

# The Role of peer support and self-efficacy of Diabetes in Yogyakarta: Theater performing art education

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## ABSTRACT

**Background:** The lack of self-eficacy and social support will affect the self-management of patients with type 2 diabetes mellitus (T2DM). theater performance art education (TPAE) is one method that can be used to improve self-efficacy and social support in controlling blood glucose. This study aims to determine the effectiveness of peer support and self-efficacy in T2DM through TPAE.

**Methods:** Sampling was conducted in purposive sampling at four primary care in Sleman of Yogyakarta, Indonesia. From 138 T2DM, only 102 were eligible to become respondents. Questionnaires about self efficacy and social support were adapted to the IFLS. The intervention was implemented for three months, from October to December 2019. Measurements were made before and after the TPAE. All data were analyzed using the SPSS 17.0 statistical package.

**Results:** The results showed that patients who attended education through TPAE had a significant influence on social support ( $P < 0.05$ ), but did not show a significant effect on self-efficacy ( $P > 0.05$ ) in controlling blood glucose of T2DM in Sleman Regency.

**Conclusion:** TPAE based community empowerment has proven to be effective in increasing social support among peer lead education of T2DM in controlling blood glucose.

Keywords: T2DM, community empowerment, TPAE, self-efficacy, social support, blood glucose

## 1. Introduction

Diabetes Mellitus (DM) is basically cureless and can cause complications such as amputation, blindness, kidney failure, heart disease<sup>(1)</sup>, increase micro and macro complications of vascular disease<sup>(2)</sup>, musculoskeletal complications<sup>(3)</sup>, mouth disease<sup>(4)</sup> and cause 1.5 million deaths worldwide<sup>(5)</sup>. Diabetes Mellitus (DM) is a chronic metabolic disease caused by impaired funds or pancreatic beta cell resistance in producing the hormone insulin<sup>(3,6,7)</sup>. One of the causes of DM is an unhealthy lifestyle<sup>(8)</sup>. The majority of DM (90% to 95%) is T2DM<sup>(9)</sup>. In 2013, the number of DM was 347 million people<sup>(1)</sup>, this number is expected to increase to 438 million in 2030<sup>(5)</sup>.

The prevalence of DM in Indonesia is predicted to continue to increase to 21.3 million by 2030<sup>(10)</sup>. Results of Basic Health Research in 2018, Yogyakarta Province ranked second in the highest prevalence of DM in Indonesia after Jakarta Province<sup>(11)</sup>. In 2017 in Sleman Yogyakarta, the number of T2DM patients reached 4,204 cases, occupying the second highest non-communicable disease (NCD) after hypertension<sup>(12)</sup>.

Uncontrolled blood glucose can have a negative impact on self-management behavior. In addition, patients get more barriers to manage themselves due to their poor health. Self-management will be driven by good knowledge, positive beliefs, and high self-efficacy<sup>(13)</sup>.

The self-care model states that when a patient carries out self-care or self management, they are changed by internal and external factors. Knowledge, attitudes, feelings and beliefs of patients are internal factors that very dominant on self-management. In addition to internal factors, external factors consisting of role models, advice, social support and the health facility system also play an important role in the success of self-management<sup>(14)</sup>.

Education is a form of health promotion that aims to increase knowledge about individual health. In addition to increase knowledge, education is also expected to increase individual's ability, awareness and understanding to maintain health<sup>(15)</sup>. Patients who receive education can improve self-management, self-efficacy and knowledge levels<sup>(16)</sup> so that, it can improve the ability in diabetes eye care and blood sugar monitoring<sup>(17)</sup>. Besides, knowledge is also positively related to DM risk factors<sup>(6)</sup>.

In contrast to previous research, community empowerment emphasizes more on the independence of patients to increase and raise awareness in achieving a better and sustainable life<sup>(18)</sup>. The program is used as an educational media<sup>(19)</sup> because it can present something into reality<sup>(20)</sup>. Although the educational program has never been used in Indonesia, but in several countries, they have developed the method as a medium for health promotion. Research conducted in Africa reports that in Africa theater performing art (TPA) is effective in increasing knowledge about malaria prevention<sup>(21)</sup>. In addition, TPA can also overcome educational barriers to special people such as those who cannot read<sup>(22)</sup>. However, the implementation requires actors and the need for regular training to reduce errors send the messages when acting<sup>(23)</sup>.

