TYPE 2 DIABETES MELLITUS;
EFFECTIVENESS OF PAID FOR SCREENING EMOTIONAL PROBLEMS OF PATIENTS AFFECTING ADHERENCE AND BLOOD GLUCOSE LEVEL.

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ABSTRACT… Objectives: The study is aimed to assess emotional problem of patients with Type-2 diabetes by translating and validating PAID. Associations between PAID and blood glucose levels, and differences in prevalence of emotional problems across treatment modalities and BMI. **Data Sources:** Data was collected from various outpatients of Rawalpindi and Islamabad. **Sample and Procedure:** The sample of study comprised of 300 patients with diabetes both male = 135 (45%) and female n=165 (55%). Formal approval was taken from authorities at respective hospitals and after taking informed consent patients were interviewed. **Period:** Data collection was completed during Feb to April, 2013. **Material and Method:** Patients were asked to fill in demographic sheet along with Translated PAID scale. Latest blood glucose levels were collected from their medical records whereas BMI was calculated by measuring patients' weight and height. **Results:** Results showed that emotional problems as assessed by PAID are positively correlated with blood glucose levels (r=.12 to r=.19, p<.05). Additionally, patients with IV modality of treatment (i.e., taking insulin shots) suffered significantly high (MD=4.88, p=.01) from emotional problems and patients with normal BMI and Obese Class-II have are at higher risk of emotional problem. Finally, patients rated serious concerns on diabetes-related issues like lifelong maintenance, future complications, depression and anxiety, and satisfaction with physician. **Conclusions:** PAID is a very effective instrument in identifying emotional problems of diabetes patients related to adherence and compliance to their treatment regime and hence it shall be used by physicians and health professional in routine practice.

Key words: Emotional Problem, Adherence, Blood Glucose Management,
                   Type 2 Diabetes

INTRODUCTION

Diabetes mellitus refers to a group of metabolic diseases where the pancreas does not make sufficient insulin or the body does not respond effectively to the insulin produced[1]. For people suffering with diabetes, emotional distress related to illness is a common problem[2] affecting their psychological health which in turn may affect physical health[3] causing hindrance in compliance or adherence[4] to follow their treatment plan. The International Diabetes Federation (IDF) estimates that there are approximately 7.1 million people with diabetes in Pakistan, standing it seventh worldwide, and with the maximum number of adults with diabetes[1,5]. As far as health is concerned, people are deprived of even basic health facilities[6]. Particularly for diabetic patients our health system lacks to comply with international standards for screening, treatment, care[5,7,8].

With its unending and constant demanding self-care[9], diabetes is accompanied by frustrations to follow treatment regimen[4] as many patients become overwhelmed or burned out[10,11]. Diabetes is accompanied with other health threat and may consequence in severe long-term complications[8] resulting in a decrease in life expectancy[12]. Many patients become unduly preoccupied or worried by the fear of such complications[9]. Furthermore, in their efforts to adjust their life with diabetes, several patients undergo severe emotional defeats[10], pushing the people with diabetes to not adhere to their diabetes regimen[7]. It is evident that information on prevalence of type 2 diabetes mellitus related complications is important for the modification of policies and practices in diabetic care management to gain better control of type 2

diabetes mellitus.

Literature has indicated several emotional responses frequently reported[2,4,13] by diabetes patients. These include but are not limited to annoyance, guiltiness, frustration, denial, fear of hypoglycemia, and being alone. A study conducted by Decoster[14] in which he interviewed 34 persons with Type 2 diabetes particularly in relation to the emotions experienced while living with diabetes, 76 emotions emerging from 38 different sources were identified. The three most common emotions were fear, irritation, and sadness, with the sources for these emotions being initial diagnosis, treatment, and complications[14].

Given the significance of emotional problem, screening facility for emotional problem and provision of counseling is a necessary requirement. It is recommended that patients suffering from diseases causing lifelong care and managements (such as diabetes) shall be frequently assessed for associated emotional problems and provided with counseling (if required) by a professional trained in Health/Medical Psychology. As coping with emotional problems is positively associated[15] with treatment adherence and compliance, it is evident that identification of emotional problem and successful coping consequently results in increased life expectancy[12] and prevention from disease complication[15]. Diabetes literature shows that compliance with treatment and life style recommendation for patients with diabetes is positively related to emotional stability[3] whereas negatively related to emotional imbalance[14] resulting in poor disease control and management.

