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RESEARCH ARTICLE

Improvement in Diabetic Control Belief in Relation to Locus of Control

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Abstract:

Background:

Adherence to diabetes control is important to determine an individual's ability to maintain treatment focus of Diabetes Mellitus . The Locus of Control thereby assesses the behavior of an individual to diabetes control.

Objective:

The aim of this study was to analyze the pathways of diabetes control beliefs based on the variable locus of control in the integration of locus of control theory and the theory of planning behavior on diabetes mellitus control behavior.

Methods:

This study was carried out as an explanatory research with a cross-sectional design. The sampling technique was consecutive. The sample size was determined using multivariate numerical analytic one-time predictive concept framework and 143 respondents at 8 locations were recruited by a random lottery method. Demographic data analysis of respondents was done using statistical software, namely IBM Statistics SPSS using a *Chi-square* statistical test. The proposed hypothesis was tested by the bivariate analysis of variance to assess the effect of causal variables.

Results:

The results of this study indicate that locus of control affects diabetic control beliefs ($\rho = 0.05$; $\alpha = 0.06$; $b = 0.16$; $b^2 = 0.03$; $F = 3.91$) in the diabetes mellitus control behavior.

Conclusion:

The findings of this study suggest a need to consistently provide positive information and support as a locus of control to guard a strong intention to control diabetes mellitus.

Keywords: Behavior, Diabetes mellitus, Diabetic control belief, Locus of control.

Article History

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1. INTRODUCTION

The locus of control refers to an individual's perception where he accepts the outcomes of events in his life as part of his own behavior or characteristics. Thus, the locus of control has a strong relationship with an individual's behavior [1]. Diabetes Mellitus (DM) is considered a medical condition with an annual increase in its prevalence. For example, in 2014, 8.5% of adults aged 18 years and older were having diabetes. In 2016, diabetes was a direct cause of 1.6 million deaths, and

in 2012, a high blood glucose level was the cause of another 2.2 million deaths [2]. Therefore, controlling the disease at the global level is of utmost importance. The current estimated number of individuals with diabetes worldwide is approximately 364 million [3]. Empirical evidence shows that individuals with a chronic form of the disease and receiving inadequate care have a low quality of life with poor clinical and psychological outcomes [4, 5]. da Silva *et al.*, (2018) [6] described DM to be one of the most serious chronic diseases in the world on the basis of its prevalence, economic and social effects, and the negative impact on the quality of life of affected people. This implies that changes in lifestyle habits, especially those related to eating, physical activity, and

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constant self-care, can play a major role in combating this illness. However, these aspects require greater personal autonomy and self-motivation.

Krampen (1996), states that control beliefs are similar to the idea of locus of control. This is in line with a study [7] which suggested that the locus of control is one type of control beliefs. Locus of control refers to the place where the control originates, either internally in an individual or externally. From this statement, the researcher argues that the concept of locus of control is independent. Locus of control plays a role when individuals predict various factors that can support the creation of behavior; this includes both internal and external factors. Besides, the existing supporting factors shape individual control beliefs.

Control beliefs come from contingency expectations theory in action and represent subjective expectations that the possibility of action will succeed in certain situations [8]. Control beliefs are individual beliefs about the existence of factors that can facilitate or hinder the implementation of behavior [9]. In general, control belief is a relatively stable personality characteristic as it reflects an individual's belief that he can overcome the difficult demands [10]. The indicators used in measuring confidence control (control belief) is controlled belief strength and control belief power. An example of item control belief strength is that "I believe that my performance will be better in the coming months". An example of control belief power (linked to the level of demand) could be stated as "I believe that if I am required to improve performance at a high level in the coming month, it will be very difficult for me to do" [11].

Several earlier studies have highlighted the controversy over opinions regarding the similarity of types of locus of control and control beliefs in DM [12]. Seeman & Evans (1962) [13] conducted research supporting a relationship between the locus of control for DM and health behavior. The study reported that individuals who actively sought information related to health had an internal locus of control. The individuals suffering from tuberculosis had an internal locus of control and a better understanding of their conditions. Moreover, these patients showed a tendency to frequently ask their doctors and nurses questions about their health conditions as compared to individuals having an external locus of control. Therefore, the main objective of the present study was to prove that the locus of control is independent and not a type of control belief. Moreover, using a combination of the locus of control theory and the theory of planning behavior on control of DM, we analyzed diabetic control beliefs based on the variable locus of control.