This study uses two theories of social behavior change, namely the SCT (social cognitive theory) theory and the HBM (health belief model). TPADM is one program that develops models through dynamic interactions between personal, behavioral and environmental factors<sup>(24)</sup>. The interaction was sent through TPA which is used to change

patient behavior by providing education. Previous research explains that the HBM theory is one of the potential health education models for T2DM<sup>(25)</sup>. In addition, HBM theory explains that a person will take health-related actions if they think they can prevent disease<sup>(26)</sup>. Based on HBM theory, health education can improve individual's knowledge, beliefs and behavior to prevent their illness<sup>(27)</sup>. Based on these descriptions, researchers will examine the role of peer support and self-efficacy of DM patients through education on DM theater performance in Yogyakarta.

## 2. Methods

This research was conducted at the four primary care in Sleman, Yogyakarta, Indonesia (two public primary care and two private primary care). The selection of respondents used a total sampling technique. The research data was divided into two places, namely the intervention group and the control group. Each group consisted of one health center and one private clinic. Of the total 138 T2DM patients, only 102 patients were acceptable to become respondents.

The design of this study used a quantitative method using a quasi-experimental non-equivalent pretest-posttest control group design. The instrument used in the form of a questionnaire using closed questions. Respondents chose the answers given.

The self-efficacy questionnaire was adapted from previously published studies. The questionnaire was arranged according to the research topic, while the question points in the questionnaire were prepared based on recommendations from the Association of endocrinologists. The points of the question consist of the course of the disease, risk factors, causes, treatment, monitoring of T2DM, including recognizing symptoms and hypoglycemic treatment (PERKENI, 2015). While the social support questionnaire was adapted from IFLS-5.

The self-efficacy questionnaire was assessed using 15 general questions. Each question was scored as "2" if the response can do, score "1" was doubtful and "0" for the response that cannot do. Individual self-efficacy scores were calculated and summed up to provide a total self-efficacy score. This value was calculated based on the mean (mean), median (median), and standard deviation.

The social support questionnaire was assessed using 15 general questions. Each question is scored as "1" for a correct response and "0" for an incorrect response. Individual social support scores were calculated and summed up to provide a total social support score. Individual knowledge values were calculated based on the mean (mean), median (median), and standard deviation.

The intervention was implemented for 3 months with a total of 9 meetings. The trial was based on four steps adapted from "The California Arts Standards for Theater"<sup>(28)</sup>. Before the intervention began, respondents filled out self-efficacy and social support questionnaires.

Theater performing art education (TPAE) was performed by peers (peer lead education) accompanied by the facilitator. The patient independently compiled a story script assisted by a performing arts expert. The text used a mixture of languages, namely Javanese (local language) and Indonesian. At the characterization exercise stage, patients are divided into small groups with a maximum of 8 group type people. Each group tried

to exercise as much as possible. At the end of the exercise, the patient had a discussion to determine the group that would perform. Theater performing art education (TPAE) was performed for 30 minutes using simple and patient-like tools and properties.

The Data were analysed by using computer program, SPSS 15. Univariate analysis was implemented to see the characteristics of respondents and the pretest and posttest scores. The bivariate analysis includes two things, namely the normality test data with an intervention using the Kolmogorov-Smirnov test ( $n > 50$ ) while the control group uses the Shapiro Wilk test ( $n < 50$ ). Then, a difference test is performed using Mann-Whitney. The Research receive ethics approval before the beginning of the research from the Ethics Commission of the Faculty of Medicine, Public Health and Nursing, Gadjah Mada University, on August 12, 2019 (attached) number KE / FK / 0938 / EC / 2019.

### 3. Result

Most of the respondents in the intervention group were women (74.3%) with age less than 60 years (60%) and secondary and tertiary education (51.4%) and having jobs that did not receive salary (68.8%). The same thing was seen in the control group.