To incorporate screening for emotional problem, the very issue is unavailability of psychometrically sound instruments in local language[16]. Though a number of reliable and valid, general and specific instruments are available and are widely used as part of usual practice of endocrinologist, medical, and diabetes specialist to assess disease specific emotional problems[2,4,13]. No such instrument is available in local language to be used by medical professional. Availability of a psychometrically sound and reliable self-report instrument in local language is important to assess emotional problems from patients with low or no education[16]. A brief self-report instrument in local language may be handy for patients with low education and it may be administered by an assistant within a couple of minutes.

Given the paucity, the current study is aimed to translate a brief yet psychometrically sound and most widely used instrument to measure diabetes specific emotional problems[2,4,11,13]. The widely used PAID (Problem Areas in Diabetes) is an 18 items Likert type scale and measures diabetes specific problems in 4 domains (i.e., emotional, treatment related, food related, and social support problems)[2,4]. The study is aimed to test construct validity of the four factor structure. The critical problem areas will be assessed by estimating correlations between diabetes indicators (i.e., blood glucose level and diabetes duration) and dimensions of emotional problems. Additionally, we will also assess differences in prevalence of emotional problems across gender and BMI. Finally, by analyzing individual indicator we will assess most frequent and least frequent emotional problems for diabetes patients.

SAMPLE AND PROCEDURE
The sample of study comprised of 300 patients with diabetes both male = 135 (45%) and female n=165 (55%). Sample was approached at various outpatients of Rawalpindi and Islamabad. Formal approval was taken from authorities at respective hospitals and after taking informed consent patients were interviewed. Along with demographic, patients height, weight and latest blood glucose levels were recorded. Before administration Problem Areas in Diabetes (PAID) was translated in Urdu language, followed by a committee approach. The translated scales were then again back translated into English language followed by another committee approach .

Body Mass Index (BMI)
Body mass index was computed using the standard method. Patients weight (measured in kg) was divided by their height in meter square (i.e., weight(kg)/Height(m)* Height(m)). Though

weight was directly measured in kilogram, height was initially measured in feet and inches. Height was than transformed into meters and finally it was squared. To estimate BMI weight was divided by height in meter square. The resulting BMI values ranged 13.67 to 53.67 with Mean±SD (26.26 ±5.44) which was further transformed into categories based on WHO recommendation[17,18] i.e., Underweight (<18.5), Normal (18.5 - 22.9), Overweight (23 - 24.9), Obese Class I (24 - 29.9), and Obese Class II (= 30). With this classification, we appeared to have 15(5.5%) patients in underweight group, 56 (20.4%) patients in Normal group, 51(18.6%) patients in Overweight group, 91(33.2%) patients in Obese Class I, and 61(22.3%) patients in Obese Class II.

Problem Areas in Diabetes
PAID is a 20 items self-report measure developed by Polonsky and colleagues (1997) to measure diabetes related emotional distress. It covers the emotional problems of patients with diabetes which they face while dealing and managing with diabetes and its complications. Representative items of the questionnaire include dietary attitude, adherence to treatment, diabetes care knowledge, and negative feelings associated with hypoglycemia. Respondents rate the items on a 5-point Likert scale "not a problem"(0) to "a serious problem"(4). The scores are computed by adding the score of the 20 items and then multiplying it with 1.25 to yield a final score of 0 to 100. High scores indicate greater emotional distress and low scores indicate low level of emotional distress[4,11]. Additionally, PAID can be scored in four dimensions 1(emotional problems), 2 (treatment problem), 3(food-related problem), and 4 (social support – related problem)[2]. Internal consistency of PAID in previous studies was established to be .95[4].

RESULTS
Data was analyzed to initially estimate structural validity and to estimate psychometrics of PAID. Secondly, correlations were estimated between diabetes-related demographic and dimensions of PAID. Thirdly, mean differences were checked on all four dimensions and total score of PAID across treatment modalities i.e., Oral vs IV, and across different levels of Body Mass Index (BMI). Finally item-wise analysis was conducted to differentiate between most severe and least problematic issued faced by patients with diabetes.

