The International Journal of Indian Psychology
ISSN 2348-5396 (Online) | ISSN: 2349-3429 (Print)
Volume 10, Issue 4, October- December, 2022
DIP: 18.01.126.20221004, DOI: 10.25215/1004.126
https://www.ijip.in

Research Paper

Cognitive Distortions Among Type 2 Diabetes Patients: An Internet-based Intervention Study in India

Pavithra Parthasarathy[1]*, Pooja Varma[2]

ABSTRACT

Background: The epidemic of diabetes has given rise to the need to identify factors which play key roles in the management of type 2 diabetes. Cognitive distortions are those irrational thoughts which affect emotions and health behaviors. **Objective:** This study aimed to check the effectiveness of an internet-based intervention on cognitive distortions among type 2 diabetes patients. **Method:** A two group pretest- posttest design was used. Using purposive sampling, 45 type 2 diabetes patients between 18-60 years participated in this study. CD Quest (2015) was used to identify the different cognitive distortions. Data was analysed using graphical representations and mean differences. **Result:** The mean age of participants in the group was 48.04±7.76 with a mean A1C of 7.87±1.64. 51.1% of the population were males and 48.9% were females. The results indicated that the internet-based intervention had a significant effect on reducing the different types of cognitive distortions. **Conclusions:** Internet based intervention was effective in reducing cognitive distortions among patients with type 2 diabetes.

Keywords: *Type 2 Diabetes, Cognitive Distortions, Internet Based Intervention, India*

Diabetes mellitus is a chronic disease that occurs due to insufficient production or use of insulin. Type 1 diabetes is a condition where the body produces little or no insulin, therefore, requiring insulin injections to maintain the necessary glucose levels whereas type 2 diabetes occurs when the body is unable to use the insulin produced by the pancreas. A recent report by the International Diabetes Federation estimated 537 million adults to be living with type 2 diabetes (International Diabetes Federation, 2021). The occurrence of type 1 diabetes is relatively low as compared to type 2 which accounts for over 90% of the global cases as reported in 2010 (Zimmet et al., 2001). Type 2 diabetes occurs due to both environmental and genetic factors. There is limited information about the genetic markers of type 2 diabetes. It was identified that certain genes which afford protection against diabetes to Caucasians do not appear to protect Indians (Radha & Mohan, 2007). Increased prevalence of type 2 diabetes among children and adolescents could also be due to low birth weight, malnutrition, increased insulin levels, low muscle mass, impaired glucose tolerance and greater adiposity (Mohan, 2004; Venkat Narayan, 2001). 41.5% of

[1]Research Scholar, Department of Psychology, Jain (Deemed-to be university), Bengaluru, India.
[2]Head of the Department, Department of Psychology, Jain (Deemed-to be university), Bengaluru, India.
*Corresponding Author

Received: August 12, 2022; Revision Received: December 05, 2022; Accepted: December 12, 2022

the general population of India knew about diabetes while urban residents showed a higher awareness rate compared to rural residents(Deepa et al., 2014). Prevalence of type 2 diabetes in India is constantly increasing due to a rise in the socio-economic status, industrialization and urbanization, adoption of western 'fast food trends' with increased consumption of carbohydrates, lack of physical activity, and increased sedentary lifestyle affecting both the wealthy and the poor (A. Pan et al., 2012; Zimlich, 2021).

American Psychological Association defines culture as the distinctive customs, values, beliefs, knowledge, art, and language of a society or a community. Culture determines the day-to-day behaviors and values that are passed from generations (Americal Psychological Association, 2015). Therefore, culture plays a major role in understanding and impacting health. Health beliefs, attitudes towards health, perceptions about illness, and customs of the society shape health behaviors. In developing countries like India, management of diabetes is expensive with a wide range of cost effective treatment options available which lack approachability and availability of medicines(Gutch et al., 2014) India, the home of Ayurveda is a classic example of how alternate methods of treatment are sought after. Home treatments with the use of herbs, cessation of sweets/sugary products, acupuncture, yoga, massage, consumption of bitter foods and anecdotal evidence are commonly noted (Chacko, 2003; Sachdeva et al., 2015)

Self-statements which inaccurately represent events around us due to faulty information processing resulting in errors of thinking known as cognitive distortions (Beck, 1995). Behaviors resulting from these unbreakable "rules" become self-defeating or maladaptive. In any physical disease, cognitive distortions impact personal perception of their health condition (Drinkwine, 2019). Behavioral choices are governed by how an individual understands and thinks about the events happening around him(Farrell et al., 2004). Less positive pattern of health practices were noted in individuals with greater cognitive distortions(Christensen et al., 1999).

