LIST OF TABLES

Table No.	Title	Page No.
2.1	Nomenclature Of Vitamin D precursors and metabolites	18
2.2	Sources of vitamin D_2 and vitamin D_3	25
2.3	Calcidiol versus Calcitriol	33
2.4	Diagnostic Cut-Off Levels for serum 25[OH]D	37
2.5	Vitamin D status of ostensibly healthy Indians	49
2.6	Human studies that associate vitamin D with T2DM	85
2.7	Recommendations of The Institute of Medicine and the Endocrine Society Practice Guidelines for daily vitamin D supplementation	93
2.8	Change in Serum 25(OH)D after intake of foods enhanced with vitamin D	101
3.1	Components for development of NHE Phase IV	122
3.2	Methods and tools used for data collection	123
3.3	Asia Pacific Cut-Offs for Body Mass Index (BMI)	127
3.4	Cut-Offs for Abdominal Obesity	128
3.5	ADA Cut-Offs for percent Body Fat	
3.6	JNC VIII Cut-Offs for Blood pressure	129
3.7	Definition of Metabolic Syndrome	130
3.8	Classification for vitamin D status	
3.9	WHO Criteria for diagnosing severity of Anemia	132
3.10	NCEP ATP III (2001) Criteria for diagnosing Dyslipidemia	135
3.11	Checkpoints for Data Monitoring and Management	143
4.1.1	Background information of the subjects (n, %)	146
4.1.2	Age wise distribution of the subjects (n, %)	148
4.1.3	Family history of diseases among subjects (n, %)	149
4.1.4	Medical history of the subjects (Self Reported) (n, %)	1 7 0
4.1.5	Nutritional supplements taken by the subjects (n, %)	150
4.1.6	Dependency Syndrome among the subjects (n, %)	
4.1.7	Biophysical measurements of the subjects (Mean \pm SD)	151
4.1.8	Prevalence of overweight and obesity among the subjects (n, %)	153
4.1.9	Levels of physical activity among subjects (n, %)	154
4.1.10 (a)	Nutrient intake of the subjects (Mean \pm SD)	155
4.1.10 (b)	Percent RDA of the subjects	155
4.1.11	Dietary practices of the subjects (n, %)	158
4.1.12	Type of oil used by the subjects	159
4.1.13	Type of milk consumed by the subjects (n, %)	161
4.1.14	Frequency of consumption of vitamin D rich foods cross tabulated by gender $(n, \%)$	162
4.1.15	Non-invasive determinants of vitamin D status in the subjects (n, %)	164
4.1.16	History of fractures among the subjects (n, %)	166
4.1.17	Vitamin D levels of the subjects (Mean \pm SD)	
4.1.18	Genderwise vitamin D status of the subjects (n, %)	167
4.1.19	Iron status of the subjects (Mean \pm SD)	170

4.1.20	Prevalence of Iron Deficiency Anaemia smong subjects (n, %)	170
4.1.21	Glycemic profile of the subjects (Mean ± SD)	171
4.1.22	Lipid profile of the subjects (Mean \pm SD)	172
4.1.23	Prevalence of dyslipidemia & inflammation among the subjects (n, %)	174
4.1.24	Thyroid hormones levels of the subjects (Mean \pm SD)	
4.1.25	Kidney profile of the subjects (Mean \pm SD)	175
4.1.26	Liver profile of the subjects (Mean \pm SD)	177
4.1.27	Biophysical measurements across vitamin D status of the subjects (Mean±SD)	178
4.1.28	Non-invasive risk factors for low vitamin D levels among the subjects (n, %)	179
4.1.29	Lipid profile of the subjects across their vitamin D status (Mean \pm SD)	
4.1.30	Prevalence of dyslipidemia & inflammation across vitamin D levels of the subjects $(n, \%)$	181
4.1.31	Lipid profile & Hs-CRP levels in relation to BMI of the subjects (Mean±SD)	182
4.1.32	Biochemical parameters in relation to BMI of the subjects (Mean \pm SD)	183
4.1.33	Post-Hoc test for lipid profile and biochemical parameters across Various groups	184
4.1.34 (a)	Nutrient intake in relation to BMI of the subjects (Mean \pm SD)	100
4.1.34 (b)	Post-Hoc test for nutrient intake across various groups	186
4.1.35 (a)	Anthropometric measurements of the subjects across vitamin D quartiles (Mean \pm SD)	100
4.1.35 (b)	Post-Hoc test for anthropometric measurements across vitamin D quartiles	188
4.1.36 (a)	Lipid profile & Hs-CRP levels of the subjects across vitamin D quartiles (Mean \pm SD)	189
4.1.36 (b)	Post-Hoc test for lipid profile across vitamin D quartiles	
4.1.37 (a)	Biochemical parameters of the subjects across vitamin D quartiles (Mean±SD)	191
4.1.37 (b)	Post-Hoc test for biochemical parameters of the subjects	
4.1.38 (a)	Nutrient intake of the subjects across vitamin D quartiles (Mean \pm SD)	100
4.1.38 (b)	Post-Hoc test for nutrient intake across vitamin D quartiles	192
4.1.39	Prevalence of Metabolic Syndrome across vitamin D quartiles of the subjects $(n, \%)$	193
4.1.40	Correlations of serum vitamin D levels with anthropometric measurements & biochemical parameters of the subjects	195
4.1.41	Multivariate predictors of vitamin D status of the subjects (Stepwise Linear Regression)	196
4.2.1	Background information of the subjects (n, %)	211
4.2.2	Age wise distribution of the subjects (n, %)	213
4.2.3	Family history of diseases among subjects (n, %)	214
4.2.4	Medical history of the subjects (Self Reported) (n, %)	215
4.2.5	Regular health check-up pattern of the subjects (n, %)	
4.2.6	Duration of diabetes among the subjects (n, %)	216
4.2.7	Precipitating factors of T2DM among the subjects (self reported) (n, %)	
4.2.8	Symptoms of T2DM among the subjects (self reported) (n, %)	218