Factor structure and psychometrics
A confirmatory factor analysis was conducted based on four dimensional model of PAID using IBM-AMOS-21. Model was develop as presented in Figure 1 suggesting 12 items measuring diabetes related emotional problem, three items measuring treatment related problems, 3 items measuring food related problem, and two items measuring social support related problems. The results, as presented in Figure 1 showed that all items loaded well on their respective factors. Item loadings for emotional problems ranged .52 to 76, for treatment related problems it ranged .48 to .67, for food related problems item loadings ranged .65 to .72, and for social support related problems both items appeared to have equal lambda .67. Furthermore, the unidimensionality of PAID was also established in the same model, and results suggested that all four dimensions were highly representative of diabetes-related problems with factor loadings ranged .84 to 1.00. Though all items appeared to have loading above .30 (a rule of thumb used in factor analysis), and even fulfilled a more conservative criteria of above .40; a factor structure analysis using SEM (structural equation modeling) can only be accepted if the model fit indices are following the criteria. These criteria include a magnitude of ≥ .90 for GFI, TLI, CFI etc. and a magnitude of ≤ .08 for RMSEA. The model fit indices presented along with model in Figure 1 shows that the CFA model fitted very well to the data i.e., Chi sq (df) = 293.25 (153), GFI= .91, CFI = .94, TLI = .93, IFI = .94, and RMSEA = .055.

Internal consistency was tested using Chronbech's alpha reliability, which showed acceptable to very good reliability except the scale treatment related problems appearing to have a relatively low alpha .57. The other three dimensions appeared to have a good reliability ranging .65 to .89 as presented in Table-IV. Additionally, PAID appear to have high

reliability as a composite measure for assessing problem areas in diabetes with a alpha reliability = .92 for total scale score.

Correlations with diabetes-related demographics

Pearson bivariate correlation was conducted using IBM-SPSS version 21to test relationship between diabetes related and general demographic characteristics. The results as presented in Table -I suggested that age appear to have a significantly negative correlation with social support related problems (r= - .12, p<.05). Additionally, age appear to positively correlate with diabetes specific variables i.e., BMI and diabetes duration (r=.14, p<.05). Diabetes duration positively significantly correlated only with BMI (r=.15, p<.05) whereas blood glucose level significantly positively correlated with all aspects (except treatment related problems) and total score of PAID. The relationship magnitude ranged (r=.12 to r=.19, p<.05). Finally, all four domains of PAID highly significantly positively correlated with each other and with total PAID score (r ranges = .50 to .98, p<.01).

	1	2	3	4	5	6	7	8
Age								
Body Mass Index	.14*							
Diabetes Duration	.14*	.15*						
Blood Glucose Level	-.07*	.07	.08					
Emotional Problems	-.10	-.03	.05	.19**				
Treatment Related Problems	-.08	.05	.02	.02	.65**			
Food Related Problems	-.04	.02	.07	.20**	.79**	.53**		
Social Support Related Problems	-.12*	-.04	.02	.12*	.63**	.50**	.55**	
Problem Areas in Diabetes Total	-.10	-.01	.05	.18**	.98**	.74**	.85**	.72**

Table-I. Bivariate correlations between diabetes-related demographics and PAID
*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed)

Mean differences across gender, treatment modalities and BMI

Further analysis was conducted to investigate mean differences on all four dimensions and total PAID score across gender, treatment modalities and categories of BMI. To test mean differences across gender and treatment modalities, t-test was conducted and results presented in Table II suggest that no significant mean difference appeared between men and women on any dimension of PAID (p>.05). Contrary to that diabetes related emotional problem and food related problems along with total PAID score differed significantly across treatment modalities. Results suggest that diabetes patients on IV treatment face more emotional and food related problems (mean difference MD= 3.2, and MD=0.96; p=.01). Patients taking IV treatment also scored high on overall PAID (MD=4.88, p=.01). Patients with IV treatment though also scored high on treatment related problem and social support related problems yet the difference was not significant (i.e., p>.05) compare to patients taking oral medication.