Since type 2 diabetes is predominantly a lifestyle disorder, development of healthy thoughts, behaviors and emotions about diabetes should be practiced. The death of research about cognitive distortions specifically in India lead to this study. The aim of this study to check the effectiveness of an internet based intervention on cognitive distortions among type 2 diabetes patients in India.

MATERIALS AND METHODS

The aim of this study is to check the effectiveness of an internet based intervention on cognitive distortions among type 2 diabetes patients. A sample of 45 participants were chosen using purposive and snowball sampling. A pre-test –post-test design among the intervention and the control group was used in this study. General Health Questionnaire (Goldberg & Williams, 1988) was used as a screener to check for eligibility. 12 item scale with each item rated on a four-point scale (less than usual, no more than usual, rather more than usual, or much more than usual) was chosen in order to assess the severity of responses. Higher score indicating more symptoms. The Cronbach's alpha of the GHQ-12 was found to be 0.9 among older adults in India(Qin et al., 2018). Cognitive distortions were assessed using the CD Quest(De Oliveira et al., 2015). –A brief, 15-item questionnaire assessed dimensions frequency of occurrence and intensity of cognitive distortions. Each item presents a category of distorted thinking with two thought examples. Frequency options include "No (It did not occur)," "Occasional (1–2 days during the past week)," "Much of the

time (3–5 days during the past week)," and "Almost all the time (6–7 days during the past week)." Intensity options include "A little (Up to 30%)," "Much (31% to 70%)," and "Very much (More than 70%). The internal consistency of the CD-Quest total score was assessed using Cronbach's alpha. Internal reliability of the total score was excellent (α = .88) (Morrison et al., 2015) Socio demographic profile consisted of age, gender, educational qualification, occupation, marital status and latest A1C scores were collected.

Figure 1 indicates the inclusion and exclusion criteria:

Inclusion Criteria	Exclusion Criteria
Diagnosis of Type 2 Diabetes	Gestational or Type 1 Diabetes
Access and knowledge of using the internet	Comorbid physical or mental health conditions
Age between 18 - 60 years	Those without access to internet
Should have a record of last A1c levels	Patients below 18 or above 60 years of age
	Patients with a history of psychological treatment/intervention

Procedure

Participants were invited to be a part of the study. Rapport was established and confidentiality was assured. Consent was obtained. In order to understand the psychological profile of participants, they were asked to complete the general health questionnaire and the cognitive distortion questionnaire in a single Google form and then divided into intervention group and control group. The forms were administered in the presence of the therapist. The intervention format is presented in Table 1. The treatment group were then explained the course of the intervention. Participants in the control group continued with the standard treatment. After all the sessions for the treatment group, the tools were administered a second time for both the groups.

Table 1 indicates the components of the intervention

Session No.	Skills taught	Homework
1	Assessment using tools	List 3 problems with frequency, severity, intensity
2	Orientation to CBT, Identification of thoughts, hot thoughts, thought monitoring, mood monitoring	Record thoughts (using situation, thought and feelings triangle) and resulting behavioral and emotional changes (using ABC model)
3	Automatic thought recognition, mood monitoring, relaxation	Write the first 3 columns of the dysfunctional thought record for 2 situations, practise the relaxation technique for atleast one situation daily
4	Thought challenging/cognitive restructuring, relaxation, mood monitoring	Complete the dysfunctional thought record and practise relaxation exercise.
5	Assessment using tools	

RESULTS AND DISCUSSION

The participants were between 32-55 years with a mean of 44.09±6.5 in the experimental group and between 36-60 years with a mean age of 51.83±7.01 in the control group. The experimental group had a mean A1c score of 7.75±1.38 and the control group had a mean A1c score of 7.9±1.87. Table 2 indicates the demographic details of both groups.

