

Illness perception, stress, religiosity, depression, social support, and self management of diabetes in Indonesia

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Abstract

This is an integration of three studies on diabetes type 2. In this study, diabetes was seen in relation to illness perception, stress, depression, social support, and self management. The studies conducted using a quantitative approach, employing 68 participants, aged between 40 – 75 years old.

Methods & analyses: interviewer-administered questionnaires were used for the data collection. The Sobel test was employed to examine the mediation states of the variables in the three quantitative studies, and regression analysis was then executed for hypotheses testing.

Results: self-acceptance was significantly related to depression ($r: -.14, p < .05$) without being mediated by perceived social support ($r: -.16, p > .05$). Religiosity appeared to be significantly related to the stress ($r: -.69, p < .05$), mediated by self acceptance ($r: -.36, p < .05$). "Easily being tired in work, compared to the previous condition" was identified by most of the study participants as the cause of stress. It was also discovered that illness perception and coping strategies were not having a direct association with self-management in general. Partial significant correlations were found between problem focused coping with control treatment, and emotion focused coping with the illness consequences and personal control. This study suspected that there was multicollinearity among 8 sub-components of illness perception, coping strategies and self-management. Conclusion: self-acceptance is the most important among others; and that participants, with family, need to have correct knowledge on the nature of the illness and its management.

Key words; diabetes mellitus, self-management, psychosocial aspect, depression, social support, self-acceptance, religiosity, anxiety, illness perception, peer support

Background

"Towards a Healthy Indonesia in 2010" is a program which seeks to improve Indonesian society through the development of public health, on a national and state level, that is characterized by living in healthy environments and engaging in healthy behaviors - physically, spiritually, and socially. Nevertheless, the incidence of diabetes mellitus, hereinafter referred to as diabetes, continues to rise (Winasis, 2009).

Diabetes is a metabolic disorder caused by glucose disruption within the body. The bodies of individuals with diabetes do not produce a sufficient amount of insulin, thus causing excess glucose within the blood. There are two types of Diabetes, type 1 and type 2. Type 1 diabetes often occurs since childhood, whereas type 2 diabetes is more prevalent in those individuals 35 years and older. Diabetes may cause individuals to be more susceptible to infections, such as urinary tract infections, lung infections, and foot infections, and it can cause abnormalities in blood vessels of the retina which could result in blindness.

Globally, the number of people with diabetes is 135 million as of 2000, according to the WHO. This number is expected to continue to increase to 366 million people in 2025. At that time, Asia is expected to have the world's largest diabetic population (at 82 million). Indonesia currently ranks fourth largest in the number of people with diabetes in the world.

In Indonesia, type 2 diabetes mellitus is found more frequently than type 1. The prevalence rate of type 2 diabetes mellitus ranges between 14% - 16% (<http://www.kedaioobat.co.cc>). The prevalence rate of cases of diabetes mellitus increases each year. Recent results of epidemiological studies in Indonesia

showed similar trend in different cities and regions. Jakarta (the capital city of Indonesia) proved that there was an increased diabetes prevalence from 1.7% in 1982 to 5.7% in 1993, and turn out to be 14.7% in 2001. Increased prevalence of diabetes mellitus also occurred in Makasar, which increased from 1.5% in 1981, to 2.9% in 1998, and to 12.5% in 2005. In 2005, West Sumatra reported that they have a diabetes mellitus prevalence of 5.1%, Pekajangan (Central Java) had 9.2% while Bali had a diabetes prevalence between 3.9% - 7.2% in 2004 (<http://www.pdpersi.co.id>). According to Rudjianto (2009), Indonesia's pre-diabetes prevalence rate is approximately 21.6%. It was estimated that 50% of individuals who are in position of pre-diabetes will develop diabetes. Moreover, the highest number of pre-diabetic individuals were found in the age group of 12-17, with a percentage of around 27% (Rudjianto, 2009).

The increasing tendency of diabetes mellitus, globally, is caused by several factors, which consist of genetic factors, obesity due to lifestyle changes, overeating, lack of exercise, demographics, as well as a reduction in number of infectious disease and malnutrition (Suyono as cited in Soegondo, 2009).

Diabetes is capable of striking people of all ages, regardless of whether they reside in rural or urban areas. Health Research Association (*Riskesdas*) Ministry of Health of Indonesia, in 2007, showed that diabetes was the 2nd leading cause of death of those aged 45 - 54 in urban areas, causing 14.7% of deaths. Meanwhile, in rural areas, diabetes ranks in 6th (5.8%) in terms of leading cause of death (<http://www.depkes.go.id>). People with type 2 diabetes generally experience an increase in blood sugar; this increase will trigger a rise in the cortisol, epinephrine, and norepinephrine hormones, leading to depression.

Complications that may occur to diabetics, aside from the disease itself which is degenerative and incurable, is that many of the patients experience anxiety disorders.

