

Original Article

IMPACT OF LIFE STYLE MODIFICATIONS AMONG DIABETICS IN AN URBAN SLUM OF MUMBAI

Sultan R Ahmad¹, Gajanan D Velhal², Yasmeen K Kazi³**Financial Support:** Non declared**Conflict of interest:** Non declared**Copy right:** The Journal retains the copyrights of this article. However, reproduction of this article in the part or total in any form is permissible with due acknowledgement of the source.**How to cite this article:**

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Author's Affiliation:¹Assistant Professor, Department of Community Medicine, Deccan college of Medical sciences, Hyderabad, ³Assistant Professor, ²Professor (Addl.), Department of Preventive & Social Medicine, T N Medical College & B Y L Nair Ch. Hospital, Mumbai**Correspondence:**Dr. Sultan Ahmad
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ABSTRACT

Purpose: Present study was undertaken to assess the impact of life style modifications and self care practices, among type II diabetics.**Methodology:** An experimental epidemiological study adopting before and after intervention study design, was undertaken in an urban slum in Mumbai. Representative sample of 200 type II diabetics, received package of interventions along with follow up for 12 months, to assess the impact.**Findings:** Present study reveals good family support to the patients (90%). Blood sugar, BP, BMI and calories intake decreased significantly after intervention, along with improvement in life style (29% to 40% of patients) and self care practices (1.5% to 15% of patients), with clear difference according to the level of modifications. Major life style modifications and self care practices include spacing of meals, regular exercises, self examination of urine, foot care and carrying biscuits/sugar during traveling.**Conclusion:** Life style modifications and self care practices promote health of type II diabetics evident by qualitative and quantitative parameters.**Keywords:** Type 2 diabetes, self care practices, life styles changes,

INTRODUCTION

Chronic non communicable diseases are assuming increasing importance among the adult population in both developed and developing countries. Diabetes type II is leading cause of death among these non communicable diseases. The role of genetic and environmental factors like lifestyle changes, dietary habits, physical inactivity, obesity and stress etc, contributes to the development of type II diabetes mellitus.¹

An estimated 100 million people world wide are affected by diabetes which may reach up to 300 million by year 2025.¹ Out of these 100 million patients, nearly 30 million are from South East Asia (may increase to 80 million by year 2025).¹ In India it is estimated that presently 19.4 million individuals are affected by this disease which is likely to go up to 57.2 million by year 2025.¹ By using WHO criteria for diagnosis, the prevalence of diabetes among adults in India is found to be approximately 2.4% in rural and 4 to

11.6% in urban dwellers.¹ High frequencies of impaired glucose tolerance, ranging from 3.6 to 9.1 indicate that in the absence of effective interventions, diabetes will continue to increase in prevalence in world.

It is a public health problem affecting the people despite of significant medical advances globally. Why do we fail to achieve near-normal glycemic control in type 2 diabetic patients? Frequently, non-compliance of the diabetic patient has been blamed for the treatment failure. However, adherence to an exercise program varied from 19% to 30%, accuracy and frequency of taking insulin varied from 20% to 80%, and home blood glucose monitoring varied from 57% to 70%.² Besides adequate, appropriate and timely treatment with antidiabetic drugs, crucial elements to prevent complications and prolong the survival of the patients are, to adopt healthy lifestyles with appropriate diet and increase in physical activity^{2,3} self care by the patients and family support towards the self care.^{1,2}

Twenty five percent (25%) of India's population lives in urban slum area while in Maharashtra urban population is 38.73%. All over India 14.27 crore people live in urban slum as per latest census and Mumbai have a large share in this. Such large population always goes ignored. It is therefore important that effort should be made for primary prevention, and recognition and management of multiple risk factors to reduce diabetic complications, as comprehensive preventive care for urban slum population.

Present study was undertaken mainly to highlight the lifestyles adopted and observance of self care practices by the patients after diagnosis and to assess the impact of intervention measures like, health education, dietary counseling, regular blood sugar and urine sugar monitoring and physical exercises including YOGA exercises, to promote the health of diabetics in qualitative and quantitative parameters.