Table 2 indicates the baseline characteristics of participants

	Experimental group		**Control group**	
	N	**%**	**N**	**%**
Male	9	40.9	14	60.9
Female	13	59.1	9	39.1
Married	22	100	21	91.3
Widowed/Divorced	0	-	2	8.7
Employed	20	90.9	15	65.2
Home maker	2	9.1	5	21.7
Unemployed	0	-	3	13
Higher secondary	0	-	1	4.3
Degree	11	50	9	39.1
Post-Graduation	9	40.9	10	43.5
Research	2	9.1	3	13

The Shapiro Wilkes test of normality shows that the data is normally distributed (p= 0.09). Cohen's d indicated small effect size (0.30). There was a significant average difference between pre-test and post-test scores ($t = 2.32$, $p < 0.05$). On average, Pre test scores were 3.62 points higher than post test scores (95% CI [0.48,6.76])

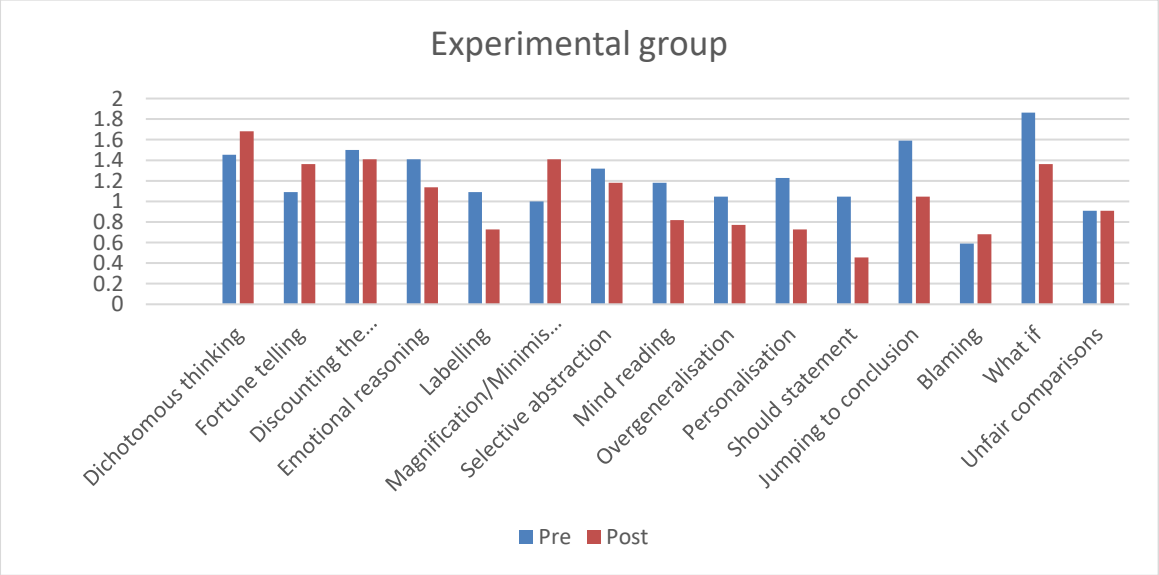
Table 3 indicates the mean and standard deviation on cognitive distortions of both groups.

	Experimental group				**Control group**			
Variable	**Pre test**		**Post test**		**Pre test**		**Post test**	
	Mean	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
Cognitive distortion	18.31	11.12	15.68	12.97	16.78	12.33	12.21	10.74