In a study involving 1456 subjects with diabetes, both type 1 and type 2, from different regions in Ireland, the prevalence rate of those who experience anxiety was 32.0%, and the rate of those who were depressed was 22.4% (Collins, et al., 2008). Studies conducted in Turkey, from 161 subjects with diabetes type 1 and type 2, found that 79% of the subjects experienced anxiety (Tuncay, Musabak, Gok, & Kutlu, 2008).

In addition to social support, an important factor for people with diabetes is self-acceptance. A study revealed that higher rates of self-acceptance generally lead to lower levels of stress.

Religiosity – self acceptance – stress

Religiosity and self acceptance were also factors predicted to have the ability to decrease the level of anxiety disorder of individuals with diabetic. Based on the results of research done in the USA, religiosity was able to decrease the anxiety faced by a patient who donated his kidney (Morse et al., , 2009).

Factors suspected to influence depression include patients perception on social support and their acceptance of illness. On the other hand, factors expected to affect anxiety include religiosity and self-acceptance.

Disease and management perception

Illness perception is associated with the effectiveness of self management for those who suffer from diabetes (Bean et al., 2007) including a good psychological adaptation for diabetic patients (Gois et al., 2010). Illness perception is also associated with healthy lifestyle and coping behaviour (Keogh, et.al, 2007). Someone with low control on their diabetes have a different illness perception compared to those with good diabetic control (Keogh, et.al, 2007).

Illness perception

Illness perception is an individuals' response toward an illness (Leventhal, et.al. as cited in Keogh, et.al., 2007) that is formed through the individual's organized perception and conception of their illness base on their experience and environment (Croyle & Barger as cited in Taylor, 2006). Illness perception is based on Leventhal Self Regulation Model theory which measures five separate components. These components are identity, cause of illness, duration, consequence, and self control (Ogden, 2000), specifically:

1. Identity is the name and symptoms of the disease that relates to the name that was given.
2. The cause of illness is the attribution process that is characterized by the beliefs of why the disease emerged.
3. The duration is the belief of how long the disease may last.
4. Consequence reflects the individuals' hope related to the effect of the illness towards psychological and physical functions.
5. Self control is the belief of how far the disease or symptoms may be controlled and changed by the medicine and health workers.

Illness perception is activated by the long term memory, and the representation is formed based on the comparison between the current incident and the individuals' former belief. Illness perception was employed in many studies to predict the health status of several chronic diseases such as in asthma (Horne & Weinman, 2002), diabetes (Bean et al., 2007; Lawson et al., 2007), hypertension (Hekler et al., 2008), kidney failure (Timmers et al., 2008), osteoarthritis (Kaptein et al., 2010). Study on illness perception of people with diabetes showed consistent positive results on adherence (Mann et al., 2009), coping strategies (Bean et al., 2008; Lawso et al., 2007; Sloan et al., 2009).

Coping

Coping is defined as a cognitive and behavioral process to manage both specific external and internal pressures that are considered heavy or have exceed individuals' resources (Lazarus & Folkman, as cited in Taylor, 2006). Furthermore, coping consists of efforts, both action-oriented and intra-psychic, in order to manage (master, tolerate, reduce, save time) environmental and internal demands and conflicts among themselves (Lazarus & Launier as cited in Taylor, 2006).

Coping strategies are predicted to influence the output of self-monitoring;

such as glycemic control and psychological factors (depression and anxiety). Research on adults without diabetes showed that problem-focused coping has predicted lower levels of HbA1c (Tsenkova et al., 2008). Likewise, a meta-analysis study showed that problem-focused coping is associated with an overall better adjustment, avoidance while emotional-focused coping was not significantly associated with an overall adjustment (Duangdao & Roesch, 2008).

Management

Essentially, diabetes is a disease that can be controlled. Controlled sugar levels is consistently correlated with a small chance of complications of the disease (Macrodimitris & Endler, 2001; Waspadji, 2004). Current literature regards diabetes as a process of self-management behavior (Gonder-Frederick et al. as cited in Cox & Gonder-Frederick, 1992). Self-management of diabetes is a challenging lifetime task and requires high commitment from patients, such as an adherence with diet, regular exercise, take prescription medication and test blood sugar levels regularly (Bean et al., 2007).

Glycemic control is a major goal of diabetes management. Glycemic control is characterized by HbA1c, whereas in general, glycemic control in Indonesia is characterized by “GDN” (*Gula Darah Normal*, or translated into English literally would be as normal blood sugar) (Sinorita et al., 2008). *Riskesdas 2007* results showed that many of those who were diagnosed with diabetes still have uncontrolled blood sugar levels. In 75.9% of those diagnosed, the glucose levels were higher than 140mg/dl. Psychologically, research by Hasanat (2008) & Soeharjono et al. (2002) reported difficulties in the management of diabetes. Meanwhile, a qualitative study conducted by Ningrum (2008) indicated that those with high self-efficacy and strong control in diabetes management were able to maintain a controlled diabetic condition, and conversely, those who succumbed to the management of diabetes had uncontrolled diabetes condition.