MATERIALS AND METHODS

Present community based experimental epidemiological study adopting before and after intervention comparison design without control, was conducted in Shivaji Nagar Urban slum, Govandi (Total population 48000), which is the catchment area of Shivaji Nagar Urban Health Centre located in eastern suburbs of Mumbai, (affiliated to Department of PSM, T N Medical

College & B Y L Nair Ch. Hospital), over a period of 2 years from October 2005 to September 2007.

Rapid survey of the designated area, undertaken by house to house visits, to identify existing cases of type II diabetes of at least 1 year duration and on treatment for a duration 1 year, among resident adults > 20 years of age, based on clear H/o of disease or H/o of taking anti-diabetic drugs or documentary proof (e.g. diabetic card, report of blood sugar etc) of type II diabetes, confirmed total number of 1712 such cases in the community. To have minimum 10% of these study subjects, receiving intervention package and available for post intervention survey and likelihood of at least 15 -20% loss over a duration of 1 year of follow up, 250 patients were enrolled by employing simple random sample method, in the present study with their written consent. Out of these 250 individuals, only 200 patients received the stipulated interventions and were available for post intervention survey. Pre formed, pre tested, semi structured interview schedule, used as data collection tool, included information on socioeconomic profile, family history, addictions, diet (24 hours recall), physical activity (daily activity + exercise), self care, family support and associated disorders or complications etc. Height, weight and blood pressure were measured. Body Mass Index (BMI) was used as an indicator of obesity. The extent of life style modifications, self care and family support (mentioned as some, moderate and major based on score, <4, 4-7 & >7 respectively), were assessed by weighted score method by identifying ten parameters for each and giving one mark to each positive answer and zero to each negative answer.

All study group subjects were given temporary identity cards and were followed for a duration of 12 months from April 2006 to March 2007 with provision of intervention phase benefits. Intervention package included:

Assurance of regular medical treatment:

Participants were followed up fortnightly on Wednesday in Geriatric clinic in Urban Health Center. Detail enquiry of compliance to ongoing treatment, clinical examination and anthropometric measurements were done and appropriate referral advice was given and compliance to the same was ensured for the deserving patients. Average number of visits by all study subjects is 20 over duration of 1 year

and 34 patients were referred to nearby higher level, health care institution.

Health Education: At each follow up visit patients were given health education either on individual basis or in groups, on basic facts about diabetes and its complications and how to control blood sugar and prevent its complications and scope for self care at individual level along with responding to their difficulties and queries. Patients were also given knowledge of Dos and Don'ts during traveling, and about hypoglycemia, how to prevent it and what to do in hypoglycemic episode. On an average each individual has attended health education sessions 6 times.

Dietary counseling: Dietary counseling given on monthly basis to each patient included information about different types of foods which are harmful or beneficial in diabetes and spacing of meals. Each individual was counseled at least 6 times during follow up period.

Blood Sugar and Urine Sugar examination: Blood sugar and urine sugar (fasting and postprandial) were monitored monthly.

Demonstration to check urine sugar at home: During fortnightly visits patients were demonstrated repeatedly, how to check urine sugar at home by using dipstick and how to take injection insulin by him/her self.

Yoga exercise: Yoga sessions were conducted weakly on Saturday between 4.00 pm to 6.00 pm at Urban Health Center, by yoga experts of Ambika Yoga Kuteer, Yoga institute, Thane. All 200 study subjects practiced Yoga exercises at home on daily basis

After completion of 12 months of intervention phase, information was collected about diet, physical activity, addictions, complications, life style modifications and self care etc. on the same interview schedule used at the beginning. Data was analyzed by applying Pearson's Chi square tests and paired 't' tests through SPSS soft ware (version.10).

RESULTS & DISCUSSION

Profile of study subjects reveals that majority of patients (60%) were in late adulthood (40-60 years) stage with mean age as 53.42 years, which by itself is one of the important risk factor for many non communicable diseases including diabetes mellitus. A cross-sectional, hospital-based study⁴ done by Jali MV, Kambar Sanjay showed that the prevalence of diabetes among males was 10.38%, females it was 7.69% while it was 18.24% in the age group 40-49 years, which was quite high compared with other age groups.

