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Evaluation of knowledge, attitude and practice among post-graduate staff and post-graduate students of dental colleges in Navi Mumbai for diagnosis, monitoring and management of patients with impaired glucose tolerance: a questionnaire survey

Jaishree Rijhwani[1,*], Vineet Kini[2], Ashvini M. Padhye[3], Priyanka Machale[4], Tushar Pathak[5], Bharat Gupta[6]

[1]PG Student, [2]Professor, [3]Professor & HOD, [4]Reader, Dept. of Public Health Dentistry, [5,6]Lecturer, Dept. of Periodontics, Mahatma Gandhi Mission Dental College & Hospital, Navi Mumbai, Maharashtra, India.

***Corresponding Author:**
Email: jaishreerijhwani@gmail.com

Abstract

Objectives: To evaluate and compare the knowledge, attitude and practice among post-graduate staff and post-graduate students of dental colleges in Navi Mumbai for diagnosis, monitoring and management of patients with impaired glucose tolerance through a set of 18-item multiple- choice closed ended objective questions.

Materials & Method: The cross-sectional questionnaire survey was conducted among post-graduate staff and post-graduate students of various dental specialties in dental colleges of Navi Mumbai during March – April 2015. The validated questionnaire consisted of 18-item closed ended questions based on recent literature and updated American Diabetic Association Guidelines (ADA) in 2014. Total of 605 individuals participated in the survey out of which 240 were post-graduate staff and 365 were post-graduate students.

Results: After the questionnaire was collected out of 605 participants, 509 participants (84.13% response rate), met the inclusion criteria out of which 202 (39.69%) were PG Staff and 307 (60.31%) were PG Students. The results showed that PG Staff members were very much aware about the diagnosis, monitoring and management of patients with impaired glucose tolerance (IGT) as compared to PG students. The knowledge of PG staff was considerably higher, probably due to their clinical exposure.

Conclusion: The study emphasizes the need for better instillation of diagnosis, monitoring and management protocols for impaired Glucose tolerance (IGT) and guidelines as standardized by ADA amongst both the post-graduate staff members and post-graduate students of dental colleges in Navi Mumbai in order to achieve prevention and better control of diabetes mellitus and its complications.

Keywords: Impaired glucose tolerance test, Diabetes mellitus, American Diabetic Association, Knowledge, Attitude

Introduction

Insulin resistance and compensatory hyperinsulinemia are intimately linked to the metabolic syndrome, a combination of abdominal obesity, hypertension, and dyslipidemia that is associated with increased vascular diseases. The American Diabetes Association issued new classification and diagnostic criterion for diabetes in 1997.[(1)] These criterion were modified in 2003 to include the diagnosis of impaired fasting glucose and impaired glucose tolerance. Prediabetes is an intermediate state between normoglycaemia and diabetes, where the glucose levels are higher than normal but not significant enough to be diagnosed with diabetes mellitus. Prediabetes includes either impaired glucose tolerance (IGT) i.e. post prandial blood sugar (PPBS) 140-199mg/dl or impaired fasting glucose (IFG) i.e. fasting blood sugar (FBS) 100-125mg/dl alone or combination of both IGT and IFG. Impaired glucose tolerance (IGT) serves as a marker for the state of insulin resistance. Early detection of this status and treatment can prevent development of Diabetes Mellitus and also reduces complications during dental treatment, especially in pre-diabetic subjects having combined IGT and IFG. To achieve prevention and better control of diabetes mellitus and its complications, dentists should be aware about the diagnosis, monitoring and management of the patients with IGT. The purpose of the present survey was to evaluate and compare the knowledge, attitude and practice among post-graduate staff members (PG-S) and post-graduate students (PG-s) of various dental specialities of dental colleges in Navi Mumbai for diagnosis, monitoring and management of patients with IGT.