2. METHODS

The present investigation was an explanatory study with a cross-sectional design and was conducted from June 2015 to August 2015. The sample size was comprised of 122 respondents using the multivariate numerical analytic one-time predictive concept framework [14]. However, considering various errors, including incomplete responses, the sample size was increased by 20% and finally, 143 respondents were recruited. Sampling was performed using the consecutive

sampling technique. Consecutive sampling refers to the selection of samples in a sequential manner and is based on research criteria to obtain the desired sample size or until the research period ends [15]. The inclusion criteria were people with type 2 Diabetes Mellitus (DM), patients with new type 2 diabetes (<6 months from the onset of symptoms until being diagnosed), patients who have had type 2 DM (≥ 6 months from symptoms to diagnosis), and those having complications of type 2 DM. The data were collected at eight locations including three hospitals in Makassar City and five Primary Health Care centers in Makassar City. The site selection, especially for primary health care centers, was performed by random lottery. The research instrument used in the present study was a structured questionnaire with closed questionnaire patterns. Individuals with DM who previously agreed and signed an informed consent participated in the study and attempted the questionnaire.

The questions on the locus of control variables were obtained from a modified locus of control scale DM instrument [1], which is overall items modified according to DM instrument, based on research requirements which including among others internal items (skill, abilities, and effort) and external items (powerful others and chance items). The locus of control served as the original source control that played a role when individuals predicted various factors that supported the confidence in control diabetes mellitus which sufferers. The instrument consists of 15 numbers with 5 numbers internal items which if answered agree to be given a score of 10 points (0 = disagree, 10 = agree) and external items as many as 10 numbers which if answered agree to be given a score of 5 points (0 = disagree, 5 = agree). The measurement results are interpreted internal locus of control if the total score internal items are higher than external items while interpreted as an external locus of control if the total external items score are higher than internal items. The questionnaire for the diabetic control beliefs instrument itself measures the respondents' beliefs about whether or not to carry out DM control behavior with the strength of control beliefs indicators, which is a strong belief that respondents can exercise DM control behavior. The measurement results are interpreted strongly if the total score of the respondents' answers is in the range of 43-102 points and is said to be weak if the total score of the respondent's answers is in the range under 43 points.

Questions on other variables were prepared with reference to the theoretical concepts, which were tested for validity and reliability. The validity of the research instrument was confirmed by correlating each item score and the total score using Pearson's product moment correlation analysis ($n = 31$, r table at $\alpha (0.05) = 0.36$ and $\alpha (0.01) = 0.46$). Where the test decision from the analysis is if r count is greater than r table then the item has validity and if r count is smaller than r table then the item is declared invalid. The invalid items were rejected, and the validity was tested again using Cronbach's alpha ($\alpha = 0.50-0.70$, moderate reliability; $\alpha > 0.7$, sufficient reliability; and $\alpha > 0.80$, all items are reliable and internally consistent). The respondent's data were demographically analyzed using the statistical software, IBM Statistics SPSS, in the form of frequency distribution analysis. The analysis was presented in a tabular form. The hypothesis testing was

conducted using a chi-square statistical test with $\alpha = 0.06$, with the intention that the chance of error in measurement was six times or 6% of the total measurement.

3. RESULTS

Table 1 shows the results of the validity and reliability tests of the questionnaire used. Out of a total of 18 questions on the locus of control, there were 2 invalid questions with a reliability value of 0.81. In contrast, among questions on diabetic control beliefs, 1 invalid question from 18 questions had a reliability value of 0.89. These results demonstrated that the distribution of socio-demographic factors of the respondents was in the locus of control dimension (Table 2). The frequency distribution data analysis showed that most respondents belonged to the age group of 46 to 55 years (35.7%). Out of these, 52.4% were males, had a high school education (45.5%), and were suffering from DM for more than five years (48.3%). Most of the respondents (55.9%) did not experience DM complications. Moreover, some respondents (88.1%) were more likely to have an internal locus of control.

Table 3 shows the results related to age groups. It could be concluded that with increasing age, patients with DM developed a higher internal locus of control and tended to be stable in the 46 to 65 years of age group. This reflected a higher percentage of respondents having an internal locus of control as compared to those having an external locus of

control. Regarding the gender, the internal locus of control was higher in men (92.0%) as compared to an external locus of control; similarly, in women, the internal locus of control was higher (83.8%) as compared to an external locus of control.