**Table 1 1. Demographic Data of Respondents**

Variable	Intervention (n=70)		Control (n=32)	
	Frequency	%	Frequency	%
<b>Gender</b>				
Male	18	25,7	7	21,9
Female	52	74,3	25	78,1
<b>TOTAL</b>	<b>70</b>	<b>100</b>	<b>32</b>	<b>100</b>
<b>Age</b>				
<45 years	5	7,15	1	3,1
45-60 years	47	67,15	23	71,9
> 60 years	18	25,7	8	25
<b>TOTAL</b>	<b>70</b>	<b>100</b>	<b>32</b>	<b>100</b>
<b>Education</b>				
No education	2	2,9	3	9,4
Basic	18	25,7	6	18,8
Secondary	16	22,9	7	21,9
Tertiary	19	27,1	8	25
Higher	15	21,4	8	25
<b>TOTAL</b>	<b>70</b>	<b>100</b>	<b>32</b>	<b>100</b>
<b>Job</b>				
WR	22	31,45	8	25
NWR	15	21,45	5	15,6
Unemployed	33	47,1	19	59,4
<b>TOTAL</b>	<b>70</b>	<b>100</b>	<b>32</b>	<b>100</b>

Description: WR (Wage Recipient), NWR (Not a Wage Recipient)

Based on the *pre-test* result analysis, descriptively, the level of self-efficacy and social support in efforts to control blood glucose of T2DM patients in Sleman Regency was poor. Based on the posttest table, female respondents in the intervention group had high self-efficacy and social support. Whereas female respondents in the control group had high social support even though self-efficacy was still low.

**Table. Results difference in pre-post test scores of the intervention and control groups**

Variable	Control group		Intervention group		P
	Mean ± SD	Δ Mean	Mean ± SD	Δ Mean	
<b>Self Efficacy</b>					
Pretest	23,31±3,84	0,750	23,16±4,37	-3,343	0,096
Posttest	22,56±3,57		26,50±3,51		
<b>Social Support</b>					
Pretest	11,19±2,39	-0,375	11,09±1,68	-1,629	0,004
Posttest	11,56±2,38		12,72±1,54		
<b>Blood glucose</b>					
Pretest	154,53±79	-33,21	114,59±45,3	-4,986	0,000
Posttest	187,75±63		119,57±37,3		

Difference tests for self-efficacy and social support variables were organized with Mann Whitney. Collecting was done by looking at the P value. If  $P < 0.05$ ,  $H_a$  was accepted, which means there is a significant difference between pre and post intervention. Difference test results concluded that the social support variable had a significant difference between the mean difference in the pre-post score of the intervention group and the mean difference in the pre-post score of the control group in T2DM patients ( $P < 0.05$ ). Whereas in the self-efficacy variable, there was no significant difference between the mean difference in the pre-post score of the intervention group and the mean difference in the pre-post score of the control group in T2DM patients ( $P > 0.05$ ).

**Table. Score result of d (Effect Size)**

Variable	ΔMean	Std. Deviasi	d
<b>Self Efficacy</b>			
Intervention	3,34	6,856	-0.055
Control	3,72		
<b>Social Support</b>			
Intervention	1,63	1,925	0.649
Control	0,38		
<b>Blood glucose</b>			
Intervention	-2,66	54,004	0.566
Control	-33,22		

The results of the interpretation are substantially calculated by determining the value of d (effect size). It is said to have a small effect size if the value of d: 0.2, while for medium d: 0.5, large d: 0.8 and very large d: 1.3<sup>(29)</sup>. From the table above, it can be concluded that in substance, self-efficacy has a small effect size value. Whereas social support has a moderate effect size. The results of this study indicate that TPAE is proven to increase social support provided by peers which has a considerable influence. In addition, TPAE can also reduce the blood glucose of T2DM patients, although self-efficacy does not show a significant increase.

