Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

Effects of Morning's Prayer Routines in The Congregation on Random Blood Sugar Levels of Elderly at Al Wahyu Mosque Rungkut Surabaya

Lani Diana[1], Indri Ngesti Rahayu[2*], R. Varidianto Yudo T.[3]

[1]Medical Faculty Hang Tuah University, Surabaya
[2]Physiology Department, Medical Faculty Hang Tuah University, Surabaya
[3]Microbiology Department, Medical Faculty Hang Tuah University, Surabaya
Corresponding email: indri.ngesti@hangtuah.ac.id

ABSTRACT

Background: Increased health problems in the elderly occur because of the aging process that causes many changes in their body. One of the changes is the increase in blood glucose more than normal and at risk of diabetes mellitus. Morning prayer can be a religious coping and regular physical activity that lowers blood sugar levels.

Objective: to analyze the effect of the morning prayer routines in the congregation on random blood sugar levels of the elderly at Al-Wahyu Mosque Rungkut Surabaya**.**

Method: This study was an observational analytic study with a cross-sectional design using 30 respondents. The group studied was the congregation of the morning prayers of the Al Wahyu Mosque Rungkut Surabaya which was over 45-year-old which undergoes random blood sugar levels measurement.

Results: The Independent t-test method showed that the value of signification was 0,000 ($p<0,05$) which means that there is the influence of the morning prayer's routines in the congregation on random blood sugar levels of the elderly at Al-Wahyu Mosque Rungkut Surabaya.

Conclusion: Elderly people who routinely carry out the morning prayer routines in the congregation have lower blood sugar levels than elderly people who are not routine.

Keyword: the morning prayer's routines in the congregation; Elderly people; Random Blood Glucose Level; Coping mechanism

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

INTRODUCTION

The proportional development of the elderly in Indonesia experienced an increase in 1980 to 2020 in which 1980 it was around 5,45%, in 2010 it was around 9,77%, and it was estimated that in 2020 it would increase by around 11,34% (Kesehatan-RI, 2014). The increase of elderly people would increased health problems among them, because of the aging process which caused many changes in their body such as disruption of the blood glucose regulation system results in an increase in blood glucose more than normal and the risk of developing diabetes mellitus (DM). DM is a disease characterized by increasing blood glucose levels above normal (hyperglycemia) due to insulin deficiency, both absolute and relative.

The Fajr (Subuh) prayer is the only prayer that must be performed in the morning before dawn so that it can cause various effects that are good for health, different from another prayer. It also includes nonphysical components such as mental spiritual and solemnness when performing so that can provide religious coping effects.

Several studies on the benefits of prayer, including the relationship between prayer and the activity of the autonomic nervous system, show that during prayer, parasympathetic activity increases and sympathetic activity decreases. Therefore, the practice of regular prayers can help promote relaxation, reduce stress and anxiety, and reduce cardiovascular risk (Haque and Ghosh, 2013). The importance of spiritual and religious factors can affect the self-

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

care of patients including diabetic patients, because there is a relationship between spiritual and religious in glycemic control (Newlin, et al., 2008).

Prayer also can play a role as a physical activity that plays a role in controlling blood sugar levels. Ilyas in Soegondo (2018) explained that physical activity causes an increase in blood flow, the capillary nets are more open so that more insulin receptors become active which will affect the decrease in blood glucose (Ilyas, 2018).

International Diabetes Federation Study in 2013, DM suffered by 382 million people worldwide (IDF, 2013). BPS's data in 2012 shows that the highest health complaint of the elderly is the effects of chronic diseases such as gout, high blood pressure, rheumatic disease, low blood pressure and diabetes (32,99%), followed by cough (17,81%) and colds (11,75%) (Kesehatan-RI, 2014). Therefore, it is necessary to improve the efforts to prevent the occurrence of Diabetes Mellitus. Research has been conducted on the effect of Dhuha's prayer on blood glucose levels which significantly reduces blood glucose levels (Rajin M, 2010). The purpose of this study was to determine the effect of the routine morning prayer in the congregation with random blood glucose levels in the elderly at Al Wahyu Mosque in Surabaya.