Table 1: Life style changes and self care practices adopted before and after intervention (N=200)

Self care practices	Pre-Intervention (%)	Post-Intervention (%)	P Value
Taking medicine regularly	185 (92.5)	195 (97.5)	0.0389
Visiting doctor regularly	182 (91)	194 (97)	0.0206
Adjust dose by self	24 (12)	20 (10)	0.6317
Check urine sugar at home	6 (3)	29 (14.5)	< 0.001
Taking injection insulin by self (N=22)	5 (22)	6 (27.2)	0.7277
Identify hypoglycemic spell	186 (93)	196 (98)	0.0300
Care of feet	26 (13)	46 (23)	0.0134
Carry biscuit / sugar	11 (5.5)	31 (15.5)	0.0019
Carry diabetic card	95 (47.5)	104 (52)	0.4237
Regular Blood Sugar Monitor	154 (77)	165 (82.5)	0.2134
Cut down sweet intake	176 (88)	185 (92.5)	0.1775
Cut down oil intake	144 (72)	163 (81.5)	0.0331
Space the meals	14 (7)	70 (35)	< 0.001
Increased vegetable consumption	47 (23.5)	56 (28)	0.0571
Cut down non veg food consumption	134 (67)	155 (77.5)	0.0755
Doing exercise	45 (22.5)	94 (47)	< 0.001
Cut down addiction (N = 85)	26 (30.59)	65 (76.47)	< 0.001
Cut down outing	26 (13)	82 (41)	< 0.001
Cut down attending ceremony	90 (45)	147 (73.5)	< 0.001
Cut down eating outside	98 (49)	153 (76.5)	< 0.001
Pearson's Chi square test			

In this study 70.5% (141) patients were females and 85% of them, were from higher socioeconomic status. No of females are more than males because of their availability at home during day time when investigation team made home visits. Similar finding is shown in a study⁵ done by Mohan V et al that the higher socio-economic status (SES) group had two-fold higher prevalence of diabetes compared to the lower socio-economic group. The reason for high prevalence has been attributed to the consumption of unhealthy diet like foods rich in calorie and fat and lack of physical activity in the higher SES group.

In the present study, 27% of patients had positive family history of diabetes. Studies show that genetic factors play an important role in causation of diabetes. Results of a study⁶ conducted in Chennai by Mohan V et al found a

positive correlation between obesity, family history and diabetes.

Among the study subjects, 54.5% of patients had associated diseases like hypertension and IHD and 27 % of patients had complications. The most common complications were ophthalmic (15%) like retinopathy and cataract, nephropathy (5%) and diabetic foot 3%. Type II diabetes mellitus in association with other medical disorders like obesity and hyperlipidemia predispose to cardiovascular disorder. This cluster of conditions is known as syndrome X. A study⁷ conducted in the University of Wisconsin Medical School by Klein R et al found that the Proliferative retinopathy is more likely to develop in younger-onset women with less education than in those with more education.

Table-2: Changes between Pre intervention & Post intervention (N=200)

Parameters	Mean		t value	P value
	Pre Intervention	Post Intervention		
Systolic Blood pressure	135.41	120.34	13.158	< 0.001
Diastolic Blood Pressure	84.87	77.72	11.443	< 0.001
Fasting Blood sugar	169.75	139.67	10.833	< 0.001
PP Blood sugar	246.75	203.57	11.958	< 0.001
BMI	25.8371	25.5841	2.173	0.031
Calories	1851.95	1517.83	12.916	< 0.001