Materials and Method

A questionnaire was prepared based on recent literature and updated American Diabetes Association Guidelines 2014. PG-S and PG-s of various dental colleges in Navi Mumbai were invited to participate in the survey. This survey was conducted after procuring permission from the head of institutions during March 2015. The one time cross-sectional survey form consisted of 18-item multiple choice questions with single best answer, out of which 8 were based on diagnosis, 5 on monitoring and 5 on management. A team of 10 experts from MGM dental college did content validation and face validation of the questionnaire from department of Endocrinology, Internal Medicine and department of Pharmacology. The validity was examined by evaluating whether the questions in the questionnaire are correct and comprehensive reflection of the concept of the questionnaire which is intended to be measured is

correct. Reliability was tested by asking the pilot sample to complete the questionnaire on two separate occasions i.e. 2 weeks apart. Consistency of the questionnaire was evaluated using Cronbach's Alpha (0.80). The Ethical approval was obtained from the Ethics Committee of the MGM dental college, Kamothe, Navi Mumbai. The participation was voluntary and responses were anonymous. The participants were given questionnaire in hand and were given a duration of twenty minutes to complete the questionnaire so as to maximize respondent's compliance. Participants were not permitted to ask questions, share answers or to refer to any reference material. Partially filled or unfilled or incomplete questionnaire were excluded from the study.

Statistical analysis was performed using SAS statistical package (version 9.0; SAS Institute, Inc., Cary, NC). The results were expressed as frequencies (percentages) for quantitative variables. Chi-square test was used to test differences in proportions. A *p* value of < 0.05 was considered significant.

Results

Total 605 individuals participated in the survey out of which 240 were PG-S and 365 were PG-s. After the questionnaire was collected out of 605 participants, 509 participants (84.13% response rate), met the inclusion criteria out of which 202 (84.16%) were PG-S and 307 (84.10%) were PG-s. The various responses for the questions posed to the PG-S and PG-s regarding diagnosis, monitoring and management of IGT are given in (Table 1).

Table 1: Questionnaire responses of the participants regarding management of IGT

Questions	Options	Total population (n=509)	
		PG Staff (n=202) (%)	PG Student (n=307)
Q.1 Conditions that may cause IGT	a) Infection	53 (73.76)	156 (50.82)
	b) Trauma	62 (30.69)	45 (14.66)
	c) Cystic Fibrosis	159 (78.71)	218 (71.01)
	d) Hypothyroidism	27 (13.37)	92 (29.97)
	e) Down Syndrome	30 (9.77)	22 (10.89)
	f) Carpel Tunnel Syndrome	------	11 (3.58)
	Totally correct	25 (12.37)	8 (2.6)
Q.2 Drugs that may cause IGT	a) Antimalarial	------	-----
	b) Alpha interferon	48 (23.76)	44 (14.33)
	c) Glucocorticoids	172 (85.15)	248 (80.78)
	d) Mineralocorticoids	------	13 (4.24)
	e) Oral contraceptives	149 (73.76)	232 (75.57)
	f) Thiazides	83 (41.09)	82 (26.71)
	Totally correct	43 (21.28)	26 (8.47)
Q.3 Most appropriate method of collecting blood sample for checking BSL	a) Capillary blood	80 (39.6)	236 (76.87)
	b) Venous blood	122 (60.4)	71 (23.13)
Q.4 Do you have Glucometer in your operatory?	a) Yes	43 (21.29)	16 (5.21)
	b) No	159 (78.71)	291 (94.79)
Q.5 Above what levels of BSL will you infers patient has IGT?	a) ≥110mg%	43 (21.29)	21 (6.84)
	b) ≥126mg%	-----	57 (18.57)
	c) ≥140mg%	157 (77.72)	134 (43.65)
	d) ≥120mg%	2 (0.99)	95 (30.95)
Q.6 What is the lower limit of FBSL?	a) ≥110mg%	38 (18.81)	9 (2.93)
	b) ≥126mg%	164 (81.19)	198 (64.59)
	c) ≥140mg%	------	65 (32.18)
	d) ≥120mg%	------	35 (39.09)
Q.7 Most reliable test to diagnose diabetes?	a) Random blood sugar	-----	155 (50.49)
	b) Post-prandial blood sugar	38 (18.81)	55 (17.92)
	c) Fasting blood sugar	145 (71.78)	92 (29.97)
	d) Oral glucose tolerance test	19 (9.41)	5 (1.63)