## **4. Discussion**

### **4.1 Local culture based education through TPAE**

Theater performing art education (TPAE) based on patient empowerment has been proven to increase social support provided by peers. During the performance, peers provide mutual support by sharing DM control experiences. Each patient is given the freedom to convey the problems that have been experienced. These problems are solved together so as to produce a strategy that will be used to solve these problems. Unfortunately, this study did not show an increase in self-efficacy scores. The results of this study differ from previous studies which state that the empowerment of T2DM using the DM teaching and treatment program (DTTP) method which is implemented for 12 sessions for 90 minutes each session, effectively decreases HbA1c and increases self-efficacy<sup>(30)</sup>. We could not identify the cause of the difference in results in this study. However, we suspect that the different results are influenced by the different types of education used. The education program through TPAE is one of the media to deliver information.

In India, they use traditional theater to conduct health promotion related to malaria control in rural areas. Then, in Laos also used the traditional song "Lam" to increase knowledge about HIV/AIDS prevention<sup>(31)</sup>. Theater performing art education (TPAE) is an entertaining educational method. Patients are given a collection of songs with the accompaniment of modern traditional music. The songs are one of the people's preferred media<sup>(21)</sup>. In addition, TPAE involves T2DM peers to deliver messages.

### **4.2 Social Support Empowerment**

Theater performing art education (TPAE) is one of the educational media for the DM community. The results of this study indicate that this program has a significant impact on increasing peer social support among T2DM patient. This condition will affect DM's self-management behavior in controlling blood sugar levels. In some countries, such as the United Kingdom, the community empowerment model is realized in online. The program is managed by the National Health Service (NHS). In addition, the program contains all the information needed about diabetes, diabetes management, online counseling with professional medical staff, establishing DM management plans (diet plans, diet recipes, diet tips and more)<sup>(32)</sup>.

Social support through community empowerment can be used for self-care DM patients who are independent. This is influenced by factors that are based on health service providers such as funding, infrastructure, availability of medicines and equipment as well as staff availability<sup>(33)</sup>. The main source of social support is from family and friends<sup>(34)</sup>. Other studies explain that DM patients who live together with family members and live in a supportive community environment can improve patient self-care<sup>(35)</sup>. This social support is also a direct determining factor in carrying out physical activity of DM patients<sup>(36)</sup>. Family members are also needed to help and support patients in implementing self-management. This support is realized by helping patients make plans, determine and solve problems faced by patients. So that families and patients are involved in regulating blood sugar<sup>(4)</sup>. The family can also provide effective feedback about negative perceptions of DM, exchange health

information, reduce care resistance and build self-reliance that is emphasized by family members<sup>(35)</sup>.

The results of this study provide further support for driving a change in paradigm about the health care system from a doctor-centered approach to a patient-centered one. This means that each patient is encouraged independently by health workers to play an active role in determining problems and solving problems they face. Patients also determine the material as needed through group discussions accompanied by health workers<sup>(37)</sup>. The messages were delivered through TPAE peer based on community empowerment. The empowerment program is one technique that can be used to change the behavior of T2DM patient<sup>(38)</sup>.

### **4.3 Social Support**

This study shows a significant increase in social support compared to control patients. The post-test score is higher than the pre-test score. Substantively, it explains that intervention has a very big influence on changes in social support in controlling blood glucose. The results of this study are consistent with previous research which shows that increased social support between teachers and students after participating in theater performance<sup>(39)</sup>. This social support is a useful social interaction<sup>(40)</sup> that shows individual perceptions about being supported, loved, valued and the existence of useful communication and reciprocal relationships<sup>(41)</sup>. The better the social support they receive, the better their well-being will be<sup>(42)</sup>.

Social support is a trigger for the habits of T2DM patient in self-care<sup>(43)</sup>. In addition, it is also psychologically beneficial for people who experience physical, psychological and social stressful events<sup>(34)</sup>. Social support from family and friends has a good effect on behavior change (sports) of young women in Iran<sup>(44)</sup>. In the United Kingdom, low family support behavior is associated with poor medication adherence and blood sugar control<sup>(8)</sup>.

Social support can be divided into 4 types, namely affective support (feeling loved, trusted, sympathy, and attention), financial support (funding sources), information support (information provision) and evaluation support (getting information to do self-evaluation). These four functions cannot be separated in practice<sup>(45)</sup>. Theater performing art education (TPAE) is support in the form of affective and provision of information delivered through peers (peer lead education). This program has been proven to increase social support for controlling T2DM<sup>(39)</sup>. Peer educators as non-professionals provide various functions including social and emotional support. Peers provide support in carrying out disease management from planning to clinical care for T2DM<sup>(46)</sup>.

