Original Article

An evaluation of type 2 diabetes care in the primary care setting

Josianne Cutajar

Abstract

Objectives: To assess the clinical outcome of type 2 diabetes care currently provided at the primary healthcare centres.

Method: A clinical audit was performed among 110 type 2 diabetes patients in the two major primary healthcare centres. The measurements of fasting blood glucose, HbA_{1c}, serum lipid profile, blood pressure, serum creatinine, body mass index and waist circumference were carried out during a clinical examination. Knowledge, behaviour and attitude among the participants were assessed via a questionnaire composed of four sections concerning diabetes and its complications, physical activity, nutrition and smoking.

Results: The ideal standards recommended by the International Diabetes Federation were employed for data analysis. HbA_{1c} level was controlled in 37. 3%, systolic blood pressure was controlled in 44. 5%, cholesterol was controlled in 30% while LDL was controlled in 10.9 % of patients. Body Mass Index was above the normal threshold in 72.7% of participants while waist circumference was abnormally high in 96.3% of females and 64.7% of males. Serum creatinine level was controlled in 60% of patients. Significant correlations with HbA_{1c} were registered for BMI (p-value 0.038) and serum creatinine (p-value 0.04). Patients showed limited knowledge on diabetes, its complications and exercise but were better informed on nutrition and smoking. Inappropriate eating habits were evident among participants while better behaviour was demonstrated in relation to the adherence to medication, physical activity and smoking.

Conclusion: The framework for structured care is in place at the primary healthcare centres and compliance with process measures was confirmed. The present local care is based on good practice and is compatible with that provided in developed countries. However the health status of these patients is under imminent threat by a cluster of risk factors. This necessitates improvement in all components of present care while additional efforts must address the inadequacies in cardiovascular risk and lifestyle management.

Key words

type 2 diabetes management, lifestyle, diet, patient education, self-care

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Introduction

Diabetes is a chronic condition with significant morbidity and mortality which can be reduced by effective treatment and preventive measures.[1,2] Experts claim that the management of this condition in primary settings can achieve outcomes as good as or better than follow-up at hospitals.[3,4] Structured care addressing all risk factors and complications remains the essential framework for the management of type 2 diabetes at primary care level.[5,6]

International bodies have issued clear statements of what is considered as effective management of this condition while guidelines including standards and target values for all components of care are available.[7-9] Audits based on these standards reflect directly the clinical outcomes for patients with type 2 diabetes while providing information about the quality of care being delivered.[10,11] Ultimately audits lead to improvements by helping practices choose areas on which

Table 1: *Distribution of occupations*

Occupation	Percent %
Housewives	36.4
Crafts and Trade	18.2
Service and Sales workers	17.3
Plant and Machine operators	9.1
Professionals	4.5
Alimentary	3.6
Clerks	3.6
Agriculture and Fisheries	2.7
Technicians & Associate Professions	1.7

to focus while discouraging them from applying unnecessary investments in other areas.[12]

In Malta diabetes has long been recognised as a major health problem. Moreover prevalence of diabetes and its risk factors is on the increase with projections indicating a huge toll on the patients, their families as well as the healthcare system[13] [14]. Collecting and analysing key clinical information is the stepping stone towards evidence-based improvements of type 2 diabetes care provided from the primary healthcare centres. Better management at this level will prevent or delay long-term complications, improve the lives of people living with type 2 diabetes and reduce costly emergency hospital admissions.[15-17]

Purpose

This audit intends to improve disease control of type 2 diabetes in Malta by proposing more effective management of these patients at primary care level.

Table 2: *Present treatment*

Treatment	Percent %	n value
Diet 99.1 98		
Hypoglycaemic agents	70.9	98
Antihypertensive drugs	40.0	98
Lipid lowering drugs	23.6	98
Aspirin	10.4	98

Objectives

- An evaluation of the clinical outcome of type 2 diabetes care currently provided at the diabetes clinic in the primary healthcare centres.
- Assessment of knowledge, behaviour and attitude of these patients as part of the evaluation of care.

Population

Type 2 diabetes patients followed up at the diabetes clinic.

Inclusion criteria

All type 2 diabetes patients attending the diabetes clinic in the primary healthcare centres.

Exclusion criteria: Patients with severe mental impairment were excluded in view that the project was assessing issues related to knowledge and behaviour.