Q.8 Most reliable test for diagnosing gestational Diabetes?	a) Fasting blood sugar b) Oral glucose tolerance test c) Post-prandial blood sugar d) Random blood sugar	------ 142 (71.3) ------ 60 (29.7)	------ 26 (8.47) ------ 281 (91.53)
Q.9 Good control in HbA1c?	a) 6.0%-6.5% b) 7.0%-7.5% c) 7.5%-8.0% d) 6.5%-7.0%	159 (78.71) 43 (21.29) ------ ------	99 (32.25) 208 (67.75) ------ ------
Q.10 Glycated fructosamine measures BSL over a period of?	a) 1-2 weeks b) 2-3 weeks c) 3-4 weeks d) 2-4 weeks	----- 173 (85.64) 29 (14.37) -----	----- 129 (42.02) 177 (57.66) -----
Q.11 How many hours patient is asked to fast before checking the FBSL level	a) Atleast 6 hrs b) Atleast 8 hrs c) Atleast 10 hrs d) Atleast 12 hrs	35 (17.33) 149 (73.76) 18 (8.91) -----	76 (24.76) 91 (29.64) 140 (45.60) -----
Q.12 Instruction to the patient before Post-prandial blood sugar level?	a) Have regular meals 2 hrs before the test b) Have 75gms of glucose 2 hrs before the test c) Have your regular meals 3 hrs before the test d) Have 100gms of glucose 2 hrs before the test	145 (71.78) 57 (28.22) ------ ------	260 (84.69) 46 (14.98) 1 (0,33) -------
Q.13 When do you advise a patient to get test done for blood sugar levels?	a) Routinely b) Only if the patient is symptomatic c) Only in patients with history of diabetes d) Only if patient has to undergo surgical procedure	94 (46.54) 68 (33.66) 40 (19.80) ------	59 (19.22) 107 (34.85) 141 (45.93) ------
Q.14 What test you advise to a diabetic patient before surgery?	a) Random blood sugar b) Post-prandial blood sugar c) Fasting blood sugar d) Glycated haemoglobin	----- 136 (67.33) ----- 66 (32.67)	29 (9.45) 220 (71.66) ----- 58 (18.89)
Q.15 If elective surgery is to be performed what is the maximum post prandial BSL at which you will operate?	a) 200-250mg/dl b) 250-300mg/dl c) 300-350mg/dl d) >350mg/dl	200 (90.01) 2 (0.99) ----- -----	299 (97.40) 8 (2.61) ------ ------
Q.16 If emergency surgery is to be performed at 250mg/dl post prandial BSL what will you do?	a) Give patient antibiotic and start the surgery b) Take physicians consent	------ 202 (100)	------ 307 (100)
Q.17 Which all emergency drugs you have in your operatory?	a) Glucose powder b) Glucagon (1mg I.M) c) Sodium bicarbonate d) Dextrose (0.5% I.V)	202 (100) 27 (13.37) 13 (6.44) 12 (5.94) All : 4 (1.98%)	307 (100) 8 (2.61) 4 (1.3) -----
Q.18 Is there a need for continuing education programme?	a) Yes b) No	201 (99.51) 1 (0.49)	307 (100) -----