Goodall & Halford review (1991) stated that even if a strong relationship between the effective self-management with glycemic control is found, it does not necessarily mean that good self-management causes good glycemic control. Good response to the management was measured by better controlled blood sugar levels that can be driven by good self-management.

The above description shows that there are psychological factors in diabetes management. Treatment strategies are needed to prevent and control diabetes (Bean et al., 2007). Psychological factors are thought to play a role in diabetes management including the illness perception and coping strategies.

Social support

Psychosocial aspects are important elements in a person's diabetes' self-management (Jones et al., 2008). These include the psychosocial aspects of social support, motivation (beliefs and attitudes), and coping skills. Some research on social support suggests that social support effectively reduces psychological burden (Haines et al. as cited in Taylor, 2006), such as depression and anxiety (Taylor, 2006).

Results of research conducted by Fleming et al. (as cited in Taylor, 2006) showed that people with high social support experience lower stress compared to those with low social support. Social support can also reduce the possibility of illness, accelerate recovery from illness, and reduce the risk and serious disease-related mortality (Berkman et al., as cited in Taylor, 2006). In addition, social support plays a role in helping individuals in setting distance themselves or minimizing the occurrence of complications from serious health problems (Taylor, 2006), better adjustment in diabetes, lung disease, heart disease, arthritis, and cancer (Penninx et al., as cited in Taylor, 2006), better control diabetes (Marteau et al., as cited in Taylor, 2006) and increase the prospects of recovery among people who are sick (Wallston et al., in Taylor, 2006). According to the research above, it appears that social support has a strong influence in relation to psychological treatment and adjustment to health and illness. Christenfeld et al. (as cited in Taylor, 2006) revealed that individuals perceived the calming effect to be better from friends rather than strangers.

Hypotheses

Based on the nature of the study, the proposed and tested hypotheses for each study are as followed:

Study 1:

- There is a negative correlation between perceptions of social support and self-acceptance with depression
- Perceived social support is negatively correlated with depression
- Self Acceptance is negatively correlated with depression.

Study 2:

- There is a negative correlation between religiosity and self-acceptance with anxiety
- Religiosity is negatively correlated with anxiety
- Self Acceptance is negatively correlated with anxiety

Study 3:

- There is a positive correlation between illness perception, coping strategies, and self-management diabetes.
- There is a negative correlation between illness perceptions and glycemic control.
- There is a positive correlation between problem-focused coping, self-management, and glycemic control.
- There is a negative correlation emotional-focused coping and self-management.

Methods

Studies 1, 2 and 3 have similar respondents, all having a total of 65 people, patients with diabetes, male & female, age between 40-75 years old, and was

willing to engage in research without coercion by signing an informed consent.

Based on the nature of the study, the research instruments used are as the following:

Study 1

1. Depression scale, depression is measured using the Beck Depression Inventory (BDI) in the form of a self report, having 21 categories of depression symptoms.
2. Social Support Perception Scale which covers emotional, instrumental, informational support, and positive feedback.
3. Self Acceptance Scale
Covers 7 general self acceptance indicators, which are:
 - The existence of a belief on one's ability in facing problems.
 - The notion of self-worth as human being, and perceived equality with others
 - The absence of a weird/abnormal presumption of themselves and no hope of being rejected by others
 - The absence of shame or lack of attention to oneself
 - The existence of a courage to take responsibility of one's actions
 - The objectivity in receiving compliments/critics
 - Does not blame others because of either the limitations that exist or denial of excess.

Study 2:

- Anxiety Scale, based on the manifestation of anxiety which was manifested in both the physical and psychological indicators.
- Religiosity scale, expressed in the five dimensions of religiosity (religiosity); faith, worship, charity, deeds, and science.
- Self Acceptance Scale, a modification of the self-acceptance scale from Novvida (2007) which was also used in study 1.

Study 3:

- The Brief Illness Perceptions Questionnaire (BIPQ) (Broadbent, Petrie, Main, & Weinman, 2006), for the illness perception, which measures the dimensions: identity, consequences, duration, personal control, attention, understanding and emotional representations.
- The Coping Styles Inventory, called COPE (Carver, Scheier, & Weintraub, 1989) was used to measure coping strategy (Jamaluddin, 2007).
- Diabetes Self-management Scale developed by Ayusmi (2008), was used to map the respondents self-management

Result and Discussion

Detailed result and discussion within this study is shown according to the focus of study. Discussion and conclusion of the grand study will be used as the closing remark of this article.

Description of Research Subjects

General overview of the characteristics of research subjects in study 1 can be seen in Table 1.