Based on the highest level of education, the percentage of respondents showed that the higher the education, they tend to have a higher internal locus of control compared to an external locus of control. Based on the duration of DM, the percentage of respondents suffering from DM >5 years was higher in the internal locus of control (91.3%) compared to an external locus of control (8.7%). It can be concluded that the longer a person suffers from DM, the more likely he is to have an internal locus of control. Regarding the presence or absence of complications, the percentage of respondents who had not experienced severe complications was higher for the internal locus of control (90.0%) compared to the external locus of control (10.0%).

The data shown in Table 4 suggest that the locus of control affects the diabetic control beliefs ($\rho = 0.05$; $b = 0.16$; $b^2 = 0.03$; $F = 3.91$). Thus, it could be concluded that the locus of control had a direct effect on the diabetic control beliefs in DM control behavior with a total effect on diabetic control beliefs. The frequency distribution data showed that 99.2% of patients with an internal locus of control orientation and 100% of patients with an external locus of control orientation had strong control beliefs.

Table 1. The results of validity and reliability tests.

Variable	Number of Question		Reliability (r)
	Before	After	
Locus of control	18	15	0.81
Diabetic control beliefs	18	17	0.89

Table 2. The frequency distribution of respondents' characteristics (n = 143).

Characteristics of Respondents	Hospital		Primary Health Care		Total	
	n	%	n	%	n	%
Age group						
26-35 year	1	1.2	0	0.0	1	0.7
36-45 year	15	18.5	9	14.5	24	16.8
46-55 year	34	42.0	17	27.4	51	35.7
56-65 year	16	19.8	27	43.5	43	30.1
>65 year	15	18.5	9	14.5	24	16.8
Gender						
Male	51	63.0	24	38.7	75	52.4
Female	30	37.0	38	61.3	68	47.6
Last Education						
No School	4	4.9	3	4.8	7	4.9
Primary School	8	9.9	14	22.6	22	15.4
Junior High School	14	17.3	8	12.9	22	15.4
Senior High School	38	46.9	27	43.5	65	45.5
Diplomas and Scholars	17	21.0	9	14.5	26	18.2
Magister	0	0.0	1	1.6	1	0.7
Long Suffering						
<1 year	12	14.8	5	8.1	17	11.9

(Table 4) contd....

Characteristics of Respondents	Hospital		Primary Health Care		Total	
	n	%	n	%	n	%
1-5 year	33	40.7	24	38.7	57	39.9
>5 year	36	44.4	33	53.2	69	48.3
Complication						
No	44	54.3	36	58.1	80	55.9
Yes	37	45.7	26	41.9	63	44.1
Locus of control						
Internal	72	88.9	54	87.1	126	88.1
External	9	11.1	8	12.9	17	11.9

Table 3. The dimensions of locus of control based on age, gender, highest education, duration of diabetes, and complications (n = 143).

Characteristics of Respondents	Internal LoC		External LoC		Total	
	n	%	n	%	n	%
Age group						
26-35 year	1	0.8	0	0.0	1	0.7
36-45 year	21	16.7	3	17.6	24	16.8
46-55 year	46	36.5	5	29.4	51	35.6
56-65 year	37	29.3	6	35.4	43	30.1
>65 year	21	16.7	3	17.6	24	16.8
Gender						
Male	69	54.8	6	35.3	75	52.4
Female	57	45.2	11	64.7	68	47.6
Highest Education						
No School	6	4.8	1	5.9	7	4.9
Primary School	19	15.1	3	17.6	22	15.4
Junior High School	20	15.9	2	11.8	22	15.4
Senior High School	57	45.2	8	47.1	65	45.4
Diplomas and Scholars	23	18.2	3	17.6	26	18.2
Magister	1	0.8	0	0.0	1	0.7
Disease Duration						
<1 year	13	10.3	4	23.5	17	11.9
1-5 year	50	39.7	7	41.2	57	39.9
>5 year	63	50.0	6	35.3	69	48.2
Complication						
No	72	57.1	8	47.1	80	55.9
Yes	54	42.9	9	52.9	63	44.1

Table 4. The distribution of respondents based on the locus of control on diabetic control beliefs in DM patients.