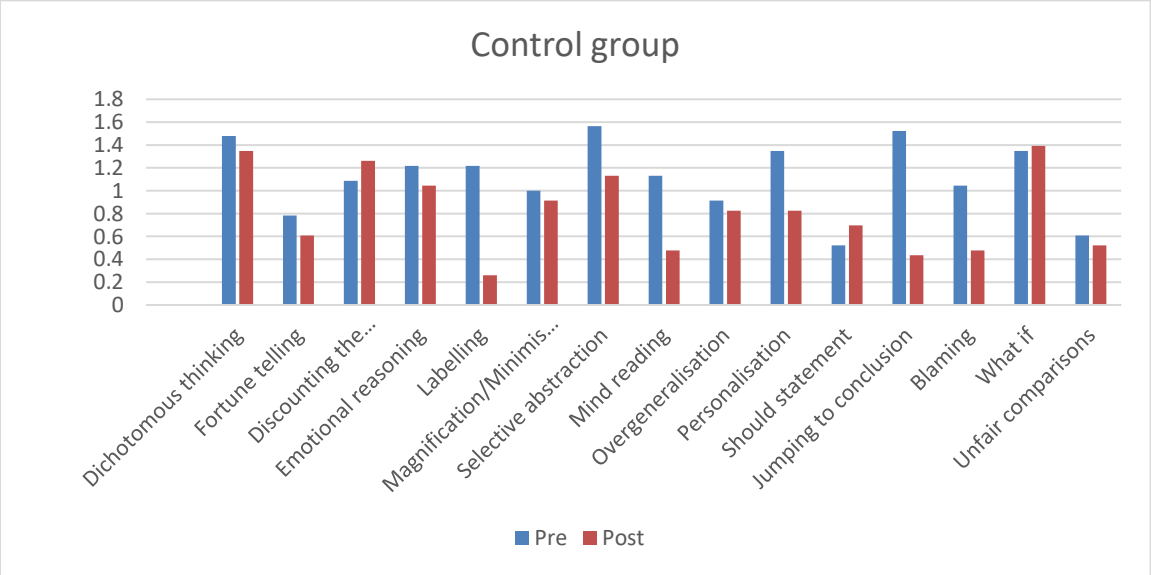
Table 4 indicates the mean and standard deviation of all participants along with t test results

	Mean	**N**	**Std. Deviation**	**t**	**Sig.(2 tailed)**
Pre CD total	17.53	45	11.65	2.32	0.025
Post CD total	13.91	45	11.87		

Graph 1 compares the pre and post test scores among the experimental group participants:



Graph 2 compares the pre and post test scores among the control group participants:



The results indicate that there is a significant reduction between pre-test and post-test scores on cognitive distortions. CBT based interventions have shown similar results in studies by (Koochaksaraee et al., 2022; X. Pan et al., 2020; Uchendu & Blake, 2017; Yang et al., 2020) Cognitive distortions are the irrational patterns of thinking which are associated with negative health beliefs(Uhl, 2007).Emotional states affect mental health which in turn impacts medical outcomes(Lustman et al., 1998). How an individual thinks about a situation impacts his/her emotions and therefore his/her behaviors. For example: When the normal diet, activity or medications are disrupted, it would create distorted thinking leading to hopelessness and lack of confidence in medicine(Noroozi et al., 2017b). If patients of type 2 diabetes become influenced by situational factors leading to higher stress, it could indirectly impact their blood glucose levels(Farrell et al., 2004). The cycle of disrupted blood sugar levels leading to cognitive distortions which then leads to poor adherence which lead to

further distorted thinking, needs to be broken(Noroozi et al., 2017a). Patients with type 2 diabetes also show higher prevalence of depression, anxiety and other mental health conditions (Centers for Disease Control and Prevention, 2021).

Since type 2 diabetes management requires rigorous long term behavioral changes, identification and challenging of cognitive distortions becomes a priority. Distortions about self, future and surroundings are prone to irrational interpretation which could lead to reinforced perceptions of helplessness about negative health habits like sweet cravings or overeating (Shook, 2010). Distorted thinking implies rigidity with the inability to be open and flexible leading to retrieving information which are congruent to their current negative state(Rnic et al., 2016). The significant reductions in cognitive distortions after the intervention indicates that individuals are able to better identify their automatic thoughts. Recognition of unhealthy thoughts is similar to creating a filter which then leads to rational reasoning to reevaluate their condition therefore reducing anxiety(Koochaksaraee et al., 2022). By enhancing the awareness between negative thoughts and glucose levels, better self-management techniques are created and maintained (Yang et al., 2020).

While the study has the advantage of being easily accessible and self-paced, some recommendations for future studies include a larger sample size, randomization of samples and a follow up to see if the impact lasts for a period beyond the intervention period.

CONCLUSIONS

Cognitive distortions are commonly occurring thoughts which shape thoughts and beliefs. This study highlights the need to identify the different types of cognitive distortions which occur among patients of type 2 diabetes. The knowledge about cognitive distortions and techniques learnt to challenge them has helped participants to identify distortions in day to day life. Insight about distortions could have led to increased scores post intervention on some types of distortions.

REFERENCES

Americal Psychological Association. (2015). *APA Dictionary of Psychology* (2nd ed.). https://dictionary.apa.org/culture

Beck, J. (1995). *Cognitive Behavior Therapy - Basics And Beyond*.