Table 1. The study participants

Socio-demographic	Category	Sample (n)	(%)
Age	40-50	17	26,5
	51-60	28	43,08
	61-70	15	23,08
	71-75	5	7,69
Sex	Female	45	69,23
	Male	20	30,77
Education	Grammar School	4	6,15
	Junior High School	4	6,15
	Senior High School	32	49,23
	Undergraduate	5	7,69
	Graduate	20	30,77
Marital Status	Married	57	87,69
	Widow/Widower	8	12,31
	Unmarried	0	0
Residence Status	Single	2	3,08
	Partner/Children/Relative/ Grandchildren/Friends	63	96,92
Duration of Illness	≤ 2 years	18	27,69
	3-5 years	19	29,23
	6-10 years	17	26,15
	>10 years	11	16,92
Complication	None	39	60,00
	There is complication	26	40,00

Table 2 shows the descriptive data of the study variables, namely: perception of the social support, self acceptance and depression.

Table 2. Perceived social support, self acceptance and depression

Variable	Hypothetical				Empirical			
	Min	Max	M	SD	Min	Max	M	SD
Perception on Social Support	39	156	97.5	16.25	87	155	125.55	13.94
Self Acceptance	29	116	72.5	12.08	68	108	87.20	9.02
Depression	0	63	31.5	5.25	0	29	10.37	7.25

Note : Xmin = Minimum Score M = Mean (average)
Xmax = Maximum Score SD = Standard Deviation

Results of the descriptive analysis showed that subjects generally had an average empirical perceived social support (125.55), which was above the hypothetical average (97.5). The subjects also have shown the empirical average of self-acceptance (87.20) was above the hypothetical average (72.5). The empirical mean of subjects on depression scale (10.37) was below the hypothetical average (31.5).

Subjects of this study were classified in 3 categories, namely high, medium, and low.

Table 3. Detemining of the categories

Category	Value
High	$M + 1SD \leq X$
Medium	$M - 1SD \leq X < M + 1SD$
Low	$X < M - 1SD$

Criteria classification was made based on standard deviation and the score of empirical mean of the perception on social support, self acceptance, and depression.

Table 4. Perceived social support of the study participants

Category	Value	Total	Percentage
High	$139,49 \leq X$	10	15,38%
Medium	$111,61 \leq X < 139,49$	45	69,23%
Low	$X < 111,61$	10	15,38%

Table 4 has showed that the perceived social support variables is $139.49 \leq X$ for the high category, $111.61 \leq X < 139.49$ for the medium category, and $X < 111.61$ for the low category. Based on the description of the data obtained, the empirical mean of the whole subject is 125.55 so it can be estimated that the perceived social support is in the medium category.

Table 5. Categorisation Scale of Self Acceptance

Category	Value	Total	Percentage
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High	$96.22 \leq X$	9	13.85%
Medium	$78.18 \leq X < 96.22$	47	72.30%
Low	$X < 78.18$	9	13.85%

From Table 5, it can be seen that the variable self acceptance has a range of $96.22 \leq X$ for the high category, $78.18 \leq X < 96.22$ for the medium category, and $X < 78.18$ for the low category. Based on the description of the data obtained, the empirical mean of the whole subject is 87.20 so it concluded that the subjects' self-acceptance is in the medium category.

Table 6. Categorization Scale Depression

Category	Value	Total	Percentage
High	$17.62 \leq X$	10	15.38%
Medium	$3.12 \leq X < 17.62$	43	66.15%
Low	$X < 3.12$	12	18.46%

From Table 6, it can be seen that the depression variables has a range of $17.62 \leq X$ for the high category, $3.12 \leq X < 17.62$ for the medium category, and $X < 3.12$ for the low category. Based on the description of the data obtained, the empirical mean of the entire subject is 10.37 so it can be concluded that the Depression among the subject is in the Medium category. A total of ten subjects were in the High depression category, and 12 subjects were in the low category.

Test of hypothesis

Sobel test was used to see the indirect effect of independent variables on the dependent variable through the mediator variable (Baron & Kenny, 1986).

Table 7. Analytical Result of Sobel Test Mediation

Direct Effect and Total Effect		
	Coefficient	P
b(YX)	-0.1662	0.0095
b(MX)	0.3132	0.0000
b(YM.X)	-0.4482	0.0000
b(YX.M)	-0.0258	0.6758

Based on the mediation analysis that the Sobel test obtained, results showed that the "influence" of perceived social support on depression was $b(YX) = -0.1662$, $p = 0.0095$, which indicates that the perceived social support has a significant role toward depression; a negative correlation was observed. The same was found also between perceived social support on self acceptance as shown in a positive correlation; $b(MX) = 0.3132$, $p < 0.0001$. The result of the third mediation analysis showed that the effect of self acceptance towards the depression by controlling the perceived social support was $b(YM.X) = -0.4482$; $p < 0.0001$. It shows that diabetic patients with good self acceptance tend to not experiencing depression or have low levels of depression, with or

without social support. Thus, it can be concluded that there is a negative correlation between self acceptance with depression.

The fourth analysis is the result of the direct effect of perceived social support on the depression, by controlling for self acceptance $b(YX.M) = -0.0258$; $p = 0.6758$. This indicates that there is no correlation between perceived social support on depression after controlling self acceptance. It can be concluded that by controlling self acceptance, the perceived social support significantly related towards depression.