To estimate differences across categories of BMI, ANOVA was estimated and results presented in Table III showed that diabetes related emotional problem, food related problems and PAID total score significantly differed across BMI categories. The mean score trends as presented in Figure 2 showed highest score for both Normal and Obese class II groups whereas lowest values appeared for Underweight and Obese Class I groups. Though posthoc analysis with Bonferoni correction showed that for all three variables (i.e., emotional problem, food related problems, and PAID total) only Obese Class I appear to score

Variables	Groups	N	M	SD	t	p	LL	UL
Diabetes Related Emotional Problems	Women	165	18.84	10.03	-0.01	0.99	-2.35	2.33
	Men	135	18.85	10.48				
Treatment Related Problems	Women	165	3.37	2.56	-0.19	0.85	-0.67	0.55
	Men	135	3.43	2.76				
Food Related Problems	Women	165	4.35	3.11	-0.38	0.70	-0.85	0.57
	Men	135	4.49	3.10				
Social Support Related Problems	Women	165	2.48	2.17	-1.92	0.06	-0.96	0.01
	Men	135	2.96	2.10				
Problem Areas in Diabetes Total	Women	165	29.04	15.71	-0.36	0.72	-4.37	3.01
	Men	135	29.73	16.69				
Emotional Problems	IV	116	20.70	10.32	2.66	0.01	0.83	5.56
	Oral	181	17.50	9.97				
Treatment Related Problems	IV	116	3.58	2.76	1.05	0.30	-0.29	0.95
	Oral	181	3.25	2.56				
Food Related Problems	IV	116	4.97	2.98	2.64	0.01	0.24	1.68
	Oral	181	4.01	3.11				
Social Support Related Problems	IV	116	2.92	2.06	1.59	0.11	-0.10	0.90
	Oral	181	2.52	2.18				
Problem Areas in Diabetes Total	IV	116	32.16	16.29	2.58	0.01	1.15	8.62
	Oral	181	27.28	15.73				

Table-II. Mean differences on PAID across gender and treatment modality

significantly low from Normal (MD= -5.75, MD= -1.58, and MD= -8.65 respectively, p<.05) and from Obese Class II (MD= -5.29, MD= -1.84, and MD= -8.46 respectively, p<.05).

Item-wise analysis

Finally item-wise analysis was conducted to see which indicators of PAID were of most concern and which were of least concern to the study sample. Patients rating on the PAID indicators (0: not a problem, and 1: minor problem) were considered as "not a serious concern" whereas (3: somewhat serious problem, and 4: serious problem) were considered as "a serious concern". The results presented in Table-IV describe a detailed picture of PAID indicators and their concern for the patients.

As is evident from the table among emotional problem, item 20 "Feeling "burned out" by the constant effort needed to manage diabetes" appeared to be a most serious concern with (n=121), 40.3% patients rating it as a serious problem with an average rating of (m=1.99, sd=1.31).

This is followed by item12 (m=1.68, sd=1.31) "Worrying about the future and the possibility of serious complications", item 6 (m=1.58, sd=1.28) "Feeling depressed when you think about living with diabetes", and item 10 (m=1.57, sd=1.33) "Feeling angry when you think about living with diabetes" appeared to be serious concerns with (n=87, 29%; n=85, 28.3%; and n=91, 30.3% respectively) patients rating it as a serious problem. Item 14 (m=1.34, sd=1.26) "Not accepting your diabetes" appeared to be the least concern for diabetes patients with (n=167), 55.7% patients reporting it as not a serious problem. Among treatment-related problem, item 15 average rating (m=1.21, sd=1.27)"Feeling unsatisfied with your diabetes physician" appeared to be the most