Centers for Disease Control and Prevention. (2021, May 7). *Diabetes and Mental Health* . Centers for Disease Control and Prevention. https://www.cdc.gov/diabetes/managing/mental-health.html

Chacko, E. (2003). Culture and therapy: Complementary strategies for the treatment of type-2 diabetes in an urban setting in Kerala, India. *Social Science and Medicine*, *56*(5), 1087–1098. https://doi.org/10.1016/S0277-9536(02)00105-3

Christensen, A. J., Moran, P. J., & Wiebe, J. S. (1999). Assessment of irrational health beliefs: Relation to health practices and medical regimen adherence. *Health Psychology*, *18*(2), 169–176. https://doi.org/10.1037/0278-6133.18.2.169

De Oliveira, I. R., Seixas, C., Osório, F. L., Crippa, J. A. S., De Abreu, J. N., Menezes, I. G., Pidgeon, A., Sudak, D., & Wenzel, A. (2015). Evaluation of the psychometric properties of the cognitive distortions questionnaire (CD-Quest) in a sample of undergraduate students. *Innovations in Clinical Neuroscience*, *12*(7–8), 20–27. www.academyofct.org

Deepa, M., Bhansali, A., Anjana, R. M., Pradeepa, R., Joshi, S. R., Joshi, P. P., Dhandhania, V. K., Rao, P. V., Subashini, R., Unnikrishnan, R., Shukla, D. K., Madhu, S. V., Das,

A. K., Mohan, V., & Kaur, T. (2014). Knowledge and awareness of diabetes in urban and rural India: The Indian Council of Medical Research India Diabetes Study (Phase I): Indian Council of Medical Research India Diabetes 4. *Indian Journal of Endocrinology and Metabolism*, *18*(3), 379–385. https://doi.org/10.4103/2230-8210.131191

Drinkwine, S. C. (2019). *Impact of Cognitive Distortions and Perceived Stigmatization on Acceptance among Adults With Neurofibromatosis Type 1* [Philadelphia College of Osteopathic Medicine]. https://digitalcommons.pcom.edu/psychology_dissertations

Farrell, S. P., Hains, A. A., Davies, W. H., Smith, P., & Parton, E. (2004). The impact of cognitive distortions, stress, and adherence on metabolic control in youths with type 1 diabetes. *Journal of Adolescent Health*, *34*(6), 461–467. https://doi.org/10.1016/S1054-139X(03)00215-5

Goldberg, D. P., & Williams, P. (1988). *A Users' Guide To The General Health Questionnaire*. GL Assessment.

Gutch, M., Razi, S. M., Kumar, S., & Gupta, K. K. (2014). Diabetes mellitus: Trends in northern India. *Indian Journal of Endocrinology and Metabolism*, *18*(5), 731. https://doi.org/10.4103/2230-8210.139219

Koochaksaraee, F. M., Shirmahaleh, F. M., Tajeri, B., & Kopkan, A. S. (2022). Effectiveness of cognitive-behavioral therapy in diabetes self-management and HbA1C level in patients with type 2 diabetes. *Razavi International Journal of Medicine*, *10*(2), e1161. https://doi.org/10.30483/rijm.2022.254335.1161

Lustman, P. J., Griffith, L. S., Freedland, K. E., Kissel, S. S., & Clouse, R. E. (1998). Cognitive behavior therapy for depression in type 2 diabetes mellitus. A randomized, controlled trial. *Annals of Internal Medicine*, *129*(8), 613–621. https://doi.org/10.7326/0003-4819-129-8-199810150-00005

Mohan, V. (2004). Why Are Indians More Prone to Diabetes? *Journal of the Association of Physicians of India*, *52*. https://www.japi.org/v2b4d464/why-are-indians-more-prone-to-diabetes

Noroozi, Z., Hamidian, S., Khajeddin, N., Honarmand, M. M. Z., Zargar, Y., Rashidi, H., & Dolatshahi, B. (2017a). Improving depression, and quality of life in patients with type 2 diabetes: Using group cognitive behavior therapy. *Iranian Journal of Psychiatry*, *12*(4), 278–283.

