**ABSTRACT**

**PHYSICIAN INVOLVEMENT WITH FAMILY “GENOGRAM MODEL” TO IMPROVE HEALTHY LIFESTYLE TO PATIENT WITH FAMILY HISTORY OF TYPE 2 DIABETES MELLITUS**

**TA Larasati**

Department of Community and Family Medicine

Medical Faculty, University of Lampung

Changes in lifestyle such sedentary lifestyle, minimal consumption of fiber, and high calories intake, made Indonesia is facing a triple burden of health problems, besides the family history of type 2 diabetes mellitus or hypertension. The family as the smallest institutions where individuals live responsibility in maintaining family health. Physicians are required to more involved as a  families partners in maintaining health. The physician's involvement with the family often limited to curative care. So the aim of this study is to identified effectivity of the physician's involvement with the family “Genogram model” in changing lifestyle in patient with family history of type 2 diabetes mellitus.

Physician involvement with the family”Genogram model” consists of 7 dimensions and 25 items.  There are (1) family profile (2) Environment and lifestyle (3) Norm and functions identified (4) Go to patients home (5) Relay or communication (6) Family Activating (7) Multilevel prevention for the family. This quasi-experimental with postest only and control group design. The tools were used to identifies variables are diabetes lifestyle behavior questionnaire, global physical activity questionnaire, perceived family support questionnaire, food recall and food record.The intervention was conducted in Bandar Lampung during 6 months period, with 149 subject and families, divided into 4 group, one group as a control and 3 groups interventions.

All variables are improved except calories intake. Family support(p=0,02); physical activity (0,007); fiber intake (p=0,001). Physician involvement with the family”Genogram model” is effective to improve fiber intake and physical activity in  patients with family history of type 2 diabetes mellitus.

**Keywords       : Family, family history, Genogram model, lifestyle changes, physician involvement,  type 2 diabetes mellitus**

**INTRODUCTION**

Based on the data of Basic Health Research 2013, some risk factors for diabetes in the level of worry has occurred since early in Indonesia such as less physical activity, sedentary lifestyle, fatty food and high calories intake. Almost all people aged over 10 years (93.5%) less fiber from fruits and vegetables (1). In addition to these risk factors, family history of diabetes is also an independent risk factor for the occurrence of diabetes, this risk factor does not depend on other risk factors such as insulin resistance, pancreatic β cell function, and body mass index (2)(3). Individuals who have a family history of diabetes have a risk for diabetes 1.8 and 2.8 times than individuals who are not at risk, this risk is greater if the history of diabetes from his mother than father (2) (3) (4). Therefore, prevention of diabetes in individuals with a family history of diabetes aimed at improving lifestyle should be a rationale for diabetes prevention programs, since it is well known that effective lifestyle changes reduce the risk of diabetes(5)(6)(7).

However, prevention of diabetes in individuals with a family history of diabetes is not easy. Based on the study, in individuals with a family history of diabetes, it is difficult to understand the causes of diabetes and underestimate the risks they have(8), they also consider less associated with them (9) and less believe that diabetes can be prevented (6). Several studies on interventions to improve diabetes prevention behavior in healthy individuals with a history of diabetes have been done on primary care, such face-to-face communication, over the telephone and written general instruction, leaflets combined with face-to-face or telephone interviews web on line methods, individual consultations combined with vignette and predicted diabetes risk the next five years (10) (11), (12), (13)(14). The family is the smallest institution in society that has health maintenance function by developing healthy lifestyle. Physician play an active role through cooperation with the family to realize the function. In primary care practices, the involvement of physicians with families is still very limited. Based on the research, 41% of doctors have not been involved with families in dealing with patient health problems; 35.5% are involved with the family at a minimum; 23% are aware of the family role in patient management; and 2% of physicians involved with the family and intervention(15). Based on the background above, this study aims to determine the effectiveness of the “physician involvement with family “Genogram model” to improve healthy lifestyle in individuals with family history of diabetes mellitus type 2 in primary health care in Bandar Lampung districk, Indonesia.

