliescu, 2015).

Physiological changes caused by age in the elderly can increase sympathetic activity and peripheral resistance. The arterial baroreflex sensitivity in the elderly as regulating blood pressure has decreased (Palesa and Sridani, 2019). The condition of the elderly who suffer from hypertension must require treatment or therapy in the form of non-pharmacological. Among the non-pharmacological therapies is complementary therapy using the wet cupping method, a traditional one (Aboushanab and Alsanad, 2018). Cupping therapy can control the hormone aldosterone levels reducing the amount of blood that flows blood vessels. It will trigger the arterial baroreflex sensitivity and providing a stimulus to increase sensitivity to conditions causing hypertension (Aboushanab & Alsanad, 2018).

Research from Saudi Arabia stated wet cupping therapy effectively reduces systolic blood pressure in hypertensive patients for up to 4 weeks, so that there is an increase in baroreceptors, without serious side effects (Aleyeidia et al., 2015). Another study explained that the cupping point location in the hypertension treatment only focuses on two points (Elizabeth et al., 2019). Based on previous studies, wet cupping therapy can reduce blood pressure in people with hypertension. But this therapy is still rarely done in the working area of Puskesmas Empagae, Sidrap Regency because they are more focused on pharmacological ones.

Many people think that hypertension among the elderly is a common thing. So treatment is not needed because it is considered not to affect life. Based on the studies that blood pressure always increases, it can cause complications such as a heart attack or stroke (Beddhu et al., 2018). Increased sensitivity of the arterial baroreflex will cause sympathetic and parasympathetic activity. The increase resulting in a decrease in heart rate and blood pressure, and vice versa, decreased arterial baroreflex sensitivity will cause an increase in blood pressure (Aboushanab & Alsanad, 2018; Kazimierska et al., 2019). The objective of this study is to determine the effect of wet cupping therapy intervention on the arterial baroreflex increased sensitivity in hypertension elderly people in Sidrap, eastern Indonesia.

Method

This research is a quantitative study with a quasi-experimental research design using a pre and post-test approach and a control group design (Ingham-Broomfield, 2015). The objective is to determine the difference in the sensitivity increase of arterial baroreflex to blood pressure indicators, before and after the wet cupping therapy intervention. The research was conducted in Sidrap Regency, South Sulawesi, eastern Indonesia, conducted from January to April 2020. Before data collection, this study received approval from the STIKES Muhammadiyah Sidrap Research Ethics Commission (No.092 / KEP / II.3.AU / F / 2020) uses ethical principles by obtaining informed consent beforehand in the elderly.

The population was all hypertension elderly, based on data from the examination results by the manager of Non-Communicable Diseases (NCD) at Empagae Health Center, Sidrap Regency. The elderly included in this study were those suffering from grade I and grade II hypertension. The sample met the criteria if had high blood pressure at the research time (systolic blood pressure ≥140 mmHg and diastolic blood pressure ≥90 mmHg), aged between 45 and 65 years old, and male. The elderly on grade III hypertension (systolic blood pressure of 180 mmHg or more and diastolic blood pressure of 110

mmHg or more), having complications such as DM, was excluded in this study. The sampling technique was simple random sampling (Polit and Beck, 2017), with 21 respondents who met the criteria.

After re-checking the feasibility and written approval of the respondent then the researcher does the sample randomization process. In this study, We kept the respondents' identities secret during the research process. This research applied the lottery method as a randomization process. The researcher processed randomizing and recruiting respondents into groups. If respondents want to drop, they are free, and there is no coercion element and maintain the respondent's confidentiality.