METHODS

This research was an analytical observational study with a cross-sectional design using 30 respondents chosen by the consecutive sampling method. The

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

group studied was the congregation of the morning prayers of the Al Wahyu Mosque

Rungkut Surabaya which was over forty-five-year-old, performing the morning prayer's routine in the congregation at the Al-Wahyu Mosque Rungkut Surabaya and willing to participate in this research which was stated by signing informed consent, undergo random blood sugar levels measurement. This study did not use a control group, samples were grouped by age.

Data collection was done through filling out questionnaires to determine the characteristics of respondents consisting of age, education, history of DM, and the frequency of morning prayer's routines in the congregation. Routine frequency is categorized based on ADA 2016 physical activity recommendations, which is more than 2−3 days/week. Then it is said routine if more than 3 days a week while not routine if less than 3 days a week.

Random blood sugar level measurements are performed after the elderly do the morning prayer routines in the congregation. This measurement is done by taking capillary blood and using Nesco Multi check with a measuring range of 20-600 mg / dL. Furthermore, data processing is performed using a computer program. Analysis of the data in this study uses the Independent T-test with $\alpha < 0.05$ to find out whether there is an effect of morning prayer routines in the congregation on the elderly random blood glucose levels.

RESULTS AND DISCUSSION

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

Characteristic of respondents

1. Age

Table 1 Frequency distribution of elderly respondents in the morning prayer's routines in the congregation at Al-Wahyu Mosque Rungkut Surabaya based on age

Age	N	%
45-59	3	10%
60-74	25	83,33%
75-90	2	6,67%
>90	0	0%
Total	30	100%

* Distribution according to WHO

Based on table 1 it can be seen that the elderly respondents of the morning prayer's routines in the congregation at the age of 45-59 years as many as 3 people (10%), 60-74 years as many as 3 people (83.33%), 75-90 years as many as 2 people (6, 67%), and none were> 90 years old.

2. Sex

Table 2 Frequency distribution of elderly respondents in the morning prayer's routines in the congregation at Al-Wahyu Mosque Rungkut Surabaya based on sex

Sex	n	%
Man	26	86,7%
Woman	4	13,3%
Total	30	100%

Based on table 2 it can be seen that the majority of respondents are male as many as 26 people (86.7%) and a small proportion of respondents are female as many as 4 people (13.3%).

3. Education history

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

Table 3 shows that respondents with a history of graduating from junior high school were 1 person (3.3%), not graduated from high school were 1 person (3.3%), graduated from high school were 12 people (40%), the diploma was 2 people (6.7%) and as many as 14 people graduates (46.7%).

Table 3 Frequency distribution of elderly respondents based on educational history

Educational history	n	%
Graduated from Junior High School	1	3,3%
Not graduated from Senior High School	1	3,3%
Graduated from Senior High School	12	40,0%
Diploma	2	6,7%
Bachelor	14	46,7%
Total	30	100%

4. History of DM

Table 4 shows that out of 30 respondents, most of them do not have a history of DM, as many as 21 people (70%) and a small proportion of respondents who have a history of DM as many as 9 people (30%).

Table 4 Distribution of respondent frequencies based on DM history

History of DM	n	%
Yes	21	70%
No	9	30%
Total	30	100%

5. Distribution of respondents' random blood sugar levels

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

Based on table 5 it is known that the elderly respondents with high blood sugar (> 200 mg/dl) amounted to 1 person (3.33%). Respondents mostly had random blood sugar levels of 90-199 mg/dl as many as 26 people (86.67%) and <90 mg/dl as many as 3 people (10%).