Locus of Control	Diabetic Control Beliefs				Total		F	ρ	b	b ²
	Strong		Weak							
	n	%	n	%	n	%				
Internal	125	99.2	1	0.8	126	100.0	3.91	0.05	0.16	0.03
External	17	100.0	0	0.0	17	100.0				
Total	142	99.3	1	0.7	143	100.0				

4. DISCUSSION

The results presented in this article lead to the conclusion that socio-demographic factors affect locus of control. This finding is in line with previous research that locus of control is influenced by various factors, namely, age [14, 15], environ-

ment [16], past experience [17, 18], and culture [1, 19]. Someone who has an external locus of control believes that their behavior is caused by some external factors [20, 21]. Levenson (1972) [22] divided the external control center into two types: powerful-others and opportunities (chance) mainly by fate, opportunity, and luck.

The patients with diabetes mellitus are more likely to have an internal locus of control. This finding indicates that DM patients consider themselves to have the greatest influence on DM control, so policies and strategies for DM control should be emphasized more on DM patients' involvement in controlling actions related to their disease. Although so far no method or treatment has been found that can cure diabetes, normal glycemic levels can be achieved by diet, exercise, and anti-diabetic drugs. The control method is very specific for each patient, thus the success of the treatment program depends on a patient. This is in line with the results of a study that shows that the perception of control of the disease will affect the patient cure rate [23].

The results obtained show that the locus of control is variable and has a causal effect on diabetic control beliefs that are defined and measured not as a trait but as a place of control in DM patients regarding their ability to control DM. Therefore, the overall reflection of patient characteristics can lead them to the dominant internal locus of control because it will be more selective to choose the information that enters and controls DM behavior. Therefore, the results of this study prove that the locus of control is independent, this is in contrast to the earlier opinions about the locus of control, which, in the context of social learning theory, states that locus of control is one type of personality trait [1].

Based on this, it can be concluded that locus of control is independent and not a type of personality traits or control beliefs. The control center has an impact that plays an important role in a variety of domains of a person's life, including health, happiness, job satisfaction, and life as a whole, and to a large extent also influences the career and vocation they choose [24]. In addition, the findings of this study are also supported by the research showing that age, gender, ethnicity, socioeconomic status, mood, personality traits, and knowledge influence individual attitudes and behavior toward something [25]. Therefore, the locus of control is the place where the formation of control beliefs occurs in an independent dimension. In the behavioral theory, it is explained that the background factors are basically the characteristics present in a person, which, in the Kurt Lewin model, are categorized as the aspects of O (organism) [25].

The locus of control affects diabetes control beliefs ($p = 0.05$). The frequency distribution data showed that 99.2% of patients with an internal locus of control orientation have strong control beliefs and 100% of patients with an external locus of control orientation have strong control beliefs. This means that the locus of control orientation does not distinguish the sufferer's control beliefs, but it is different from the source of the belief support. The individual differences at the level of how they generalize beliefs about the ability of their actions are related to the results they get [26].

This finding also supports the development of new ideas because it proves that locus of control is different from control beliefs, so an interesting issue is a concept that the locus of control is a place that accommodates various supporting sources for the creation of behaviors originating from internal and external environment in DM sufferers and determines the patients' confidence in DM control. This answers the controversy over previous opinions regarding the link between locus of control and control beliefs, whether the locus of control is a type of control beliefs or rather a place of control

[7]. Control beliefs are similar to the idea of locus of control [8].

The locus of control can affect individual behavior related to health, including risky health behaviors and adherence to health care recommendations [27]. Previous research shows that individuals who actively seek information related to health are individuals who have an internal locus of control [28]. The individuals, who have an internal locus of control that is more independent and more resilient, have strong endurance and are more resistant to dealing with social influences [28], more able to delay gratification, not easily affected, and more able to deal with failure [29].

The previous studies that were almost similar to this one were focused on the effect of perceived control and locus of control for cortisol and subjective responses to control for cortisol (stress hormone) [30]. An intensive control for diabetic through medical nutrition therapy, exercise and medicine is necessary so that the blood sugar is well controlled and the occurrence of disease complications is prevented or delayed. Physicians, healthcare professionals, nurses, and nutritionists must be able to motivate patients and work together in tackling diabetes [31].

The locus of control has an effect on diabetes control beliefs. It has implications that patients should be exposed more often to various factors that can be used as a source to strengthen control center, both internally and externally, so that the patient's confidence in being able to control DM is also strengthened. The internal dimension or external locus of control has an equally good role if it contains positive sources and will strengthen the patient's confidence to exercise control.