Wet cupping therapy is the intervention in this study. The research was taken place in Sidrap Regency, South Sulawesi, eastern Indonesia. Wet cupping therapy procedures, namely; measure blood pressure, prepare wet cupping equipment (hands-on, mask, apron, cupping cup, cupping pump, lancing, lancet, tray, com, sterile gauze, scissors, and herbal oil). Clean the area using herbal oil and put a header. Then do suction for 3-5 minutes, do a lancing device injury, put the cupping back on, and do the suction. After 3-5 minutes, open the header, then wipe around the cupped area. Wet cupping therapy is applied at three points on the body. The first point is on two fingers posterior to the lower jaw corners on both sides. Below the skull bone at the hairline (Al-Akhda'ain). The second point is the upper part of the spine that extends to the neck, the top third of the spine consisting of six vertebrae or the C7 cervical spine (Al-Kaahil). The other point is Azh-Zahrul A'la on both sides of the front shoulder point. In this study, wet cupping therapy was carried out once a month for three consecutive months on the 17th, 19th, and 21st of the Arabic calendar (Hijrah) (Qureshi et al., 2017).

The result of this research is the measurement of blood pressure. Each measurement was taken in a seated position. The researcher used a digital oscillometric sphygmomanometer to minimize the results of the observation bias. Measurement of blood pressure after wet cupping therapy is viewed weekly to determine the average value of blood pressure reduction and to determine the maximum daily limit for the effect of cupping therapy on blood pressure. Based on the guidelines, patients should rest 3-5 minutes after giving wet cupping therapy and take blood pressure measurements in the arm during the initial visit. Patients are also advised not to consume foods containing nicotine or caffeine for 1 hour before measuring blood pressure. The measurement results recorded were documented at least twice per visit, as for the schedule of visits every once a week for the next eight weeks.

Statistical analysis uses the SPSS version 21.0 program. The researcher compared arterial baroreflex sensitivity to blood pressure indicators since the baseline of measurement, two weeks and four weeks after the intervention. The test used was the General Linear Model Repeated Measures (GLM-RM) (Heavey, 2014). A p-value <0.05 was considered significant and the average difference in blood pressure indicators, with a 95% confidence interval.

Result And Discussion

This study result showed that the respondents' mean age was 57.6 ± 6.5 years, with 7.4 ± 1.8 years suffering from hypertension. The cholesterol level value measurement from the average low-density lipoprotein value in the high category was 160.7 ± 11.5 gr / dL. So this is one of the triggers for an increase in blood pressure. Meanwhile, 41.5% had a family history of heart disease. Other risk factors were a smoking history of 19.0% and lack of activity in 21.4% (Table 1).

Based on table 2, baroreceptor sensitivity in the elderly with hypertension have a visible difference from the average value of lowering blood pressure. Based on the BP systolic indicator before, after a follow-up period of 2 weeks to 4 weeks, there was a significant difference in the elderly (p-value = 0.000). This result is different from the measurement at the period after four and six weeks. There was no significant difference in systolic BP (p-value = 0.267) (Table 3). So the systolic BP at week four had reached normal limits as well as at week six. But the 6-week follow-up period saw a mean increase of 1.43 ± 5.73 mmHg so that the limit

of effect of wet cupping therapy was only up to week 4 (Figure 1).

Tabel 1. Respondents Characteristics (n=21)

Characteristics	Result
Age average, year (±SD)	57.6±6.5
Time of hypertension average, ratio (±SD)	7.4±1.8
LDL average, mg/dL (±SD)	160.7±11.5
Family history of cardiac disease, n (%)	17 (41.5)
Smoking history, n (%)	8 (19.0)
Physical activity, n (%)	9 (21.4)

SD= standard deviation; LDL= Low Density Lipoprotein.
Source: Primary Data, 2020

Diastolic blood pressure indicator also decreased every time the follow-up measurement period except at week six experienced an increase of 0.48 ± 7.40 mmHg (Figure 1). These results indicate that after a follow-up period of 2 to 4 weeks, there is a significant difference in the elderly (p-value = 0.000). Measurements after four by six weeks had no significant difference (p-value = 0.771). So the limit of the cupping therapy effect on the sensitivity of arterial baroreflex on the diastolic blood pressure indicator is only up to week four (Table 3). The cupping effect on high blood pressure has the benefit of relaxing the sympathetic nervous system. Furthermore, triggers the secretion of an enzyme having a role as angiotensin renin in lowering blood pressure (Aboushanab & Alsanad, 2018).