Variables	Groups	N	Mean	S.D	F	P
Emotional problems	Underweight (<18.5)	15	17.33	12.66	3.98	0.00
	Normal (18.5 - 22.9)	56	21.34	11.07		
	Overweight (23 - 24.9)	51	19.59	9.34		
	Obese I (24 - 29.9)	91	15.59	10.11		
	Obese II (≥30)	61	20.89	9.06		
Treatment related problems	Underweight (<18.5)	15	2.67	2.55	1.59	0.18
	Normal (18.5 - 22.9)	56	3.75	2.98		
	Overweight (23 - 24.9)	51	3.78	2.71		
	Obese I (24 - 29.9)	91	3.10	2.55		
	Obese II (≥ 30)	61	3.97	2.58		
Food related problems	Underweight (<18.5)	15	2.80	3.19	5.35	0.00
	Normal (18.5 - 22.9)	56	4.96	3.05		
	Overweight (23 - 24.9)	51	4.75	3.10		
	Obese I (24 - 29.9)	91	3.38	3.09		
	Obese II (≥ 30)	61	5.23	2.84		
Social support related problems	Underweight (<18.5)	15	2.40	1.99	1.02	0.40
	Normal (18.5 - 22.9)	56	3.04	2.38		
	Overweight (23 - 24.9)	51	2.80	1.94		
	Obese I (24 - 29.9)	91	2.36	2.21		
	Obese II (≥ 30)	61	2.82	2.16		
Problem area in diabetes total	Underweight (<18.5)	15	25.20	19.12	4.01	0.00
	Normal (18.5 - 22.9)	56	33.09	17.39		
	Overweight (23 - 24.9)	51	30.92	15.02		
	Obese I (24 - 29.9)	91	24.44	16.22		
	Obese II (≥ 30)	61	32.90	14.51		

Table-III. Mean differences on PAID across BMI categories

serious concern with (n=60), 21% patients rating it as a serious problem whereas item 1 (m=1.04, sd=1.22) "Not having clear and concrete goals for your diabetes care" appeared to be the least concern for diabetes patients with (n=219), 73% patients reporting it as not a serious problem. Among food related problems item 4 average rating (m=1.48, sd=1.33) "Uncomfortable social situations related to your diabetes care (e.g., people telling you what to eat)" appeared to be extremely rated on both sides i.e., appearing at the same time most serious concern for (n=82),

27.3% patients rating it a serious problem, and for (n=167), 55.7% patients reporting it as not a serious problem. Similarly, among social support related problems item 18 average rating (m=1.36, sd= 1.31) "Feeling that your friends and family are not supportive of your diabetes management efforts" appeared at the same time most serious concern for (n=75) 25% patients rating it a serious problem, and the least serious concern for (n=173) 57.7% patients reporting it as not a serious problem.

	Not a problem (<=1)		Serious problem (=>3)		
	N	%	N	%	M(SD)
Diabetes Related Emotional Problems (Cronbach's alpha = .89)					18.85 (10.22)
3. Feeling scared when you think about living with diabetes?	150	50.0%	79	26.3%	1.54 (1.27)
6. Feeling depressed when you think about living with diabetes?	158	52.7%	85	28.3%	1.58 (1.28)
7. Not knowing if your mood or feelings are related to your diabetes?	147	49.0%	55	18.3%	1.48 (1.19)
8. Feeling overwhelmed by your diabetes?	155	51.7%	74	24.7%	1.51 (1.32)
9. Worrying about low blood sugar reactions?	142	47.3%	73	24.3%	1.61 (1.27)
10. Feeling angry when you think about living with diabetes?	160	53.3%	91	30.3%	1.57 (1.33)
12. Worrying about the future and the possibility of serious complications?	141	47.0%	87	29.0%	1.68 (1.31)
13. Feelings of guilt or anxiety when you get off track with your diabetes management?	148	49.3%	71	23.7%	1.51 (1.23)
14. Not "accepting" your diabetes?	167	55.7%	65	21.7%	1.34 (1.26)
16. Feeling that diabetes is taking up too much of your mental and physical energy every day?	161	53.7%	84	28.0%	1.57 (1.30)
19. Coping with complications of diabetes?	150	50.0%	57	19.0%	1.48 (1.17)
20. Feeling "burned out" by the constant effort needed to manage diabetes?	107	35.7%	121	40.3%	1.99 (1.31)
Treatment Related Problems (Cronbach's alpha = .57)					3.40 (2.65)
1. Not having clear and concrete goals for your diabetes care?	219	73.0%	41	13.7%	1.04 (1.22)
2. Feeling discouraged with your diabetes treatment plan?	206	68.7%	36	12.0%	1.14 (1.13)
15. Feeling unsatisfied with your diabetes physician?	183	61.0%	60	20.0%	1.21 (1.27)
Food Related Problems (Cronbach's alpha = .72)					4.41 (3.10)
4. Uncomfortable social situations related to your diabetes care (e.g. people telling you what to eat)?	167	55.7%	82	27.3%	1.48 (1.33)
5. Feelings of deprivation regarding food and meals?	158	52.7%	73	24.3%	1.48 (1.29)
11. Feeling constantly concerned about food and eating?	155	51.7%	63	21.0%	1.45 (1.24)
Social Support Related Problems (Cronbach's alpha = .65)					2.69 (2.15)
17. Feeling alone with your diabetes?	162	54.0%	47	15.7%	1.34 (1.18)
18. Feeling that your friends and family are not supportive of your diabetes management efforts?	173	57.7%	75	25.0%	1.36 (1.31)
Problem Areas in Diabetes Total (Cronbach's alpha = .92)					29.35 (16.13)