**Methods**

This study was quasi-experimental with postest only and control group design. Subject were 149 families, divided into 4 group, one group as a control and 3 groups interventions. Each group intervented based on physician involvement with family model, that contain 7 dimension and 25 items. Inclusion criteria in this study are 19-50 years; Have a family history of DM type 2 degree 1; Married and live with nuclear family; Willing to be the subject of this research; Good family function based on APGAR family; graduated from high school or equivalent; and have ability to communicate with others,exclusion criteria are diagnosed type 2 DM at study (Undiagnosed DMT2),Has physical disability; vegetarian; and pregnant or lactating. Variables are the subjective norm, family support, physical activity, fiber intake, and calories consumption. The tools were used to identifies variables are global physical activity questionnaire (16)(17), perceived family support questionnaire(18), food recall and food record.The intervention was conducted in Bandar Lampung city,Indonesia during 6 months period.

Table 1. Items of Physician involvement with family “Genogram model”

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No** | **Items of Physician involvement with family** | **K** | **I1** | **I2** | **I3** |
| 1 | Assessing demographic information (name, date of birth, occupation, religion, education, etc.) of each family member | - | √ | √ | √ |
| 2 | Assess disease history of nuclear family members | - | √ | √ | √ |
| 3 | Developing a family genogram (including a history of three generational diseases) | - | - | √ | √ |
| 4 | Assses family function | - | √ | √ | √ |
| 5 | Identify healthy lifestyles and unhealthy lifestyles of family members | - | - | - | √ |
| 6 | Assesing the stages of the family life cycle | - | - | - | √ |
| 7 | Identify potential hazards of the family environment (physical, chemical, biological, psychological and ergonomic) | - | - | - | √ |
| 8 | Identify family support to patients | - | - | √ | √ |
| 9 | Identify family members who serve as family health counselors or caregivers | - | - | √ | √ |
| 10 | Listening to and respecting the opinions of family health counselor or caregivers | - | - | - | √ |
| 11 | Working with family health advisors to enhance family roles and support to patients |  | - | - | √ |
| 12 | Continous family assesment | - | - | - | √ |
| 13 | Communicate information about a patients health or disease problem to the family (consider the ethical aspect) | - | - | - | √ |
| 14 | Explain the prognosis and complications of patient’s health or disease problem to the family | - | - | - | √ |
| 15 | Explains the management plan of the patient’s health or disease problem to the family | - | - | - | √ |
| 16 | Inisiate a family meeting to resolve a patient’s health or illness problem | - | - | - | √ |
| 17 | Conducting family counseling to solve patients health problems | - | - | - | √ |
| 18 | Improving family skills for managing patients health problems | - | - | - | √ |
| 19 | Increase family knowledge (not just patients) for managing patient health problems | - | Only patient | √ | √ |
| 20 | Asssesing family coping | - | - | - | √ |
| 21 | Assesing the impact of patients health/disease problem on the family | - | - | √ | √ |
| 22 | Disease prevention of the family ( *family wellness plan*) | - | - | - | - |
| 23 | Initiating families disability limitation | - | - | - | - |
| 24 | Initiating families in disease rehabilitation | - | - | - | - |
| 25 | Doing a home visit | - | - | - | √ |

After meeting criteria, based on location their living, subject divided into 4 groups, one group as control and 3 groups intervention. Patients in group 1 as control **(G0-En0 – O0 -G0 -R0 – A0 – M0)** , the physicians involvement with family is none or very limited. Physician was only telling family history of type 2 diabetes mellitus, so the patients must improve his lifestyle, such more active, less calories, and more fiber from fruits and vegetables. The time required for this group intervention is approximately 5 minutes.

In treatment group 1**(G2-En1 – O0 -G0 -R0 – A0 – M0)**, 2**(G4-En3 – O2 -G0 -R0 – A0 – M0)**, and 3(G4 -En3- O4 -G1 -R3 - A6 - M1), physician's involvement with the family was delivered based on intervention table 1 above. Intervention had done by physician in primary care setting in Bandar Lampung. The ethical clearance of this research was approved by Medical Ethics Committe Medical Faculty University of Lampung.

**Result**

**Table 2. Subject Characteristict**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Characteristic | K | | P1 | | P2 | | P3 | |
|  | F | % | f | % | f | % | f | % |
| **Gender** |  |  |  |  |  |  |  |  |
| Male | 21 | 14,1 | 10 | 6,7 | 7 | 4,7 | 6 | 4,1 |
| Female | 32 | 21,4 | 38 | 25,5 | 17 | 11,4 | 18 | 4,1 |
| **Age** |  |  |  |  |  |  |  |  |
| 20 ≤ n < 30 | 8 | 5,4 | 10 | 6,7 | 5 | 3,3 | 3 | 2,1 |
| 30 ≤ n < 40 | 27 | 18,1 | 16 | 10,7 | 9 | 6,1 | 5 | 3,3 |
| 40 ≤ n < 50 | 18 | 12,1 | 22 | 14,7 | 10 | 6,7 | 16 | 10,7 |