Table 2. Comparison of arterial baroreflex sensitivity on systolic blood pressure (BP) indicator before and after 2 to 6 weeks wet cupping therapy (n=21)

Variation of measurement result (n=21)	Mean difference±SD	Min-Max (CI95%)	T	P*
Systolic BP (mmHg)				
Before --> 2 week after	24.29±8.11	20.59-27.98	13.73	<0.001
2 week after --> 4 week after	10.95±6.25	8.11-13.79	8.03	<0.001
4 week after -->6 week after	-1.43±5.73	-4.04-1.81	-1.14	0.267

Source: Primary Data, 2020

Table 3. Comparison of arterial baroreflex sensitivity on diastolic blood pressure (BP) indicator before and after 2 to 6 weeks wet cupping therapy (n=21)

Variation of measurement result (n=21)	Mean difference±SD	Min-Max (CI95%)	t	*P**
Diastolic (mmHg)				
Before --> 2 week after	5.24±6.02	2.50-7.98	3.99	0.001
2 week after --> 4 week after	9.05±6.25	6.20-11.89	6.64	<0.001
4 week after --> 6 week after	-0.48±7.40	-3.85-2.89	-2.95	0.771

Source: Primary Data, 2020

The results showed a significant increase in the arterial baroreflex sensitivity. Before and after the intervention of wet cupping therapy. It was indicated by the blood pressure measurement of 10.95 ± 6.25 mmHg systolic BP and 9.05 ± 6.25 mmHg diastolic BP after four weeks of follow-up. After six weeks of follow-up, the wet cupping effect was gone, and there was no significant difference in blood pressure reduction. The result is in line with previous studies finding a significant difference in blood pressure and diastolic values after two weeks of follow-up (Darmawan et al., 2017). Another study from China stated that wet cupping

therapy could lower blood pressure in the 4th week after (Xing et al., 2020). Thus, it has an effect that lasts 2-4 weeks.

Comparison of blood pressure before wet cupping therapy, the follow-up period was two weeks to four weeks after therapy. There is a significant difference in systolic blood pressure p-value = 0.000 and diastolic blood pressure p-value = 0.000. It is different from the follow-up period of four weeks by six weeks. There was no significant difference on systolic blood pressure p-value = 0.267 and diastolic blood pressure p-value = 0.771. But the decrease in blood pressure was not very significant. It could be influenced by the follow-up period was too short. Respondents are aware of the results and change their diet to a low salt diet and their daily lifestyle such as physical activity. Physical conditions significantly affect the increase in the arterial baroreflex sensitivity, as the autoregulator to blood pressure or heart health (Subramanian et al., 2019).

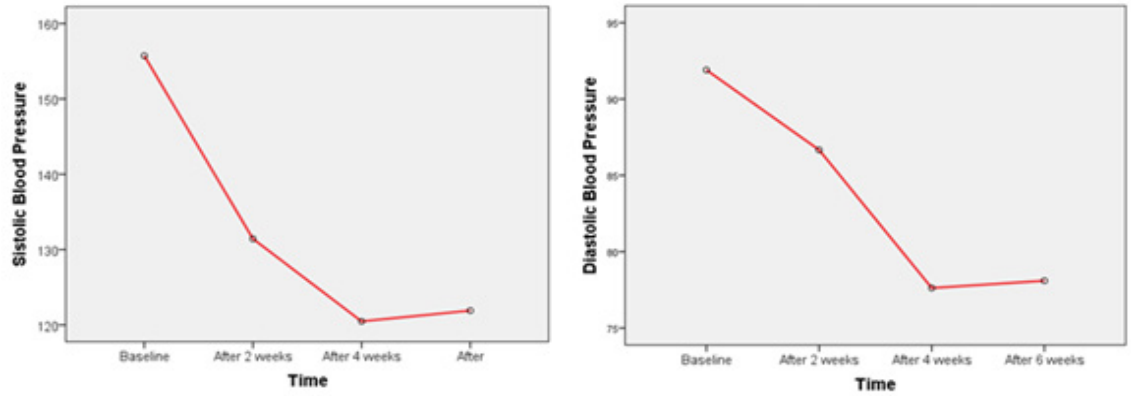

Image 1. The difference in the decrease in systolic and diastolic blood pressure for each measurement period before, after 2 weeks to 6 weeks of wet cupping therapy.