**Table-IV. Item-analysis of PAID indicators**

DISCUSSION

The very objective of the study was to translate and validate a diabetes specific measure for screening of emotional problems in diabetes patients globally used by medical and health professionals[2,4,11,13]. The diabetes specific scale for emotional problem PAID (Problem Areas in Diabetes) was selected for the purpose due to its well established psychometric properties and its potential as screening tool[2,4,11,13]. The PAID has been translated in many languages and is widely used as part of regular practice of diabetologists, endocrinologists, dietitians and health/medial psychologists[2,4,11,13]. A large number of empirical evidences are available for utility and effectiveness of PAID[2,4,11,13].

Chi Sq(df) = 293.247(153)
GFI = .913
CFI = .944
TLI = .931
IFI = .945
RMSEA = .055
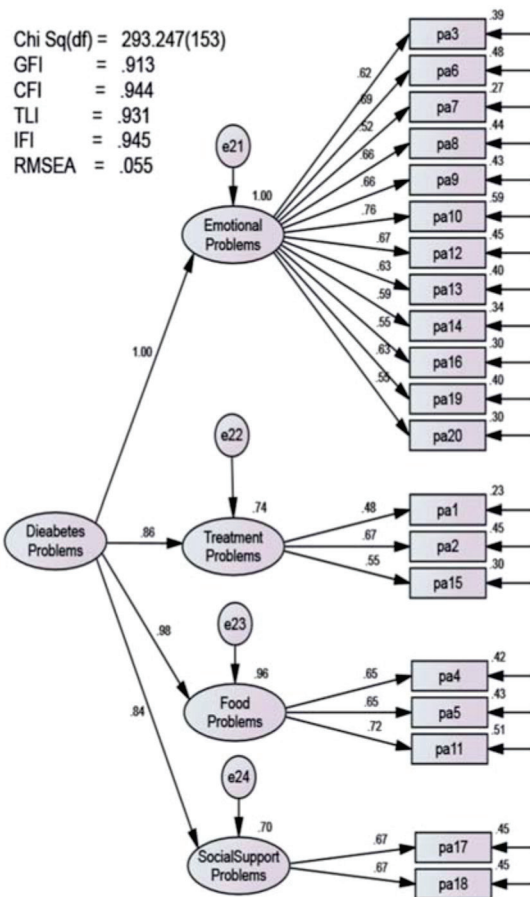
Fig-1. Model presenting confirmatory factor analysis of PAID
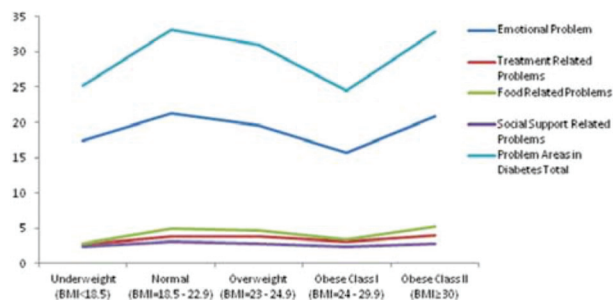
Fig-2. Trends of mean differences on PAID scales across BMI categories

A number of studies have been conducted to assess its psychometrics including studies on exploratory factor analysis[2,4,11,13] yet to the extent of our knowledge; no one has ever addressed the construct validation through confirmatory factor analysis. Our results evidenced that the four factor model as well as unidimensionality of the scale is supported with the data using a confirmatory factor analysis approach. The model fit indices and factor loadings not only confirm construct validity of the translated version but also extend validation data of the scale.