4.2.10	Blood sugar values of the subjects (secondary data) (Mean \pm SD)	219
4.2.11	History of surgeries among the subjects (n, %)	220
4.2.12	History of fractures among the subjects (n, %)	222
4.2.13	Nutritional supplements consumed by the subjects (n, %)	222
4.2.14	Dependency Syndrome among the subjects (n, %)	223
4.2.15	Dietary practices of the subjects (n, %)	224
4.2.16	Type of oil consumed by the subjects (n, %)	226
4.2.17	Type of milk consumed by the subjects (n, %)	226
4.2.18	Non-invasive determinants of vitamin D status among the subjects (n, %)	227
4.2.19	Anthropometric & blood pressure measurements of the subjects (Mean \pm SD)	229
4.2.20	Prevalence of overweight and obesity among the subjects (Mean \pm SD)	
4.2.21	Prevalence of hypertension among the subjects (n, %)	
4.2.22	Blood pressure values (mmHg) across normotensive & hypertensive subjects (Mean \pm SD)	230
4.2.23	Levels of physical activity among subjects (n, %)	232
4.2.24 (a)	Nutrient intake of the subjects (Mean \pm SD)	222
4.2.24 (b)	Percent RDA of the subjects	233
4.2.25	Frequency of consumption of vitamin D rich foods (n, %)	236
4.2.26	Vitamin D levels of the subjects (Mean \pm SD)	220
4.2.27	Vitamin D status of the subjects (n, %)	239
4.2.28	Iron status of the subjects (Mean \pm SD)	240
4.2.29	Prevalence of Iron Deficiency Anaemia among subjects (n, %)	240
4.2.30	Glycemic profile of the subjects (Mean \pm SD)	241
4.2.31	Lipid profile & Hs-CRP levels of the subjects (Mean ± SD)	242
4.2.32	Prevalence of dyslipidemia & inflammation among the subjects (n, %)	243
4.2.33	Thyroid hormones levels of the subjects (Mean \pm SD)	245
4.2.34	Kidney profile of the subjects (Mean ± SD)	246
4.2.35	Liver profile of the subjects (Mean \pm SD)	246
4.2.36	Aberrations in biochemical parameters among the subjects (n, %)	247
4.2.37	Distribution of the subjects based on their vitamin D levels (n, %)	
4.2.38	Anthropometric & blood pressure measurements across vitamin D Status of the subjects (Mean \pm SD)	249
4.2.39	Non-invasive risk factors for low vitamin D levels among the subjects (n, %)	250
4.2.40	Prevalence of dyslipidemia across vitamin D levels of the subjects (n, %)	251
4.2.41	Aberrations in biochemical parameters of the subjects across their vitamin D levels (n, %)	254
4.2.42	Distribution of the subjects based on vitamin D quartiles (n, %)	255
4.2.43 (a)	Anthropometric & blood pressure measurements of the subjects across vitamin D quartiles (Mean \pm SD)	257
4.2.43 (b)	Post-Hoc test for anthropometric & blood pressure measurements across vitamin D quartiles	231
4.2.44 (a)	Lipid profile & Hs-CRP levels of the subjects across vitamin D quartiles (Mean \pm SD)	258
4.2.44 (b)	Post-Hoc test for lipid profile & Hs-CRP levels across vitamin D quartiles	
4.2.45	Distribution of the subjects based on duration of diabetes (n, %)	260