Table 5 Distribution of respondents' random blood sugar levels

The Random blood glucose level	n	%
<90 mg/dL	3	10%
90 – 199 mg / dL	26	86,67%
>200 mg / dL	1	3,33%
Total	30	100%

* Distribution based on PERKENI

ANALYTICAL RESULTS

Table 6 T-test results

T	Df	P (signification)
-5,941	28	0,000

This study got the significance value of 0.00 from table 6. We used α = 5%, it is found that H0 is rejected because the significance value is smaller than α, so there is an effect of the morning prayer's routines in the congregation on the random blood sugar level of the elderly in the Al-Wahyu Mosque Rungkut Surabaya significantly.

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

In this study, complementary interventions in the form of dawn prayer as a therapy that causes the elderly's blood sugar levels to become normal in the morning. Prayer is a ritual and spiritual dimension that can also affect the self-care of diabetic patients. The results of this study are in line with Newlin (2008) and Singh (2012) in their research which shows the relationship between spiritual and religious in glycemic control (Newlin, et al., 2008; Singh, et al., 2012).

Fajr prayer can be a religious coping which is a stress relief that is done using the divine approach. Increased blood glucose levels can also be influenced by psychological stress factors. According to Goldstein and Muller, psychological stress has a close relationship with controlling blood sugar levels both directly and indirectly through the mechanism of hormonal changes in the body that can increase glucose levels in the blood.

The effect of religious coping is obtained from prayers that are said during prayer which will cause calm or a form of relaxation. When the body is in a state of relaxation, stress hormones will naturally experience suppression, so that glucose levels in the blood can be maintained under normal conditions. Fajr prayer is a spiritual activity that can be a meditation and relaxation therapy so that the heart becomes calmer. Meditation, yoga, qi-gong, and other relaxation techniques, have been studied in diabetes as a means of reducing blood glucose levels (DiNardo, 2009). Patients with type 1 diabetes do not make insulin, so reducing stress does not affect controlling stress. Some people with type 2 diabetes may also be more sensitive to some stress hormones (ADA, 2016).

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

The relaxed condition changes in nerve impulses occur in the afferent pathway to the brain where activation becomes inhibited. This change in nerve impulses causes feelings of calm both physically and mentally such as a decrease in heart rate, a decrease in the body's metabolic rate in this case preventing an increase in blood glucose. The anterior pituitary is also inhibited so that ACTH which secretes cortisol decreases, then gluconeogenesis, protein catabolism, and fat that play a role in increasing blood glucose also decreases (Hall, 2016).

Somogyi argued that hypoglycemia at night can cause a counterregulatory hormone response which results in hyperglycemia in the morning (Rybicka, et al., 2011). However, if the body experiences insulin resistance as in the elderly and diabetics, there will be a dawn phenomenon by increasing circadian glucose levels in the morning. The hormones that show circadian variation in the morning are cortisol and growth hormone, which both stimulate gluconeogenesis. In people with Type II diabetes, it can also occur in the morning, either as a normal circadian variation or as a response to growth hormone or cortisol. (Corwin, 2009). Many studies showed an association between diabetes and morning hyperglycemia (Porcellati, et al., 2013). However, in this study, after a complementary intervention in the form of dawn prayer as a relaxation therapy obtained elderly blood sugar levels with a history of diabetes as much as 30% of the sample had random blood sugar levels normal in the morning.

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

In addition to providing a relaxing effect, dawn prayer can be a healthy physical activity. Physical activity results in a variety of adaptation benefits in skeletal muscle, including increased glucose transporter 4 (GLUT-4). Increased muscle GLUT-4 can contribute to increased muscle sensitivity to insulin, increase insulin sensitivity, reduce blood glucose levels, and have other benefits concerning the stimulation of β-endorphin production (Gordon, et al., 2009).

The results of this study are also in line with Rajin's research that reviews prayer movements from the concept of biomechanics that can reduce blood sugar levels. There are 2 types of muscle contraction movements in the form of isometric and isotonic muscle contractions, where isometric muscle contractions are more dominant (predominant). Movement with isometric and isotonic muscle contractions can both reduce blood glucose levels, but movements with isometric muscle contraction are more effective and can reduce blood glucose more. Decreased blood glucose levels after physical activity with prayer are due to an increase in glucose uptake into muscle cells. Increased glucose uptake because the prayer is made isometric activity movement is more dominant than isotonic activity movement. Prayer movements with isometric activity movements in the form of movements when standing, prostration, stand up, bowing, and sitting between two prostrations. Glucose uptake is more on isometric movements because the movements that occur are antagonistic muscle contraction movements that involve more muscle contractions (Rajin, 2010).