The conditions that may be responsible for IGT were correctly identified by 25 (12.37%) PG-S and 8 (2.6%) PG-s. Around 43 (21.28%) PG-S and 26 (8.47%) PG-s correctly identified the drugs that may be responsible for causing IGT. 122 (60.4%) PG-S and 71 (23.13%) PG-s decorously marked that the most appropriate method of collecting blood for testing blood sugar levels is venous blood. 43 (21.29%) PG-S and 16 (5.21%) PG-s confirmed that they have glucometer at their work place. Blood sugar levels of ≥ 140mg/dl are indicative of IGT that was marked correctly by 157 (77.72%) PG-S and 134 (43.65%) PG-s. The lower most limit that is indicative of FBSL is ≥ 126mg/dl that was responded correctly by 164 (81.19%) PG-S and198 (64.59%) PG-s. FBSL is the most reliable test to diagnose diabetes that was responded correctly by 145 (71.78%) PG-S and 92 (29.97%) PG-s. Oral glucose tolerance test is the most appropriate method to diagnose gestational diabetes that was responded correctly by 142 (71.3%) PG-S and 26 (8.47%) PG-s. Values in the range of 6.0%-6.5% are considered as good control in HbA1c that was answered correctly by 159 (78.71%) PG-S and 99 (32.25%) PG-s. Glycated fructosamine measures BSL over a period of 2-3 weeks that was responded correctly by 73 (85.64%) PG-S and 129 (42.02%) PG-s. Patients are asked to be nil by mouth for atleast 8 hours before checking the FBSL level that was marked correctly by 149 (73.76%) PG-S and 91 (29.64%) PG-s. Patients are to be instructed to have 75gms of glucose 2hrs before checking the Post-prandial blood sugar level that was marked correctly by 57 (28.22%) PG-S and 46 (14.98%) PG-s. Around 94 (46.54%) PG-S and 59 (19.22%) PG-s are of the opinion that the patients should be asked to get their blood sugar levels checked routinely. Glycated hemoglobin is considered as the most appropriate method to check control of diabetes before any surgical procedure was marked correctly by 66 (32.67%) PG-S and 58 (18.89%) PG-s. 200 (90.01%) PG-S and 299 (97.40%) PG-s answered that at post-prandial blood sugar levels of 200-250mg/dl an elective surgery can be performed. 202 (100%) PG-S and 307 (100%) PG-s believe that it is necessary to take physicians consent before any surgical procedure if the post-prandial blood sugar levels are above 250mg/dl. Glucose powder, glucagon (1mg I.M), sodium bicarbonate and dextrose (0.5% I.V) are the emergency drugs that should be present in all the operatory units that were marked correctly by 4 (1.98%) PG-S and none of the PG-s student marked all the options. 201 (99.51%) PG-S and 307 (100%) PG-s felt that there is a need for continuing education in regards to IGT.

Discussion

This survey was conducted to evaluate the knowledge of diagnosis, monitoring and management of IGT on a representative sample of PG-S and PG-s of various dental colleges in Navi Mumbai. The following were the significant findings: (1) a significant disparity exists in the level of knowledge of diagnosis, monitoring and management of IGT between the PG-S and PG-s. (2) The knowledge about IGT was significantly lower in PG-s than in PG-S. The probable reason could be because the PG-S are professionals particularly dedicated to continuous medical education, with longstanding experience in diabetes care and high academic levels on an average.