The locus of control is independent. The locus of control significantly affects an individual's diabetic control beliefs in diabetes mellitus control behavior. The patients have a strong belief that they are able to control DM because there are various factors that can facilitate the creation of these behaviors that are accommodated in the locus of control; The locus of control factor comes from internal and external sources so that patients can predict these factors to increase their confidence in behavior control. Although some experts state that locus of control is a type of control belief [7].

CONCLUSION

The results of this study prove that the fundamental difference between locus of control and control beliefs is that locus of control is not a type of control belief but a determinant of control belief leading to the development of DM control behavior. Therefore, researchers assume that with an increase in the locus of control, there will also be an increase in diabetic control belief in the behavior of an individual controlling diabetes mellitus.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No animals/ humans were used for the studies that are basis of this research.

CONSENT FOR PUBLICATION

Individuals with DM who previously agreed and signed an informed consent participated in the study and attempted the questionnaire.

AVAILABILITY OF DATA AND MATERIALS

The data were collected at eight locations including three hospitals in Makassar City and five Primary Health Care centers in Makassar City. The data supporting the findings of the article is available in the Universitat Trier at https://www.uni-trier.de/fileadmin/fb1/prof/PSY/KPW/1997_Replik_zur_Rezension.pdf [7] Mahwah, New Jersey London at <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Conceptualization+and+Operationalization+of+Perceive+d+Control#0> [8] University of Massachusetts at <https://www.annualreviews.org/doi/10.1146/annurev.psych.52.1.27> [9] George Mason University at <https://www.annualreviews.org/doi/10.1146/annurev.psych.52.1.27> [10] University of Massachusetts at https://www.researchgate.net/publication/264156930_Laws_of_human_behavior_Symmetry_compatibility_and_attitude-behavior_correspondence [11] Encyclopedia of Career Development at [10.4135/9781412952675.n261](https://doi.org/10.4135/9781412952675.n261) [26].

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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REFERENCE

- [1] Rotter JB. Generalized expectancies for internal *versus* external control of reinforcement. *Psychol Monogr* 1966; 80(1): 1-28. [<http://dx.doi.org/10.1037/h0092976>] [PMID: 5340840]
- [2] WHO. Fact-Sheets Diabetes [Internet] World Health Organization 2018. <https://www.who.int/news-room/fact-sheets/detail/diabetes>
- [3] WHO. Media centre Obesity and overweight. *Phys Act* 2011; pp. 2-5.
- [4] Martínez YV, Prado-Aguilar CA, Rascón-Pacheco RA, Valdivia-Martínez JJ. Quality of life associated with treatment adherence in patients with type 2 diabetes: a cross-sectional study. *BMC Health Serv Res* 2008; 8: 164. [<http://dx.doi.org/10.1186/1472-6963-8-164>] [PMID: 18667076]
- [5] Hernandez-Tejada MA, Lynch CP, Strom JL, Egede LE. Effect of perceived control on quality of life in indigent adults with type 2 diabetes. *Diabetes Educ* 2012; 38(2): 256-62. [<http://dx.doi.org/10.1177/0145721711436135>] [PMID: 22316644]
- [6] Silva JAD, Souza ECF, Echazú Böscheimer AG, Costa CCMD, Bezerra HS, Feitosa EELC. Diagnosis of diabetes mellitus and living with a chronic condition: Participatory study. *BMC Public Health* 2018; 18(1): 699. [<http://dx.doi.org/10.1186/s12889-018-5637-9>] [PMID: 29871637]
- [7] Krampen G. Replik zu Rezension des IPC-Fragebogens zu Kontrollüberzeugungen. *IPC* 1996.
- [8] Wallston K. Conceptualization and Operationalization of Perceive d Control 2001.<http://scholar.google.com/scholar?hl=en&btnG=Search&>