Noroozi, Z., Hamidian, S., Khajeddin, N., Honarmand, M. M. Z., Zargar, Y., Rashidi, H., & Dolatshahi, B. (2017b). Improving Depression, and Quality of Life in Patients with Type 2 Diabetes: Using Group Cognitive Behavior Therapy. *Iranian Journal of Psychiatry*, *12*(4), 281. /pmc/articles/PMC5816918/

Pan, A., Malik, V. S., & Hu, F. B. (2012). Exporting diabetes mellitus to Asia: The impact of Western-style fast food. *Circulation*, *126*(2), 163–165. https://doi.org/10.1161/circulationaha.112.115923

Pan, X., Wang, H., Hong, X., Zheng, C., Wan, Y., Buys, N., Zhang, Y., & Sun, J. (2020). A Group-Based Community Reinforcement Approach of Cognitive Behavioral Therapy Program to Improve Self-Care Behavior of Patients With Type 2 Diabetes. *Frontiers in Psychiatry*, *11*, 719. https://doi.org/10.3389/FPSYT.2020.00719/BIBTEX

Qin, M., Vlachantoni, A., Evandrou, M., & Falkingham, J. (2018). General Health Questionnaire-12 reliability, factor structure, and external validity among older adults in India. *Indian Journal of Psychiatry*, *60*(1), 56. https://doi.org/10.4103/psychiatry.Indianjpsychiatry_112_17

Radha, V., & Mohan, V. (2007). Genetic predisposition to type 2 diabetes among Asian Indians. *The Indian Journal of Medical Research*, *125*(3), 259–274. https://pubmed.ncbi.nlm.nih.gov/17496355/

Rnic, K., Dozois, D. J. A., & Martin, R. A. (2016). Cognitive distortions, humor styles, and depression. *Europe's Journal of Psychology*, *12*(3), 348–362. https://doi.org/10.5964/ejop.v12i3.1118

Sachdeva, S., Khalique, N., Athar Ansari, M., Khan, Z., Kumar Mishra, S., & Sharma, G. (2015). Cultural determinants: Addressing barriers to holistic diabetes care. *Journal of Social Health and Diabetes*, *3*(1), 033–038. https://doi.org/10.4103/2321-0656.140885

Shook, C. B. (2010). *The Relationship between Cognitive Distortions and Psychological and Behavioral Factors in a Sample of Individuals who are Average Weight , Overweight , and Obese*. PCOM Psychology Dissertations.

Uchendu, C., & Blake, H. (2017). Effectiveness of cognitive–behavioural therapy on glycaemic control and psychological outcomes in adults with diabetes mellitus: a systematic review and meta-analysis of randomized controlled trials. *Diabetic Medicine*, *34*(3), 328–339. https://doi.org/10.1111/dme.13195

Uhl, J. K. (2007). *Relationship Between Cognitive Distortions and Psychological and Behavioral Factors in a Family Medicine Outpatient Sample*. Philadelphia College of Osteopathic Medicine.

Venkat Narayan, K. M. (2001). Type 2 Diabetes in Children: A Problem Lurking for India? In *Indian Pediatrics* (Vol. 38). Indian Pediatrics. https://www.indianpediatrics.net/july2001/july-701-704.htm

Yang, X., Li, Z., & Sun, J. (2020). Effects of Cognitive Behavioral Therapy–Based Intervention on Improving Glycaemic, Psychological, and Physiological Outcomes in Adult Patients With Diabetes Mellitus: A Meta-Analysis of Randomized Controlled Trials. *Frontiers in Psychiatry*, *11*, 711. https://doi.org/10.3389/FPSYT.2020.00711/BIBTEX

Zimlich, R. (2021). What to Know About Diabetes Prevalence in India. *Healthline*. https://www.healthline.com/health/diabetes/diabetes-in-india

Zimmet, P., Alberti, K. G. M. M., & Shaw, J. (2001). Global and societal implications of the diabetes epidemic. *Nature*, *414*(6865), 782–787. https://doi.org/10.1038/414782A

International Diabetes Federation, 2021. *Diabetes around the world in 2021*. [online] International Diabetes Federation. Available at: <https://diabetesatlas.org/> [Accessed 14 June 2022].

Acknowledgement

The author appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author declared no conflict of interest.

How to cite this article: Pavithra, P. & Pooja, V. (2022). Cognitive Distortions Among Type 2 Diabetes Patients: An Internet-based Intervention Study in India. *International Journal of Indian Psychology*, *10(4)*, 1345-1352. DIP:18.01.126.20221004, DOI:10.25215/1004.126