**Table 3. Univariat analysis of research variables**

|  |  |  |
| --- | --- | --- |
| Variabel | Mean (±SD) | Median (Min-Max) |
| Family support | 24,57(±3,79) | 24,00(10,00-32,00) |
| Fiber intake | 9,39(±6,34) | 7,40(0,00-30,60) |

**Table 4.** The effectiveness of physician involvement with family “Genogram model” on variables

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables | K | P1 | P2 | *p* |
| **Family support** |  |  |  | **0,002\*** |
| |  | | --- | | P1 | | **P2** | | **P3** | | 0,565 |  |  |
| |  | | --- | | P2 | | **P2** | | **P3** | | 0,268 | 0,074 |  |
| |  | | --- | | P3 | | **P2** | | **P3** | | 0,002\*\* | 0,001\*\* | 0,027\*\* |
| **Fiber intake** |  |  |  | **0,001\*** |
| |  | | --- | | P1 | | **P2** | | **P3** | | 0,194 |  |  |
| |  | | --- | | P2 | | **P2** | | **P3** | | 0,018 | 0,004\*\* |  |
| |  | | --- | | P3 | | **P2** | | **P3** | | 0,001\*\* | 0,001\*\* | 0,001\*\* |
| **Physivcal activity** | - | - | - | **0,007\*\*\*** |
| **Calories consumption** | - | - | - | **0,419\*\*\*** |
|  |  |  |  |  |

\*Result of Kruskall Wallis test, significance if p<0,5

\*\*Result of *Mann Whitney test,* significance if p<0,05

\*\*\* Result of Chi square test, significance if p<0,5

Table 2 shows that P3 is significantly different from other intervention groups and controls on all variables except for calorie intake.

**Discussion**

Physician involvement with family “Genogram model” consist 7 dimensions and 25 items. Dimension “Get family profile. Dimension “Environment and life style” indicating doctors identify family risk factors including family lifestyles, family physical and social environments. Dimension “Role of family or family role” indicating the physician identifies the role and family support to the patient including family health advisor or care giver. Dimension “Go to patient's home” indicates that physician do a home visit. Dimension “Relay (communication)” indicates physician communicate the patient's condition to the family including clinical conditions, treatment plan of complications and prognosis. Dimensions “Activation and empowerment” indicate physician enable and empower families to manage patient health problems. Dimension “Multilevel prevention” indicates the physician involved with the family in all aspects of comprehensive care with five levels of prevention.

The effectiveness of physician involvement with family “Genogram model” on family Support

Family support on group P3 different significantly with family support in controls as well as P1 and P2. Whereas both P1 and P2, have family support that is not significantly different from controls. It means, only P3 can significantly improve the patient's family support. Physician involvement with family “Genogram model” physician was directly involved in activating and empowering families to contribute for improving the patient's healthy lifestyle, in family member with a family history of type 2 diabetes. Genogram-model interventions, seeks to increase family support to patients through an understanding of family coping to solve problems, as well as on physicians' understanding of family profiles, functions and dynamics. Support that family can provide to patients in the form of material support, information and awards. This support is expected to increase the perceived control over lifestyle improvements. In addition, physician also activate family members who potentially provide support to patients, also empower family members to play a role in patient problems. The process of activation and empowerment motivates the family to solve the problems facing the patient when he wants to improve his lifestyle. There are some things that can be an obstacle for patients when they will live healthier, that is, like the availability of food, time, and social conditions. Families who are eager for patients to be healthier, not sick in the future, seek to facilitate patients by minimizing the source of the problem. So that the perceived control of the patient to be reduced, and the patient feel confident to make improvements to healthy lifestyle, because the controls that will see that the difficulty has been reduced. This findings accordance with recent evidence that family center empowerment promoting the level of awareness, and attitude, attracting family participation, using the existing skills (19). within the family under the supervission and assistance of community health nurse and through transferring knowledge and skills . Family support is the result of physician intervention at the interpersonal level of the patient, and play a role in behavioral change as do intrapersonal levels. According to Procede Proceed theory by Green and Kauter, that behavior is influenced by 3 factors, there are predisposing factors, enabling factors, and reinforcing factors, and family support is enabling factor for lifestyle improvement. Family support provided by family members in the form of information, appreciation, material and instrumental(20). Based on the social cognitive theory of Bandura, human behavior is the result of interaction between personal factors, behavior and environment, one learns from interaction and observation with those factors (21), thus involving intrapersonal and interpersonal factors, not just personal or environmental only. This is also in line with the research by Stopford et al, the social factors contributing to the formation of behavior (22). Family support can also improve self efficacy. Self-efficacy is one's belief in what it wants to achieve. Individuals will be better able to realize their desires when having high self efficacy than individuals with low self efficacy (23).