- [9] Ajzen I. Nature and operation of attitudes. *Annu Rev Psychol* 2001; 52(1): 27-58. <http://www.annualreviews.org/doi/10.1146/annurev.psych.52.1.27> [Internet]. [<http://dx.doi.org/10.1146/annurev.psych.52.1.27>] [PMID: 11148298]
- [10] Spering M, Wagener D, Funke J. Brief report: The role of emotions in complex problem-solving. *Cogn Emotion* 2005; 19(8): 1252-61. [<http://dx.doi.org/10.1080/02699930500304886>]
- [11] Ajzen I. Laws of human behavior : Symmetry , compatibility. 2014.
- [12] Haskas Y. Determinan locus of control pada theory of planned behavior dalam perilaku pengendalian diabetes melitus. Universitas Airlangga 2016.
- [13] Seeman M, Evans JW. Alienation and learning in a hospital setting. *Am Sociol Rev* 1962; 27(6): 772.<http://www.jstor.org/stable/2090405?origin=crossref> [Internet]. [<http://dx.doi.org/10.2307/2090405>]
- [14] Dahlan S. Gerbang memahami epidemiologi, biostatistik, dan metodologi penelitian: Metode MSD (multiaksial sopiyudin dahlan). Jakarta: Penerbit Sagung Seto 2014.
- [15] Currier DP. Elements of research in physical therapy. Williams & Wilkins 1984.
- [16] Peng TA. Finite groups with pro-normal subgroups. 1967; 232-4.
- [17] Crandall VC, Katkovsky W, Crandall VJ. Children'S beliefs in their own control of reinforcements in intellectual-academic achievement situations. *Child Dev* 1965; 36(1): 91-109. [<http://dx.doi.org/10.2307/1126783>] [PMID: 14296800]
- [18] Bandung SA, Bandung SA. Page 1 1. *System* 2010; 3-4.
- [19] Schneider SW. A comparison of canal preparations in straight and curved root canals. *Oral Surg Oral Med Oral Pathol* 1971; 32(2): 271-5. [[http://dx.doi.org/10.1016/0030-4220\(71\)90230-1](http://dx.doi.org/10.1016/0030-4220(71)90230-1)] [PMID: 5284110]
- [20] Price E. Novicki strickland locus of control scales 1973.
- [21] Baken D, Stephens C. More dimensions for the multidimensional health locus of control: confirmatory factor analysis of competing models of the structure of control beliefs. *J Health Psychol* 2005; 10(5): 643-56. [<http://dx.doi.org/10.1177/1359105305055310>] [PMID: 16033786]
- [22] Levenson H. Distinctions within the concept of internal-external control: Development of a new scale. *Proc 80th Annu Conv Am Psychol Assoc* 1972.
- [23] Williams JS, Lynch CP, Voronca D, Egede LE. Health locus of control and cardiovascular risk factors in veterans with type 2 diabetes. *Endocrine* 2016; 51(1): 83-90. [<http://dx.doi.org/10.1007/s12020-015-0677-8>] [PMID: 26148703]
- [24] O'Driscoll M, Jeggo PA. The role of double-strand break repair - insights from human genetics. *Nat Rev Genet* 2006; 7(1): 45-54. [<http://dx.doi.org/10.1038/nrg1746>] [PMID: 16369571]
- [25] Hussain ST, Lei S, Akram T, Haider MJ, Hussain SH, Ali M. Lewin's change model: A critical review of the role of leadership and employee involvement in organizational change. *J Innov Knowl* 2016; 1-7.<http://linkinghub.elsevier.com/retrieve/pii/S2444569X16300087>
- [26] Lent CRW, Brown SD, Hackett G, Greenhaus EJH, Callanan GA. Encyclopedia of career development social cognitive career theory. 2015; pp. 751-5.
- [27] Bonichini S, Axia G, Bornstein MH. Validation of the parent health locus of control scales in an Italian sample. *Ital J Pediatr* 2009; 35(1): 13. [<http://dx.doi.org/10.1186/1824-7288-35-13>] [PMID: 19490604]
- [28] Jhis I. 1962; 10: 14.
- [29] Jain S, Singh AP. Locus of control in relation to cognitive complexity. *J Indian Acad Appl Psychol* 2008; 34(1): 107-13.
- [30] Bollini AM, Walker EF, Hamann S, Kestler L. The influence of perceived control and locus of control on the cortisol and subjective responses to stress. *Biol Psychol* 2004; 67(3): 245-60. [<http://dx.doi.org/10.1016/j.biopsycho.2003.11.002>] [PMID: 15294384]
- [31] Mihardja L. Faktor yang Berhubungan dengan Pengendalian Gula Darah pada Penderita Diabetes Mellitus di Perkotaan Indonesia. 2009.