Earlier literature suggests that emotional problems tends to be high if diagnosis is given in earlier age as compare to older age[4]. Our results suggesting a negative relationship between age and social support related problems are in line with earlier research suggesting that social support related emotional problem tends to decrease as age increased[19]. As was expected based on earlier literature[2,4,13], our results suggested a positive correlation of BMI with both age and diabetes duration. As a matter of fact, literature suggests a curvilinear relationship between age and BMI in normal people yet for diabetes patients duration of disease is more serious matter of concern affecting BMI[20]. As with earlier research[2,11], our results also suggested clear indications for the effectiveness of PAID by presenting significantly positively correlation between latest blood glucose levels and PAID total score as well as subscales. Our results suggested that handling emotional problems, food related problems, and social support related problems have a direct effect on low maintenance of blood glucose.

Our results suggested that patients taking insulin shots suffer more from emotional problems and food related problems as compare to patients taking oral medication. This is in line with earlier research reporting that complexity of the treatment plays an important role in its compliance[4,11,13]. The simpler a treatment is, the burdensome it is for the sufferer and patient has to do little effort to adhere to treatment plan[10,16]. Given the fact, there are fewer chances that patients may fail to comply with treatment. Patients with IV treatment has to do more effort to maintain a normal life as compare to patients with oral treatment and hence their high scores on emotional and food related problems are no wonder. Furthermore, except treatment related problems, patients score differed on all other dimensions of PAID across BMI categories[17]. Though we expected linear trends between BMI and PAID score, our results

depicted a quadric trend as is clearly presented in Figure 2. The mean score trends as presented in figure showed highest score for both Normal and Obese class II groups whereas lowest values appeared for Underweight and Obese Class I groups. An explanation might be that diabetes patients with a normal BMI may be equally concerned to maintain their body shape as are the diabetes patients in a high risk situation i.e., with Obese Class II group to avoid a life risk situation. For the normal group the major concern might be maintenance whereas for the high risk group major concern might be avoidance of being in a life risk situation. Contrary to that diabetes patients in underweight group may be the least concerned followed by diabetes patients in Obese Class I category. The underweight group may not see themselves in problem regarding BMI whereas patients in Obese Class I category may not be interested in achieving a normal BMI given their large deviation from a normal BMI. On the other hand the later might also not perceive themselves in a life risk situation.

To be more specific in identification of problem areas in diabetes patients, our analysis on PAID indicators showed that feelings related to lifelong maintenance of diabetes is a major risk amplifying negative emotions, and consequently diminishing adherence[2]. Though diabetes literature doesn't identify it as the most serious problem, literature on chronic diseases suggests that lifelong maintenance is a serious issue. In line with earlier research[2,11], our results also identified that patients are more concerned about future complications associated with diabetes. Depression and anxiety appeared to be third most frequent problems faced by diabetes patients. As appeared in earlier literature, our findings also suggested that acceptance of diabetes diagnosis is not a real big issue as rated by suffers[4,9]. Though there are only three indicators in PAID covering treatment-related emotional problem, significance of these indicators is imperative and may be very helpful in improving compliance to treatment regime[13]. Our results showed that feelings of dissatisfaction with diabetes physician are of the major concern for diabetes patients compare to absence of having

clear and concrete goals for diabetes care. This suggests that treatment recommendations are of secondary nature to the patients if they are not satisfied from their physician[2]. Food related indicator showed that some patients find advices on food items very annoying where as other have no issue with such recommendation by others. If a diabetes patient is uncomfortable with such advices, it may have an inverse effect on their compliance, hence it is very important to identify such patients and communicate it to family to avoid any uncomfortable situation[11]. Finally, the social support related indicators showed that for some diabetes patients, encouragement from friends and family is also considered very helpful in maintenance of their diabetes.

CONCLUSIONS
PAID is a very effective instrument in identifying emotional problems of diabetes patients related to adherence and compliance to their treatment regime and hence it shall be used by physicians and health professionals in routine practice.
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