Result of the Sobel test also showed indirect effect of perceived social support on depression through self acceptance, which is -0.1404 ; $p = 0.0015$. This indicates that perceived social support has a significant role on depression through self acceptance. In other words, self acceptance is the mediator of perceived social support and depression. Perceived social support increases self acceptance before decreasing depression.

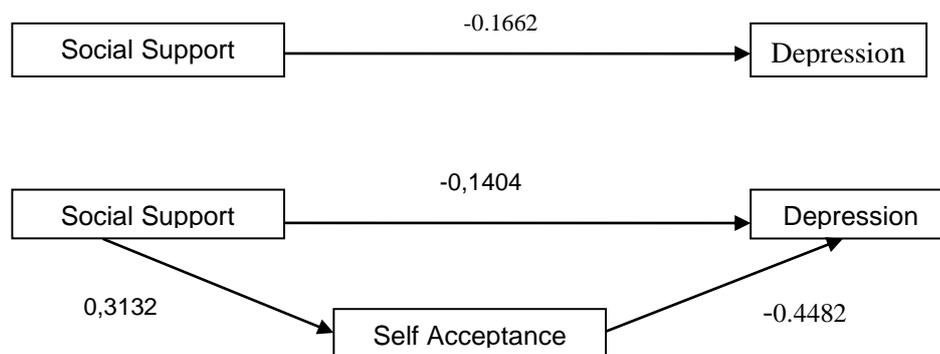


Figure 3. The diagram of mediation

Hypothesis 1 seemed to be supported, that there is a negative correlation between perceived social support and depression in people with type 2 diabetes. Result of the second stage of Sobel test mediation analysis showed a coefficient of $b(MX) = 0.3132$, $p < 0.0001$, and so hypothesis 2 is accepted, as there is a positive correlation between perceived social support and self acceptance.

The third stage of the Sobel test mediation analysis showed the coefficient result of $b(YM.X) = -0.4482$; $p < 0.0001$. The fourth stage of the Sobel test mediation analysis showed a coefficient of $b(YX.M) = -0.0258$; $p = 0.6758$. This indicates that there is no correlation between perceived social support and depression after controlling self acceptance.

Based on the results obtained by the research, it can be concluded that within this study there is a correlation between perceived social support and depression mediated by self acceptance.

There are differences and similarities between the condition of depression among the ten subjects with the highest depression, and the twelve subjects with the lowest depression. Some conditions that were often experienced by the ten subjects with high depression were rarely encountered by the twelve subjects with low depression. These are, for example, on responses related to questions on feeling punished, sleep disorders, and loss of libido. The data showed that subjects experience fatigue, regardless of whether they were in the high depression category or the low depression category. Subjects felt that they get tired easier than before and said that this fatigue is associated with the diabetes. A condition that was equally rarely experienced by subjects with high or low depression, was the desire to commit suicide and withdrawal from a social relationship. Subjects rarely had any thoughts of hurting oneself or suicide. Subjects do not lose interest toward others. Subjects within this study, on average still have interest to interact and socialize themselves with others.

Result of Study 2:

Table 8 shows the general overview of the respondents from the study 2.

Table 8. The study participants

Characteristic	Sample (n)	(%)
Age		
40-50	29	37.18
51-60	30	38.46
61-70	19	24.36
Sex		
Female	51	65.38
Male	27	34.62
Education		
Grammar School	23	29.49
Junior High School	5	6.41
Senior High School	30	38.46
Undergraduate	11	14.10
Graduate	9	11.54
Duration of Illness		
≤2 years	22	28.21
3-5 years	27	34.61
6-10 years	15	19.23
>10 years	14	17.95
Religion		
Islam	73	93.59
Protestant	2	2.56
Catholic	3	3.85

Following are the variables in the study, presented in descriptive table:

Table 9
Description of variable

Variable	Hypothetical				Empirical			
	Min	Max	M	SD	Min	Max	M	SD
Anxiety	40	160	100	16.67	57	108	79.58	13.591
Religiosity	48	152	100	16.67	113	145	126.9	9.169
Self Acceptance	29	116	72,5	12.08	71	103	87.32	8.056

Explanation : Min = Minimum Score M = Mean (average)
 Max = Maximum Score SD = Standard Deviation

The above description shows that the subject at the average has the empirical values of anxieties about 79.58, which is under the hypothetical average (100). Subjects had a mean empirical religiosity of about 126.9, which is above the hypothetical average (100). On self acceptance, subjects had an average empirical value of 87.32, which is above the hypothetical average (72.5).

Test of hypothesis

Similar to Study 1, Study 2 also used the Sobel test for mediation analysis (Baron & Kenny, 1986; Preacher & Hayes, 2004).