Infections, trauma, cystic fibrosis, Down syndrome[(1)] are amongst the various conditions that may be responsible for IGT, 25 (12.37%) PG-S and 8 (2.6%) PG-s correctly identified the various causes of IGT. Alpha interferon, Glucocorticoids, Oral contraceptives and Thiazides may be responsible for causing IGT,[(1)] 43 (21.28%) PG-S and 26 (8.47%) PG-s correctly identified these drugs. 122 (60.4%) PG-S and 71 (23.13%) PG-s decorously marked that the most appropriate method of collecting blood for testing blood sugar levels is venous blood that is in accordance with Boyd et al.[(2)] 43 (21.29%) PG-S and 16 (5.21%) PG-s confirmed that they have glucometer at their work place. In 1997 and 2003, the Expert Committee on Diagnosis and Classification of Diabetes Mellitus[(3)] recognized an intermediate group of individuals whose glucose levels do not meet the criterion for diabetes, yet are higher than those considered normal. These people were defined as having impaired fasting glucose (IFG) [fasting plasma glucose (FPG) levels 100 mg/dL (5.6 mmol/L) to 125 mg/dL (6.9 mmol/L)], or impaired glucose tolerance (IGT) [2-h values in the oral glucose tolerance test (OGTT) of 140 mg/dL (7.8 mmol/L) to 199 mg/dL (11.0 mmol/L)]. Individuals with IFG and/or IGT have been referred to as having prediabetes, indicating the relatively high risk for the future development of diabetes,[(1)]157 (77.72%) PG-S and 134 (43.65%) PG-s correctly answered the lower most limit of IGT. The lower most limit that is indicative of FBSL is ≥ 126mg/dl[1], was responded correctly by 164 (81.19%) PG-S and198 (64.59%) PG-s. FBSL is the most reliable test to diagnose diabetes that was responded correctly by 145 (71.78%) PG-S and 92 (29.97%) PG-s. Carpenter and Coustan established the criteria for glucose intolerance in pregnancy using a 50-g oral glucose challenge test.[(4)] Their criteria are supported by the American Diabetes Association. The actual diagnosis of gestational diabetes mellitus is usually based on a 3-h oral glucose tolerance test in which a fasting blood sample is drawn after 8–14 h of fasting. This is immediately followed by giving a 100-g glucose load orally and then drawing blood samples again at 1, 2, and 3 hour time-points. If two or more of the threshold glucose levels are exceeded the diagnosis is made, 142 (71.3%) PG-S and 26 (8.47%) PG-s responded correctly for the diagnosis of gestational diabetes. Values in the range of 6.0%-6.5% are

considered as good control in HbA1c,[5] which was answered correctly by 159 (78.71%) PG-S and 99 (32.25%) PG-s. Glycated fructosamine measures BSL over a period of 2-3 weeks that was responded correct1y by 73 (85.64%) PG-S and 129 (42.02%) PG-s.[6] Patients are asked to be nil by mouth for atleast 8 hours before checking the FBSL level that was marked correctly by 149 (73.76%) PG-S and 91 (29.64%) PG-s. Patients are to be instructed to have 75gms of anhydrous glucose solution for 2hrs before checking the Post- prandial blood sugar level,[7]that was marked correctly by 57 (28.22%) PG-S and 46 (14.98%) PG-s. 94 (46.54%) PG-S and 59 (19.22%) PG-s are of the opinion that the patients should be asked to get there blood sugar levels checked routinely. Glycated hemoglobin is considered as the most appropriate method to check control of diabetes before any surgical procedure by 66 (32.67%) PG-S and 58 (18.89%) PG-s. 200 (90.01%) PG-S and 299 (97.40%) PG-s answered that at post-prandial blood sugar levels of 200-250mg/dl elective surgery can be performed. 202 (100%) PG-S and 307 (100%) PG-s believe that it is necessary to take physicians consent before any surgical procedure if the post-prandial blood sugar levels are above 250mg/dl. Glucose powder, glucagon (1mg I.M), sodium bicarbonate and dextrose (0.5% I.V) are the emergency drugs that should be present in all the operatory units',[7] that were marked correctly by 4 (1.98%) PG-S and none of the PG-s student marked all the options. 201 (99.51%) PG-S and 307 (100%) PG-s felt that there is a need for continuing education in regards to IGT.

Limitations

The survey sample may not be representative of the entire fraternity. Absence of established guidelines for dentist may be responsible for significant disparity in the methodology of diagnosis, monitoring and management of patients with impaired glucose tolerance among different professionals. The survey aims to highlight the need for establishing uniform norms for all the professionals for the same.

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