**Effectiveness of physician involvement with family** **"Genogram model" on Sufficiency Caloric Adequacy, fiber intake, and physical activity**

Based on bivariate analysis between “Genogram model” based intervention with suitability of caloric intake, there was no significant difference. The control and treatment group 75% have calorie intake that is not accordance with nutritional adequacy, only a quarter of subject had intake in accordance with the adequacy of calories (25%). Caloric adequacy is defined as calorie intake is less than 65% of the total calories consumed per day. There are some goals in lifestyle improvements beside caloric adequacy, such physical activity and fiber intake. There are more than one target, makes the subject do the most easy to reach. In these case, improve fiber intake and physical activity easier than manage calorie consumption for them. This is accordance with recent evidence, whi multiple lifestyle intervention targeting different behaviors were implemented, only a favorable change over time was observed (24),

Based on analysis of fiber intake after “Genogram model” based intervention, there were significant differences in fiber intake between P3 groups with control and other treatment groups. In addition, fiber intake in P2 was also found to differ significantly with controls. In P3, the involvement of physicians is very intense by engaging directly in activating and empowering families to increase the patient's fiber intake. Fiber intake is obtained from food consumed daily. Thus, the selection of foods that contain high fiber or increase the amount of foods containing high fiber is very important

Measurement of physical activity in this study using Global Physical Activity Questionnaire which has been recommended by WHO as a tool to measure valid and reliable physical activity. There are 4 activity components measured by GPAQ, that are activities at work, activities when going to work, activities including sports and recreation, as well as sedentary activities. After “Genogram model” intervention, there was significant difference of physical activity between treatment groups. Group P3 “Genogram model “ intervention, physician involve with the Family by activating and empowering families to contribute for improving lifestyle. The family as a synergy system mainly by key person to increase physical activity. Activities performed by family members such as a partner in sports, provide special time for patients for gymnastics 3 times a week, and taking over the patients work, so he can exercise.

There are some limitations of this research:

1. Measurement of lifestyle improvement indicators performed 4 weeks after the intervention, and no measurements thereafter so that no one can ensure permanent lifestyle improvement after the measurement

2. Measurement of fiber intake using 1x food recall and 2x food record allows the measurement bias occurs, because the food record, research subjects tend to improve their nutritional intake.

Acknowledgement

The author thank to allpatient and his family as participant of this research, physicians, health center staffs, poskeskel officers, enumerators, who were involved in this study.

**This study was funded by Minister of Research and Technology and High education of Indonesia (Project number 1638/UN26.21/KU/2017)**

References

1. Badan Penelitian dan Pengembangan Kesehatan. Riset Kesehatan Dasar. 2013;306.

2. Sakurai M, Nakamura K, Miura K, Takamura T, Yoshita K, Sasaki S. Family history of diabetes , lifestyle factors , and the 7-year incident risk of type 2 diabetes mellitus in middle-aged Japanese men and women. 2013;4(3):261–8.

3. Koloverou E, Panagiotakos DB, Pitsavos C, Chrysohoou C, Georgousopoulou EN, Pitaraki E, et al. O RIGINAL D ATA 10-year Incidence of Diabetes and Associated Risk Factors in Greece : the ATTICA study ( 2002-2012 ). 2014;181–9.

4. Tan jonathan T, Tan LSUM, Chia KS, Chew SK, Tai ES. A family history of type 2 diabetes is associated with glucose intolerance in a South East Asian population. Diabetes Research and Clinical Practice; 2008. p. 268–75.

5. Kilkkinen A, Heistaro S, Laatikainen T, Janus E, Chapman A, Absetz P, et al. Prevention of type 2 diabetes in a primary health care setting. Interim results from the Greater Green Triangle (GGT) Diabetes Prevention Project. Diabetes Res Clin Pract. 2007;76(3):460–2.