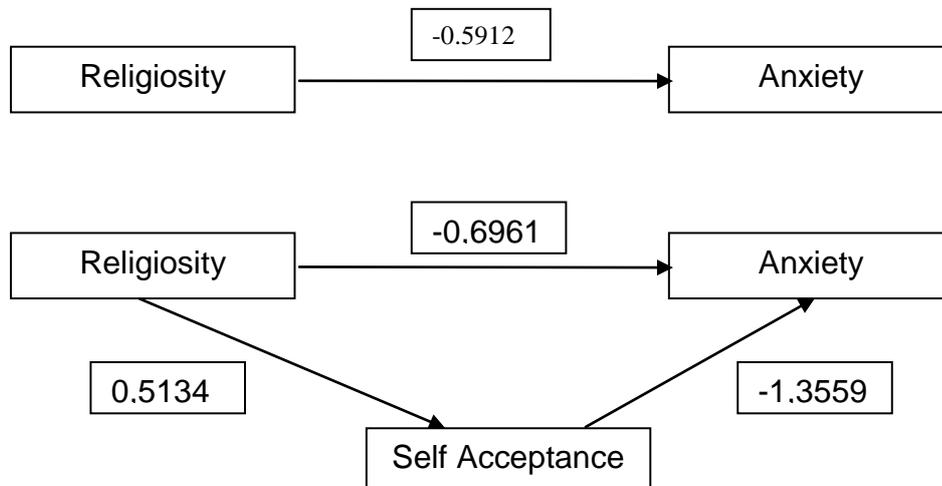


Figure 4. The diagram of mediation

Results of the mediation analysis showed that there is a significant negative correlation between religiosity and anxiety ($b(YX)=-0.5912$; and $p<0.05$). Similar result was found by Morse et. al. (2009), which showed that religiosity is related to anxiety that was experienced by patients with chronic disease. Other research stated that a good base of religiosity was associated with the declining level of anxiety they felt (Khalek, 2006). Koenig later explained that religiosity represented the source of power that came through comfort, hope, and meaningfulness (Koenig, 2009).

The results of the second analysis showed that there is a highly significant positive correlation between religiosity and self-acceptance ($b (MX) = 0.5134$, $p < 0.01$). Data also showed that there was a significant positive correlation between religiosity with self-acceptance, and there is a significant negative correlation between self-acceptance with anxiety ($b (YM.X) = -1.3599$, $p < 0.01$). Indirect effect of religiosity on anxiety through self-acceptance, indicated in the Sobel test about -0.6961 , $p < 0.01$). This suggests that religiosity has a very significant role on anxiety through self-acceptance. Self-acceptance mediated the relation between religiosity and anxiety.

Anxiety was highest in the experience of the subjects in relation to things that affect the stamina of the subject in work. The subjects became more fatigued compared to when they were healthy. A total of 35 subjects (44.9%) claimed that ever since they caught diabetes, they were more susceptible to fatigue while working. Paddison et al. (2011) stated that people, when first being diagnosed with diabetes, had high levels of anxiety.

Result of Study 3:

In general, the characteristics of the research subjects can be seen in Table 10 below:

Table 10
The study participants

Characteristic	Sample (n)	(%)
Age		
40-50	4	6.6
51-60	28	45.9
61-70	29	47.5
Sex		
Female	37	60.7
Male	24	39.3
Education		
Grade School	8	13.1
Junior High School	9	14.8
Senior High School	21	34.4
College	23	37.7
Duration of Illness		
6 months-2 years	22	36.1
3-5 years	16	26.2
6-10 years	10	16.4
>10 years	13	21.3

Table 11
Descriptive data of illness perception and self-management (n = 61)

Variable	Range of Score	Range of Empirical Score	SD	Mean
Illness Perception				
Identity	0-13	0-13	3	4
Timeline	6-30	7-25	4.316	17.74
acute/chronic				
Timeline cycle	3-15	6-15	1.883	10.59
Consequences	6-30	6-26	3.981	16.18
Personal control	4-20	7-20	2.446	15.18
Treatment control	5-25	14-25	1.975	18.97
Understanding of pain	5-25	10-24	3.500	16.13
Emotional representation	6-30	9-24	3.621	15.41
Self Management	26-104	58-100	10	82

Three of the most important factors that the subjects believe to be the cause of their diabetes can be seen in table 11 as followed:

Table 11
Causes of Diabetes

Possible causes of Diabetes	Number of subjects (%) stating it as the 1st cause	Number of subjects (%) stating it as the 2nd cause	Number of subjects (%) stating it as the 3rd cause
Eating habit	41.0	31.1	6.6
Genetics	32.8	6.6	1.6
My own behavior*	-	16.4	8.2
Stress or anxiety	8.2	8.2	8.2
Aging	1.6	3.3	6.6
Overworked	1.6	4.9	3.3
My mental attitude, such as negative thoughts on life	-	-	8.2
Emotional state, such as falling down, worry, empty	-	1.6	1.6
Immune	-	1.6	-
Family problems	1.6	-	-
God's will	-	-	8.2

* My own behavior includes lack of exercise and unhealthy lifestyle.