Several studies have shown that barriers are the most influential predictor of self-care behavior. Lack of social support is one of the main barriers to self-care, which is shown here as a barrier, but in the analysis of correlations between variables, social support has shown its role in the form of social support<sup>(47)</sup>. In this study, education through TPAE needs to be done to improve the independence of T2DM. High self-efficacy scores have been reported to be positively correlated with DM self-management behavior. When patients have higher self-efficacy scores, they are more likely to check blood glucose, take medication regularly or not overeat at

parties, and follow a good diet. Bandura (1998) which defines that human behavior is a reciprocal interaction between individual factors (self-efficacy), behavior (expectations) and the environment (social support) and self-efficacy linking between changes in behavior (physical activity) and social support<sup>(44)</sup>.

#### **4.4 Self-efficacy**

This study shows that TPAE has no effect on increasing self-efficacy. This program is caused by the small influence of TPAE on changes in self-efficacy in controlling blood glucose. The results of this study are in line with previous studies which explain that general self-efficacy does not affect patient's blood sugar control. On the other hand, the length of time diagnosed as DM is the only variable that affects the patient's blood sugar control<sup>(48)</sup>. This result is different from previous studies that reported that self-efficacy that leads to the determination and planning of a healthy life will influence behavior<sup>(9)</sup>.

Self-efficacy is an important part of care behavior because it is the basis for understanding the commitment of self-care behavior. In addition, self-efficacy can increase the effectiveness of self-management in the treatment of DM<sup>(49)</sup>. Self-efficacy affects directly or indirectly on changes in physical activity behavior<sup>(36)</sup>.

This study explains that the TPAE delivered by peers has no effect on changes in self-efficacy. However, previous research conducted in Hong Kong explained that education focused on peers could reduce the incidence of smoking by high school students. This research shows that TPAE performer have a better level of self-efficacy to resist the urge to smoke in various situations<sup>(50)</sup>. Other research also confirms that changes in healthy living behavior are influenced by self-efficacy<sup>(51)</sup>.

Self-efficacy is one of the most important HBM constructs<sup>(52)</sup>. Self-efficacy is the strongest predictor of self-care behavior among HBM constructs. However, barriers and vulnerabilities are also predictors of self-care behavior in DM patients<sup>(47)</sup>. This study concludes that TPADM is not effective in increasing changes in self-efficacy in controlling blood glucose. On the other hand, previous studies have shown that the level of self-efficacy in patients with T2DM to manage DM is weak<sup>(53)</sup>. Our findings indicate that the importance of benefits, severity, and social support for self-care behavior is not comparable to self-efficacy, vulnerability and barriers. In general, it can be concluded that HBM construction is suitable for this research data and can be applied in the design of educational interventions for T2DM<sup>(47)</sup>.

This is in contrast to previous research which explains that self-efficacy is an important part of DM patient self-care behavior. Self-efficacy is the basis for understanding the commitment of self-care behavior and the effectiveness of self-management in the treatment of DM<sup>(49)</sup>. Self-efficacy is defined as a belief in a person's ability to make certain behavioral changes, so that it is expected to be able to change that person's behavior. In one study, it was mentioned that increasing self-efficacy is closely related to increasing self-care behavior<sup>(54)</sup>. Increased self-efficacy will influence behavior and influence decision making in improving health status<sup>(55)</sup>.

## **5. Conclusion**

Theater performing art education (TPAE) based on peer empowerment effectively increases social support for T2DM and can reduce blood glucose, although it does not have a significant effect on self-efficacy. Social support arises during the interactions between patients starting from determining ideas to performing art. In addition, TPAE also presents a relaxed and pleasant atmosphere so that it can attract the attention of other patients to participate.

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### **Conflict of interest statement**

None declared.

### **Authors' contributions**

MPK has been involved starting from designing proposals, collecting and analyzing data, writing research reports, discussing and concluding. FSTD contributed to its expertise related to how to explore respondents. JH, ZMS participated in writing the discussion. All authors have read and agreed to the final manuscript.

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