CONCLUSION

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

Based on the results of research and data analysis, it can be concluded that there is an influence on the routine of dawn prayer in the congregation on blood sugar levels in the elderly at Al Wahyu Rungkut Mosque in Surabaya with a significance value of p <0.005.

This research is expected to be used as input for the elderly to do morning prayer regularly to reduce blood sugar levels and prevent diabetes and for medical staff to provide non-pharmacological treatment that can control the blood sugar levels of the elderly and people with type II diabetes mellitus with an approach spiritual. Further research is needed by expanding research variables such as a history of drugs consumed, dietary patterns for diabetics, longer research time, and intensive monitoring.

REFERENCES

ADA, A. D. A., 2016. *Diabetes Management Guidelines.* [Online] Available at: http://www.ndei.org/ADA-diabetes-management-guidelinesdiagnosisA1C-testing.aspx.html [Accesed September 18th, 2016].

Corwin, E. J., 2009. *Buku Saku Patofisiologi.* 3rd ed. Jakarta: EGC.

DiNardo, M. M., 2009. Mind-Body Therapies in Diabetes Management. *Diabetes Spectrum,* Volume 22(1), pp. 30-34.

Gordon, B., Benson, A., Bird, S. & Fraser, S., 2009. Resistance training improves metabolic health in type 2 diabetes: A systematic review. *Diabetes Research and Clinical Practice* 83, p. 157–175.

Hall, John E., 2016. *Guyton and Hall's Textbook of Medical Physiology.* 13th ed. Philadelphia: Elsevier.

Oceana Biomedicina Journal
OBJ
ocean-biomedicina.hangtuah.ac.id/index.php/journal
eISSN 2614-0519
Volume 4 Issue 2: July – December 2021
RESEARCH STUDY

Haque, Azizul. and Ghosh, Sandip S., 2013. Namaz is a very good exercise for wholesome development. *Global Research Analysis 2(11)*, pp. 220-221.

IDF, I. D. F., 2013. *IDF Diabetes Atlas, Sixth Edition.* [Online] Available at: https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/19-atlas-6th-edition.html [Accessed December 26th, 2016].

Ilyas, Ermita I., 2018. Manfaat Latihan Jasmani bagi Penyandang Diabetes. In: S. Soegondo, ed. *Penatalaksanaan Diabetes Melitus Terpadu edisi 2.* Jakarta: FKUI.

Kesehatan-RI, K., 2014. *Situasi dan Analisis Lanjut Usia.* [Online] [Accessed July 7th, 2015].

Newlin, K. et al., 2008. Relationships of religion and spirituality to glycemic control in black women with type 2 diabetes. *Nursing Research,* 5(57), p. 331–339.

Porcellati, F., Lucidi, P., Bolli, G. B., and Fanelli, C. G., 2013. Thirty Years of Research on the Dawn Phenomenon: Lessons to Optimize Blood Glucose Control in Diabetes - Commentary. *Diabetes Care* 36, pp. 3860-3862.

Rajin, M., 2010. Pengaruh Sholat Dhuha Terhadap Penurunan Kadar Glukosa Darah. *Jurnal Edu Health,* Vol. 1(1), pp. 1-26.

Rybicka, M., Krysiak, R. & Okopień, B., 2011. The dawn phenomenon and the Somogyi effect— two phenomena of morning hyperglycemia. *Endokrynologia Polska/Polish Journal of Endocrinology* 3(62), pp. 276-283.

Singh, H., Cinnirella, M., and Bradley, C., 2012. Support systems for and barriers to diabetes management in South Asians and Whites in the UK: Qualitative study of patients' perspectives. *BMJ Open Vol. 2* e001459, pp. 1-7.