Table 11 shows that diabetic patients believe the main cause of their

diabetes are eating habit (41%), genetic (32.8%), while 8.2% believe that it's caused by stress and anxiety. The second cause believed causing diabetes by the subjects of the study are eating habit (31.1%), my own behavior, including lack of exercise, and unhealthy lifestyle (16.4%), and stress of worry (8.2%). The third factors believed by the patients to cause their diabetes are their own behavior (8.2%), stress of worry (8.2%), mental attitude (negative thinking on life) 8.2%, and lastly that the illness is meant from God (8.2%).

Pearson product-moment correlation was used to ascertain whether there is a significant correlation between variables in the study. Table 11 shows that there is a positive correlation between identification with the understanding of pain ($r = 0.249$, $p < 0.05$), negative correlation timeline acute / chronic to treatment controls ($r = -0.279$, $p < 0.05$). This indicates that people with diabetes who view the disease as more chronic than acute lead individuals to believe on the effectivity of the treatment or management.

The consequences of diabetes negatively correlated with both, treatment control and understanding of illness ($p < 0.01$). This indicates that people with diabetes who view the illness as serious and impacts their lives, cannot determine whether or not the management can be effectively performed. The better patients understand their illness, the more they can minimize the consequences of diabetes. Representation of positive emotions correlate well with the cyclical timeline and consequence ($p < 0.001$). This indicates that the symptoms are intermittent with no predictable time of appearance, sometimes better sometimes worse and seriousness of the disease that bears the representation of negative emotion display for people with diabetes.

It is showed that only treatment controls is correlated with problem-focused coping ($r = 0.280$, $p < 0.01$) and emotional-focused coping is positively correlated with the consequences and personal control ($p < 0.05$).

Table 11 shows the regression analysis of the variables. It is only one significant correlation that met the criteria for mediation analysis, the independent variable relationship with the mediator variable, the other 2 relationships are not significantly correlated. In other words, a hypothesis cannot be tested because the requirement of mediation analysis was not fulfilled.

Table 11 showed other findings, namely the treatment control correlated with problem focused coping ($F = 5.033$, $p < 0.05$), correlated with the emotional focused coping ($F = 4.234$, $p < 0.05$) and correlated with emotional personal control focused coping ($F = 4.475$, $p < 0.05$).

Table 12
Correlation between Illness Perception, Coping Strategy, and Self Management.

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Identity	-	0.269*	-0.228	0.090	-0.109	-0.090	0.249*	-0.162	0.037	0.075	-0.085
2. Timeline acute/chronic		-	0.081	0.131	-0.035	-0.279*	-0.015	0.036	0.084	0.010	-0.052
3. Timeline cycle			-	0.366*	-0.107	0.001	0.237*	0.414***	0.184	0.158	0.109
4. Consequence				-	-0.111	-0.313**	-0.298**	0.420***	0.062	0.259*	-0.034
5. Personal control					-	0.439***	-0.016	0.074	0.180	0.268*	-0.193
6. Treatment control						-	0.309**	-0.152	0.280**	0.069	-0.010
7. Understanding of Illness							-	-	-0.006	0.065	0.191
8. Emotional representation								0.492***	-	0.069	0.016
9. Problem focused coping									-	0.548***	0.147
10. Emotion focused coping										-	0.202
11. Self management											-

*p<0.05 **p<0.01 ***p<0.001

Table 13
 Regression analysis of Illness perception, coping strategy, and self management

	R^2	β_0	β_1	Significance (p)
Self management				
Illness Perception				
Identity	0.007	83.277	-0.319	ns
Timeline acute/chronic	0.003	84.223	-0.122	ns
Timeline cycle	0.012	75.911	0.581	ns
Consequence	0.001	83.439	-0.085	ns
Personal control	0.037	94.104	-0.793	ns
Treatment control	0.000	83.028	-0.051	ns
Understanding of Illness	0.036	73.232	0.548	ns
Emotional representation	0.000	81.373	0.045	ns
Problem focused coping				
Illness Perception				
Identity	0.001	14.981	0.031	ns
Timeline acute/chronic	0.007	14.328	0.043	ns
Timeline cycle	0.034	12.786	0.218	ns
Consequence	0.004	14.538	0.035	ns
Personal control	0.032	12.607	0.164	ns
Treatment control	0.079	9.083	0.317	p<0.05
Understanding of Illness	0.000	15.160	-0.004	ns
Emotional representation	0.005	14.441	0.013	ns

Emotion focused coping				
Illness Perception				
Identity	0.006	37.939	0.137	ns
Timeline acute/chronic	0.000	33.263	0.011	ns
Timeline cycle	0.025	34.105	0.411	ns
Consequence	0.067	33.305	0.319	p<0.05
Personal control	0.072	30.300	0.537	p< 0.05
Treatment control	0.005	35.222	0.171	ns
Understanding of Illness	0.004	36.981	0.092	ns
Emotional representation	0.008	36.588	0.121	ns
Self management				
Problem focused coping	0.022	72.101	0.660	ns
Emotion focused coping	0.041	66.183	0.413	ns

ns= not significant

Result found no significant correlation between coping strategies with self-management. In other words, hypothesis 3 is rejected. This finding is different from the results of previous studies, namely the problem focused coping, proactive coping was positively correlated with self-adjustment and self-management (Duangdao & Roesch, 2008; Hart, 2006; Thoolen et al., 2009), while emotion focused coping was negatively correlated with self-management, especially the routine examination (Lawson et al., 2007).