A study from Arabia used the wet cupping therapy method. By comparing the results of blood pressure before and after two months of therapy, there was a result of p-value = 0.001 with a decrease in blood pressure from 149.2 mmHg to 130.8 mmHg (Al-Tabakha et al., 2018). This result is different from this study. The initial period with the follow-up period after wet cupping therapy can increase the baroreceptors at week two. At week four, blood pressure is within normal limits and at week six has an increase of 1.43 ± 5.73 mmHg in systolic BP and 0.48 ± 7.40 mmHg in diastolic BP from normal limits at four weeks of the follow-up measurement period. Wet cupping therapy worked as an alternative therapy. The effect could be lasting up to four weeks in arterial baroreflex sensitivity maintenance as blood pressure and heart rate regulator in hypertension elderly.

The procedure in this study, every 17th, 19th, and 21st (hijrah), is the process of giving wet cupping therapy selected based on Islamic literature (Qureshi et al., 2017). Another study stated that it was not conducted on days other than recommended by Islamic literature. Which once a month for three consecutive months (Zhang et al., 2020). Therefore, it is necessary to do further research on the differences between certain days and other days on the results of wet cupping therapy. Related with the changes in blood pressure in hypertensive elderly.

Although wet cupping therapy can affect the increase in baroreceptor with an indicator of a decrease in blood pressure, it is affected by several factors. One of which is the amount of blood removed during suction (Al-bedah et al., 2019). In this study, the amount of blood removed was not measured. The more blood clots, the better the results (Lu et al., 2019). The wet cupping therapy mechanism can remove toxins mixed with blood or oxidants from the body through the skin surface (Kim et al., 2017). The release of toxins can increase blood flow and prevent atherosclerosis. It will stimulate the arterial baroreflex sensitivity, which will provide a stimulus to the autonomic nerves (reduce the work of sympathetic nerves). Then it will inhibit the vasomotor center, which causes vasodilation and blood pressure

decreases (Lohmeier & Iliescu, 2015; Beddhu et al., 2018).

The "Taibah Theory" explained the increasing baroreceptors mechanism indicated by decreased blood pressure as the effect of wet cupping therapy. The "Taibah Theory" stated that it could dry out intestinal fluid, excess intravascular fluid, and harmful metabolic substances (El-shanshory et al., 2018). It can also stimulate the production of endogenous nitric oxide and the excretion of accumulated vasoactive substances and free radicals, which lead to reduced blood pressure measurements (Almaiman, 2018). That is why cupping therapy can be used to prevent a decrease in the sensitivity of baroreceptors which can stimulate an increase in blood pressure.

This study has a good effect, one of which is to monitor the respondent's condition after therapy for up to 6 weeks. The study has limitations since it does not measure blood clots per cup taken on the "Al-Akhda'ain, Al-Kaahil, and Azh-Zahrul A'la" points. This study is different from previous studies because focusing on determining the sensitivity of the arterial baroreflex, which functions as a regulating system for blood pressure using the "Taibah theory" approach. So the results of this study are useful for medical personnel in providing interventions related to the handling and prevention of increased blood pressure in the elderly with wet cupping therapy, affecting up to week four and provide a stimulus to increase the sensitivity of the arterial baroreflex in the carotid sinuses.

Conclusion

Wet cupping therapy can effectively increase baroreceptors sensitivity which can lower blood pressure in elderly with hypertension, lasting up to a limit of 4 weeks and without any relevant side effects. This research recommends wet cupping as a therapy for the prevention of hypertension. Further research, the researcher should notice the number of blood clots per cupping cup and not using anti-hypertensive drugs simultaneously. We also recommend conducting research development on heart rate measurement

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References

Aboushanab, T.S., & Alsanad, S., 2018. Cupping Therapy : An Overview from a Modern Medicine Perspective. Journal of Acupuncture and Meridian Studies, 11(3), pp.83–87.