Paired 't' Test

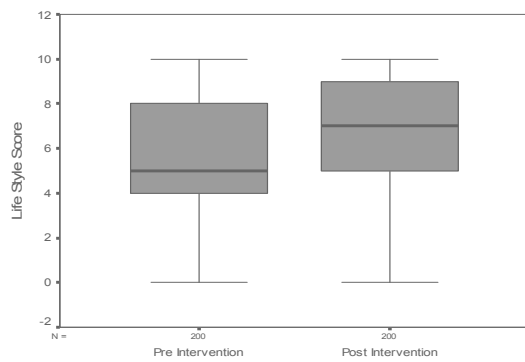
Both fasting and post prandial blood sugars were high i.e. fasting -169.75 (range 80-480), PP-246.75 (range 110-560). Mean BMI was 25.83 (range 61-40); females had higher BMI than males (26.39 Vs 24.51), 49 % female were overweight and 14% obese while 27% male were overweight and 8 % obese. Mean daily calorie intake was 1851.95 (range 1290-4375) which was high in male (2141.69 Vs 1730.71). We found that 70 % male were engaged in moderate work and 22 % in heavy physical activity. The corresponding figures for the females were 56% and 5 %.

Good family support is reported by 90% of patients, as compared to life style changes (29%) and self care practices (1.5%). Before intervention, only 23% and 7% of patients had increased consumption of vegetables and spacing of meals respectively, 22% had started exercises and 30% had curtailed addictions. Only 3% of patients used to check urine sugar at home, 13% took care of their feet and 5% carried

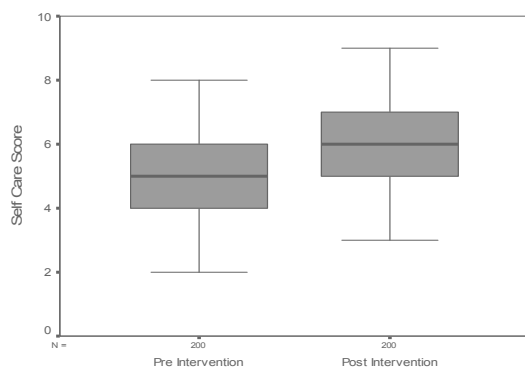
the sugar or biscuit and water during the traveling to avoid hypoglycemic spells after diagnosis. To the patients, the main concerns were only his/her curative treatment (>90%) and periodic blood sugar testing (77%). Table 1, reveals significant post intervention impact on most of the elements of self care practices, except self adjustment of insulin dose, taking injection by self (of course intervention package did not include any modifications in the treatment itself), keeping diabetic card with self and regular blood sugar monitoring. Similarly significant post intervention impact on life style modifications is also evident, except reducing intake of sweets and increased vegetable consumption. Similar findings are observed in many studies. In the cross-sectional study⁸ conducted by Kaur K, Singh MM, Kumar, Walia I at Chandigarh showed that only 18.3% were avoiding sweets and fatty foods, monitoring of blood sugar was poor (46.7%), and none of the patients on insulin injections knew about self therapy. In the study⁹ conducted by Gopalan R,

Srinivasa DK & Dasgupta B in Pondicherry found that only 50% modified their diet and only 10.6% of the subjects tested their urine. The problem of monitoring was also highlighted in many studies. In a study¹⁰ by Rayappa PH et al only seven respondents out of 611 (1.1%) undertook home monitoring of blood glucose.

Blood sugar both fasting and post prandial, blood pressure both systolic and diastolic, BMI and calories decreased significantly after intervention (Table 2). In "Modena Diabetes Project",¹¹ after four years follow-up, the individual before/after match-paired outcomes revealed an improvement in glycemic control: In a study¹² done to determine the effects of a culturally competent diabetes self-management intervention in Mexican Americans with type 2 diabetes, experimental groups showed significantly lower levels of HbA(1c) and fasting blood glucose at 6 and 12 months.