Only three out of the eight dimensions of illness perception are correlated with coping strategies, namely the treatment control which is positively correlated with problem focused coping, and consequences of personal control which is positively correlated with emotion focused coping. These findings are consistent with previous research which stated that the stronger the belief in the effectiveness of treatment associated with more and more use of active coping and seeking instrumental support. Meanwhile, the consequences is correlated with emotion focused coping (Lawson et al., 2007).

Mediation analysis to test the first hypothesis cannot be run. There is only one significant correlation, i.e. the illness perception with coping strategies. Since there is only one criterion for mediation analysis of Baron and Kenny (1986), especially direct connection and the illness perception self-management is not significant then the mediation did not occur.

Results showed that most people with diabetes attributed the main cause of illness as a result of risk factors [eating habits (41%), unhealthy behaviors (16.4%), heredity (32 %)]. This is

consistent with the medical model of the causes of diabetes, namely the development of insulin resistance caused by lifestyle factors (such as eating habits and other unhealthy behaviors) that interact with genetic factors (hereditary) (Gomersall et al., 2011; Suyono, 2004). This study found that people with diabetes looked at the causes were more attributed to psychological risk factors, such as stress or fear (8.2%). The same thing was found in a qualitative study of Adam (as cited in Gomersall et al., 2011) having a sample of Latin female participants, looked at the causes of diabetes due to stress. Based on the biopsychosocial model, stress was not directly related to the rise in blood glucose levels but rather through the psychophysiology (Peyrot et al., 1999). Nevertheless, the discussion in the literatures on stress was associated with self-management and glycemic control, not as the cause of diabetes (Goodall & Halford, 1991; Peyrot et al., 1999).

Another interesting finding was partly attributed the causes of ill people with diabetes as the will of God (8.2%). Attribution emerged as a cultural difference about the beliefs of diabetes mellitus (Barnes as cited in Moss-Morris et al., 2002). Furthermore, the attribution of the will of God as the cause of the diabetes was reinforced the results of previous qualitative studies. The study results of Ningrum (2008) Asril (2011) reflected that the subject realized that the main cause of illness was due to diabetes risk factors. When the subjects finally got diagnosed having diabetes, then it has become “the will of God”. Metasynthesis studies by Gomersall et al. (2011) showed that the presence of cultural influences in diabetes self-management, e.g. participants Muslim Pakistan and India that have a view of diabetes as the will of God to be passive in the approach to illness.

Identity dimension revealed the symptoms related to diabetes. Results of this study showed that there were diabetic patients without symptoms while there were also those who have several symptoms. These symptoms indicate the condition during hypoglycemia as well as during hyperglycemia. This study found that diabetics tend to perceive their illness as a chronic or aging illness. This can be seen from how long the disease lasted after getting diagnosed for decades. The condition of diabetes cannot be predicted, sometimes it gets better and other times it gets worse or even cyclical. This is supported by their strong belief to be able to control their illness. Illness perception is consistent with chronic diabetes model and requires complex management (Gonder-Frederick et al., 2002; Waspadji, 2004). The consequences of diabetes is negatively correlated with treatment control. This is in line with the findings of Griva et al. (2000). The consequences of diabetes correlated with the representation of emotion. These findings are consistent with previous studies which stated that the consequences associated with emotional responses (Talbot et al., as cited in Skinner et al., 2002).

General Conclusions

Results of the studies showed that self-acceptance is associated with depression ($r: -.14$, $p < .05$) without any mediation of social support ($r: -.16$, $p > .05$). Medium religiosity has a significant correlation with stress ($r: -.69$, $p < .05$), with the mediation of self-acceptance ($r: -.36$, $p < .05$). Most subjects (more than 50%) identified the root of the main stressor is lack of stamina such as getting tired faster during work, compared to the time of getting diabetes.

This study also showed that the illness perception and coping strategies are not correlated directly, nor with self-management. The partial analysis found that problem-focused coping is associated with general self management, medium emotion-focused coping correlated with the consequences of illness and personal control.

The study is by no means perfect. There are limitations of the study, such as the

suspension of multicollinearity between the components of illness perception that has 8 sub-components, coping strategies, and self-management. The sample size was not that big for running Sobel test, and the precision of the test can be limited, and so does the external validity.

Important conclusion of this study is that self acceptance is very important, compared to social support, medium religiosity is a possible reinforcement towards self acceptance, either for one-self or the family and the environment (schools, families, and communities).

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