4.2.46	Anthropometric & blood pressure measurements across duration of diabetes of the subjects (Mean \pm SD)	260
4.2.47	Prevalence of Overweight and Obesity among the subjects across their duration of diabetes (n, %)	261
4.2.48 (a)	Vitamin D levels of the subjects across the duration of diabetes (Mean \pm SD)	262
4.2.48 (b)	Vitamin D status of the subjects across the duration of diabetes (n, %)	
4.2.49	HbA1c & Average Blood glucose (ABG) levels of the subjects across the duration of diabetes (Mean \pm SD)	262
4.2.50	Lipid profile & Hs-CRP levels of the subjects across their duration of diabetes (Mean \pm SD)	0.64
4.2.51	Prevalence of dyslipidemia & inflammation across duration of diabetes of the subjects (n, %)	264
4.2.52	Aberrations in biochemical parameters of the subjects Across Their duration of diabetes $(n, \%)$	265
4.2.53 (a)	Prevalence of Metabolic Syndrome among the subjects (n, %)	
4.2.53 (b)	Prevalence of Metabolic Syndrome across vitamin D status of the subjects (n, %)	
4.2.53 (c)	Prevalence of Metabolic Syndrome across Vitamin D quartiles of the subjects (n, %)	266
4.2.53 (d)	Prevalence of Metabolic Syndrome among the subjects Based on their duration of diabetes (n, %)	
4.2.54	Multivariate predictors of vitamin D status of the subjects (Stepwise Forward Linear Regression)	271
4.2.55	Background characteristics of the population for the supplementation study $(n, \%)$	273
4.2.56	Vitamin D levels of the subjects pre & post supplementation [Mean \pm SD]	274
4.2.57	Gender-wise vitamin D status of the subjects post supplementation (n, %)	
4.2.58	Anthropometric & blood pressure measurements of the subjects pre & post supplementation [Mean \pm SD]	276
4.2.59	Lipid profile & Hs-CRP levels of the subjects pre & post supplementation [Mean \pm SD]	277
4.2.60	Biochemical parameters of the subjects pre & post supplementation [Mean \pm SD]	280
4.2.61	Liver & Kidney profile of the subjects pre & post supplementation [Mean \pm SD]	282
4.2.62	Nutrient Intake of the Subjects pre & post supplementation [Mean ± SD]	284
4.2.63	Impact of vitamin D supplementation on lipid profile & Hs-CRP levels of the subjects based on initial TC levels [Mean \pm SD]	286
4.2.64	Impact of vitamin D supplementation on biochemical parameters of the subjects based on initial TC levels [Mean \pm SD]	287
4.2.65	Impact of vitamin D supplementation on lipid profile & Hs-CRP levels of the subjects based on initial TAG levels [Mean \pm SD]	289
4.2.66	Impact of vitamin D supplementation on biochemical parameters of the subjects based on initial TAG levels [Mean \pm SD]	290
4.2.67	Impact of vitamin D supplementation on lipid profile & Hs-CRP levels of the subjects stratified by duration of diabetes [Mean \pm SD]	292

4.2.68	Impact of vitamin D supplementation on biochemical parameters of the subjects stratified by dwartion of diabates [Maan + SD]	293
	subjects stratified by duration of diabetes [Mean \pm SD]	
4.2.69	Gender-wise distribution of the subjects in supplementation & control	295
	groups (n, %)	
4.2.70	Mean serum vitamin D levels in subjects at baseline, post	295
	supplementation & washout period (n=48) [Mean ± SD]	
4.2.71 (a)	Biophysical measurements of the subjects at baseline, post	296
	supplementation & washout period (n=48) [Mean \pm SD]	270
4.2.71 (b)	LSD Post-Hoc test for anthropometric & blood pressure measurements of	297
4.2.71 (0)	supplementation group	
4.2.72 (a)	Mean Lipid Levels in subjects at baseline, post supplementation &	299
4.2.72(a)	washout period (n=48) [Mean \pm SD]	299
4.2.72 (b)	LSD Post-Hoc test for lipid parameters of the subjects	300
4 0 70	Serum HbA1c & Average Blood Glucose levels in subjects at baseline,	300
4.2.73	post supplementation & washout period (n =48) [Mean \pm SD]	
4.0.1	Anthropometric & blood pressure measurements of the subjects (Mean \pm	
4.3.1	SD)	312
4.3.2	Prevalence of Overweight and Obesity among the subjects (n, %)	
4.3.3	Nutrient intake of the subjects (Mean \pm SD)	313
4.3.4	Levels of physical activity among subjects (n, %)	515
4.3.5	Vitamin D levels of the subjects (Mean \pm SD)	315
4.3.6	Iron status of the subjects (Mean \pm SD)	016
4.3.7	Prevalence of Iron Deficiency Anaemia among subjects (n,%)	316
4.3.8	Lipid profile & Hs-CRP levels of the subjects (Mean ± SD)	017
4.3.9	Prevalence of hyperlipidemia & inflammation among the subjects (n, %)	317
4.3.10	Gender wise Thyroid hormones levels of the subjects (Mean \pm SD)	319
4.3.11	Kidney profile of the subjects (Mean \pm SD)	220
4.3.12	Liver profile of the subjects (Mean \pm SD)	320
4.3.13	Correlations between vitamin D levels and non-invasive parameters	322
4.3.14	Summary of predictors variables of vitamin D status (Stepwise Forward	324
	Linear Regression)	
		0