Life style score: 5.28 Vs 6.77 (t=7.833, P<0.001)
Fig 1: Life Style Score pre and post intervention

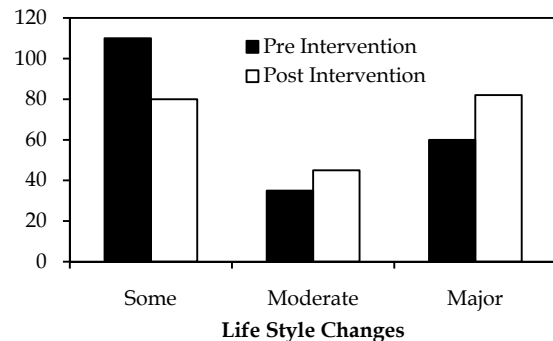


Self care score: 4.8 Vs 6.16 (t=11.404, P<0.001)
Fig 2: Self care score pre and post intervention

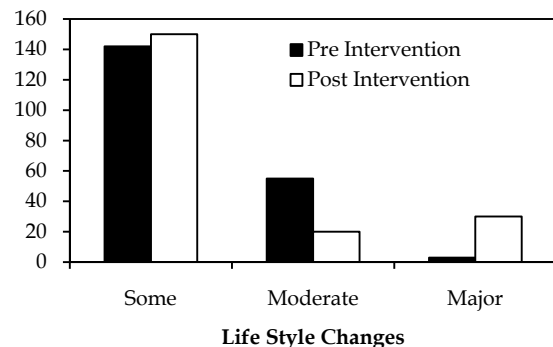
Number of patients adopting healthy life styles and self care practices had significantly increased from pre intervention to post intervention period. After one year of intervention 40% patients did major

modifications in their life style compare to 29 % before intervention and 15% patients adopted self care practices as compare to 1.5 % before intervention. (Fig.1& 2) Major changes were seen in spacing of meals (p< 0.001) and regular exercises (p< 0.001), checking urine sugar at home(p< 0.001), care of feet (p< 0.001) and carrying biscuit / sugar during traveling (p< 0.001) (Table 1). This study confirms the effectiveness of culturally competent diabetes self-management education on improving health outcomes. A programme¹³ was set up in the France between 1994 and 1998 to improve the quality of care for Type 2 diabetic patients and an educational programme at the primary health care level. The audit showed improvement in foot care, quality of prescription, HbA1c, and control of blood pressure and blood lipids.

A study¹⁴ carried out in the Department of Physiology, University College of Medical Sciences and GTB Hospital, Shahdara, Delhi, to study the effect of Yogic exercises on blood glucose level, glycosylated hemoglobin in Type 2 Diabetics. The results indicate that there was significant decrease in fasting and post prandial blood glucose levels after yoga regimen.



Pearson's Chi square test: X² = 26.967, P<0.001
Figure 3: Number of Patients modified their life style



Pearson's Chi Square test: X²=19.809, P<0.001
Figure 4: Number of Patients adopted self care practice

It was found that mean blood sugar level was significantly low in patients who had adopted major modification in their life styles compare to those who had adopted some modifications i.e. fasting was 132.57 Vs 151.9 (P=0.016) and Post Prandial was 189 Vs 242.39 (p < 0.001) at the end of one year of follow up. Diabetes Prevention Program (DPP)¹⁵ in the U.S. have shown that lifestyle intervention programs involving diet and/or exercise reduce the progression of impaired glucose tolerance (IGT) to type 2 diabetes.

CONCLUSION

Present community based experimental epidemiological study adopting before and after intervention comparison design without control, conducted in slum areas in Mumbai includes 200 study subjects and, confirms the role of life style modifications and self care practices on improving clinical profile of type II diabetes patients. Post Intervention assessment reveals significant changes in life styles, especially related to cutting down daily oil intake, spacing the meals, daily exercises including yoga exercises, cutting down addictions, avoiding attending ceremonies and eating outside. Number of patients adopting self care practices, in the form of regular intake of medicines and visit to doctor, periodic checking of urine sugar at home, early identification of signs of hypoglycemia, care of foot, and carrying biscuits, sugar, have increased significantly in response to intervention package. Post intervention assessment also confirms significant changes in mean systolic and diastolic pressure, fasting and PP blood sugar, as well as BMI and calorie intake. All these life style modifications and self care practices, would go a long way in improving wellbeing of type II diabetes. Efforts should be enhanced on a wider scale to incorporate these measures as a part of routine home based care for diabetics for improving their quality of life.

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