Ibrahim S. Elsubai,a Naseem Akhtar Qureshi,a Tamer Shaban Aboushanab,a Gazzaffi I.M. Ali,a Ahmed Tawfik El-Olemy,a,b Asim A.H. Khalil,a Mohamed K.M. Khalil,a and Meshari Saleh Alqaeda

Al-bedah, A.M.N., Elsubai, I.S., Qureshi, N.A., Aboushanab, T.S., Ali, G.I.M., El-Olemy, A.T., Khalil, A.A.H., Khalil, M.K.M., & Alqaeda, M.S., 2019. The Medical Perspective of Cupping Therapy: Effects and Mechanisms of Action. Journal of Traditional and Complementary Medicine, 9, pp.90–97.

Al-Tabakha, M.M., Sameer, F.T., Saeed, M.H., & Batran, R., 2018. Evaluation of Bloodletting Cupping Therapy in the Management of Hypertension. Journal of Pharmacy & BioAllied Sciences, 10(1), pp.1–6.

Aleyeidi, N.A., Aseri, K.S., Matbouli, S.M., Sulaiamani, A.A., & Kobeisy, S.A., 2015. Effects of Wet-cupping on Blood Pressure in Hypertensive Patients: A Randomized Controlled Trial. Journal of Integrative Medicine, 13(6), pp.391–399.

Almaiman, A.A., 2018. Proteomic Effects of Wet Cupping (Al-hijamah). Saudi Medical Journal, 39(1), pp.10–16.

Beddhu, S., Chertow, G.M., Cheung, A.K., Cushman, W.C., Rahman, M., Greene, T., Wei, G., Campbell, R.C., Conroy, M., Freedman, B.I., Haley, W., Horwitz, E., Kitzman, D., Lash, J., Papademetriou, V., Pisoni, R., Riessen, E., Rosendorff, C., Watnick, S.G., Whittle, J., & Whelton, P.K., 2018. Influence of Baseline Diastolic Blood Pressure on Effects of Intensive Compared With Standard Blood Pressure Control. Circulation, 137(2), pp.134–143.

Darmawan, B., Fatmasari, D., & Pujiastuti, R.S.E., 2017. Negative Air Pressure on Wet Cupping in Decreasing Blood Pressures in Hypertensive Patients. Nurse Media Journal of Nursing, 7(2), pp.116–129.

El-Shanshory, M., Hablas, N.M., Sheb, Y.,

Fakhreldin, A.R., Attia, M., Almaramhy, H.H., Baghdadi, H., Ayat, M., Albeihany, A., El-Dardear, A., Ibrahim, H.A., Mahmoud, H.S., Nabo, M.M.H., & Sayed, S.M.E., 2018. Al-hijamah (Wet Cupping Therapy of Prophetic Medicine) Significantly and Safely Reduces Iron Overload and Oxidative Stress in Thalassemic Children : A Novel Pilot Study. Journal of Blood Medicine, 9, pp.241–251.

Elizabeth, M., Yusof, Y.B., Mohamad, M.S.B., Bakar, M.F.A., & Ibrahim, M.A., 2019. Efficacy of Cupping in the Treatment of Hypertension Disease Using Graph Colouring. Journal of Physics: Conference Series, 1366, pp.1–8.

Gasowski, J., & Piotrowicz, K., 2017. Hypertension in the Elderly: Change of, or New Implications Within the Existing, Paradigm?. European Geriatric Medicine, 8(4), pp.289–292.

Heavey, E., 2014. Statistik Keperawatan Pendekatan Praktik. Jakarta: EGC.

Ingham-Broomfield, B., 2015. A Nurses' Guide to Quantitative Research. Aust J Adv Nurs, 32(2), pp.32–38.

Islama, T., Siraj, S., Hassan, Z., Nayem, M., Nag, D.C., Islam, A., Islam, R., Mazumder, T., Choudhury, S.R., & Siddiquee, A.T., 2020. Influence of Height on Blood Pressure and Hypertension Among Bangladeshi Adults. International Journal of Cardiology Hypertension, 5(June), pp.1–6.