6. Vadheim L, RD LN, Brewer K, Kassner D, Vanderwood K, Hall T, et al. Effectiveness of a Lifestyle Intervention Program Among Persons at High Risk for Cardiovascular Disease and Diabetes in a Rural Community. [Internet]. Vol. 26, J Rural Health. 2010. p. 266–72. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=ovftk&NEWS=N&AN=00005308-201006000-00009

7. Tabak AG, Herder C, Rathmann W, Brunner EJ, Kivim??ki M. Prediabetes: A high-risk state for diabetes development. Lancet. 2012;379(9833):2279–90.

8. Adriaanse MC, Snoek FJ. The psychological impact of screening for type 2 diabetes [Internet]. Vol. 22, Diabetes/Metabolism Research & Reviews. 2006. p. 20–5. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=cin20&AN=2009277018&site=ehost-live

9. Myers M, SL F, L A, JL H, Koehly LM. Talking About Type 2 Diabetes: Family Communication From the Perspective of At-Risk Relatives [Internet]. Vol. 41, Diabetes Educator December. 2015. p. 716–28. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=ovftq&AN=00003476-201512000-00008

10. Pijl M. Impact of Communicating Familial Risk of. 2009;32(4):3–5.

11. Williams K, Prevost a T, Griffin S, Hardeman W, Hollingworth W, Spiegelhalter D, et al. The ProActive trial protocol - a randomised controlled trial of the efficacy of a family-based, domiciliary intervention programme to increase physical activity among individuals at high risk of diabetes [ISRCTN61323766]. BMC Public Health. 2004;4:48.

12. Kinmonth AL, Wareham NJ, Hardeman W, Sutton S, Prevost a. T, Fanshawe T, et al. Efficacy of a theory-based behavioural intervention to increase physical activity in an at-risk group in primary care (ProActive UK): a randomised trial. Vol. 371, The Lancet. 2008. p. 41–8.

13. Wijdenes M, Henneman L, Qureshi N, Kostense PJ, Cornel MC, Timmermans DRM. Using web-based familial risk information for diabetes prevention : a randomized controlled trial. BMC Public Health [Internet]. 2013;13(1):1. Available from: BMC Public Health

14. Davies LE, Thirlaway K. The influence of genetic explanations of type 2 diabetes on patients’ attitudes to prevention, treatment and personal responsibility for health. Vol. 16, Public Health Genomics. 2013. p. 199–207.

15. Marvel MK, Schilling R, Doherty WJ, Macaran A Baird. Levels of Physician involvement with patient and their familyes a model for teaching and research. J Fam Pract. 1994;39:535–44.

16. WHO WHO. Global recommendations on physical activity for health. Geneva World Heal Organ [Internet]. 2010;60. Available from: http://medcontent.metapress.com/index/A65RM03P4874243N.pdf%5Cnhttp://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Global+Recomendations+on+physical+activity+for+health#0

17. Cleland CL, Hunter RF, Kee F, Cupples ME, Sallis JF, Tully MA. Validity of the Global Physical Activity Questionnaire (GPAQ) in assessing levels and change in moderate-vigorous physical activity and sedentary behaviour. BMC Public Health [Internet]. 2014;14:1–11. Available from: http://www.biomedcentral.com/1471-2458/14/1255

18. Procidano ME, Heller K. Measures of perceived social support from friends and from family: Three validation studies. Am J Community Psychol. 1983;11(1):1–24.

19. Keshvari M, Hedayati B, Moeini M, Alhani F. A survey on the effect of implementation of a family-centered empowerment model on blood pressure and empowerment dimensions in the elderly people with hypertension. Vol. 4, Journal of education and health promotion. 2015. p. 94.

20. Green L, Kreuter M. Health promotion planning: An educational and environmental approach. Mayfield: Mountainview; 1991.

21. Bandura. Health promotion from the perspective of social cognitive theory [Internet]. Vol. 13, Psychology & Health. 1998. p. 623–49. Available from: http://books.google.com/books?hl=en&lr=&id=zIZvXySP\_YcC&oi=fnd&pg=PA299&dq=Social+cognitive+theory:+An+agentic+perspective&ots=Sue3jrIcEL&sig=W5sVmZTWTAmOE1hNIN3SaCgu8OA

22. Stopford R, Winkley K, Ismail K. Social support and glycemic control in type 2 diabetes a systemati. patient educ coun; 2013. p. 549–58.

23. Bandura A. Self ­ Efficacy : the Exercise of Control. 2015. p. 3–9.

24. Evaluation AP. The Implementation of Multiple Lifestyle Interventions in Two. 2014;56(11):1195–206.