Kazimierska, A., Placek, M.M., Uryga, A., Wachel, P., Burzyńska, M., & Kasprowicz, M., 2019. Assessment of Baroreflex Sensitivity Using Time-Frequency Analysis during Postural Change and Hypercapnia. Computational and Mathematical Methods in Medicine, 2019, pp.1–17.

Kementerian Kesehatan RI., 2018. Profil Kementerian Kesehatan Tahun 2018. Jakarta.

Kim, J., Cho, J., Do, K., & Lim, S., 2017. Effect of Cupping Therapy on Range of Motion, Pain Threshold, and Muscle Activity of the Hamstring Muscle Compared to Passive Stretching. Journal of The Korean Society of Physical Medicine, 12(3), pp.23–32.

Lohmeier, T.E., & Iliescu, R., 2015. The Baroreflex as a Long-Term Controller of Arterial Pressure. Journal Physiology, 30(2), pp.148–158.

Lu, S., Du, S., Fish, A., Tang, C., Lou, Q., Zhang, X., 2019. Wet Cupping for Hypertension : A Systematic Review and Meta-analysis. Clinical and Experimental Hypertension, 41(5), pp.1–7.

Nurdiantami, Y., Watanabe, K., Tanaka, E., Pradono, J., & Anme, T., 2018. Association of General and Central Obesity with Hypertension. Clinical Nutrition, 37(4), pp.1259–1263.

Palesa, H., & Sridani, N.W., 2019. Faktor-Faktor Yang Berhubungan Dengan Penderita Hipertensi Di Rsu Anutapura Palu Provinsi Sulawesi Tengah. Jurnal Kesehatan Tadulako, 5(2), pp.63–71.

Pareek, M., Vaduganathan, M., Biering-Sørensen, T., Byrne, C., Qamar, A., Almarzooq, Z., Pandey, A., Olsen, M.H., & Bhatt, D.L., 2019. Pulse Pressure, Cardiovascular Events, and Intensive Blood-Pressure Lowering in the Systolic Blood Pressure Intervention Trial (SPRINT). The American Journal of Medicine, 132(6), pp.733–739.

Polit, D.F., & Beck, C.T., 2017. Nursing Research: Generating and Assessing Evidence for Nursing Practice. 8th edn. Philadelphia: Wolters Kluwer/Lippincott Williams and Wilk.

Qureshi, N.A., Ali, G.I., Abushanab, T.S., El-Olemy, A.T., Alqaed, M.S., El-Subai, I.S., Al-Bedah, A.M.N., 2017. Review History of Cupping (Hijama): A Narrative Review of Literature. Journal of Integrative Medicine, 15(3), pp.172–181.

Subramanian, S.K., Sharma, V.K., Arunachalam, V., Rajendran, R., & Gaur, A., 2019. Comparison of Baroreflex Sensitivity and Cardiac Autonomic Function Between Adolescent Athlete and Non-athlete Boys–A Cross-Sectional Study. Frontiers in Physiology, 10, pp.1-8.

Utaminingsih, W., 2015. Mengenal & Mencegah Penyakit Diabetes, Hipertensi, Jantung dan Stroke Untuk Hidup Lebih Berkualitas. Yogyakarta: Media Ilmu.

Xing, M., Yan, X., Yang, S., Li, L.,Gong, L., Liu, H., Xu, R., Chen, J., Ying, L., Zhao, Y., An, Y., Liu, Y., Huang, G., Guo, F., Yin, Q., Wang, R., Li, B., & Li, X., 2020. Effects of Moving Cupping Therapy for Plaque Psoriasis : Study Protocol for a Randomized Multicenter Clinical Trial. BMC. Trials, 21(229), pp.1–9.

Zhang, X., Tian, R., Lam, W.C., Duan, Y., Liu, F., Zhao, C., Wu, T., Shang, H., Tang, X., Lyu, A., & Bian, Z., 2020.Standards for Reporting Interventions in Clinical Trials of Cupping (STRICTOC): Extending the CONSORT Statement. Chinese Medicine. 15(10), pp.1–15.