Sampling and Recruitment

At significance level 0.05, 80% power and expected difference of 1 % in the mean of HbA_{1c}, sample size was calculated to be approximately 50 participants in each clinic. Due to ethical considerations convenience sampling was employed in this project. During the audit period all type 2 patients attending at the diabetes clinic were invited by the nurse to participate in

Table 3: *Frequency results for the physiological parameters expressed as percentage of the total number of patients included in the analysis*

	Overall	Mosta	Paola	p value	n value
FBG 6mmol/l or less	9.1	1.8	16.4	0.008	98
HbA1c 6. 5 % or less	37.3	38.2	36.4	0.844	98
Systolic 130 mmHg or less	45.5	60.0	30.2	0.002	98
Diastolic 80 mmHg or less	65.5	69.1	61.8	0.423	98
Cholesterol 5 mmol/l or less	30.0	30.9	29.1	0.835	98
Triglyceride 2. 3mmol/l or less	75.5	78.2	72.7	0.506	98
LDL 2. 5 mmol/l or less	10.9	9.1	12.7	0.541	98
BMI of 25. 0 or less	27.3	21.8	32.7	0.433	98
WC 94cm M , 80cm F or less	(M) 35.7	36.4	34.9	0.634	98
	(F) 3.7	4.4	3.1		98
Creatinine 84 mmol/l or less	60.9	67.3	53.7	0.147	98
Proteinuria negative	97.0	96.4	97.2	0.674	98

the study. Only two patients failed to attend for their scheduled appointment while the rest willingly accepted to be involved.

Methods

During the first two weeks of February 2007 a clinical audit was carried out in the two major primary healthcare centres namely Mosta (MHC) and Paola (PHC). The diabetes clinic in both centres is identically organised to deliver the care recommended by the Diabetes Department. The nurse at the diabetes clinic performed all measurements of the clinical parameters and assisted participants in the completion of the questionnaire.

The blood pressure was measured using a mercury sphygmomanometer and an appropriately sized cuff depending on arm size. Blood pressure was taken after sitting for at least 5 minutes, with arm at heart level using first and fifth phases of Korotkoff sounds.[7] Body height and weight were taken without shoes and outer garments. Body weight was recorded in kilograms and grams by a balance while height was measured in centimetres using a wall mounted metric chart. Waist circumference (WC) in centimetres was taken without garments using a measuring tape half way between the lowest point of the rib cage and the iliac crest.[18] Proteinuria was assessed using dip sticks available in the diabetes clinic.

Patients attending the diabetes clinic have blood investigations performed one week before their visit. The samples are submitted for the biochemical assessment of fasting blood glucose, HbA_{1c}, serum creatinine, fasting total cholesterol, triglyceride, LDL and HDL. Recent results of within one week were therefore accepted for auditing purposes. Those patients who failed to have recent results were given a next day appointment for blood investigations.

A standardised and structured questionnaire was developed to quantitatively measure knowledge, behaviour and attitude among the participants as part of an audit process (see Appendix 1). The literature review provided exact operational definitions with quantified criteria and threshold levels for the assessment of these three variables in relation to:

- The control of diabetes, its complications and adherence to treatment[7,18]
- Frequency and degree of physical activity [7,9,19]
- Quality and quantity of food and frequency of meals[8, 18, 20-22]
- Smoking habits[7]

Validity and Reliability

Instruments were tested and training was provided to the two participating nurses to minimize measurement errors between and within observers. All blood investigations were analysed at the Pathology Department in St Luke's Hospital (SLH).

A search in various databases including the ProQolid, BMJ, The Michigan Diabetes Research and Training Centre and the Cochrane Database provided a number of questionnaires that addressed knowledge, behaviour and attitude among diabetes patients separately while none were in Maltese. The available questionnaires were lengthy tackling each variable in great depth. These tools were considered inappropriate by the researcher. For auditing purposes the questionnaire had to asses all three variables in a reasonable timeframe. Therefore a questionnaire also sensitive to the local context was developed.

A panel of experts was involved in the development and validity of the questionnaire. Two consultant diabetologists, two nutritionists and two general practitioners reviewed the tool for its content validity in accordance with Parahoo's[23] guidelines. The statistician provided advice as to the response format of the questions.

Once consensus was reached the tool was tested in a pilot study. In the meantime the study also had a strong criterion-related validity element since the outcome of the questionnaire measuring issues of nutrition and exercise were concurrently compared to other physiological observations namely BMI and WC.[24]

Table 4: *Mean values for the physiological parameters in the audit population*

Parameters IDF Standards	*Mean values*	*Standard deviation*	*n value*
FBG 6mmol/l	9.56mmol/l	2.87	98
HbA1c 6.5%	7.32%	1.54	98
Systolic 130mmHg or less	138mmHg	16.13	98
Diastolic 80mmHg or less	82mmHg	9.21	98
Cholesterol 5mmol/l	5.54mmol/l	1.00	98
Triglyceride 2.3mmol/l	1.79mmol/l	0.93	98
LDL 2.5mmol/l	3.49mmol/l	0.86	98
BMI 25.0 or less	27.9	4.43	98
WC M 94cm or less	99.5cm	11.9	98
F 80cm or less	100.0cm	11.3	98
Creatinine 84mmol/l or less	81.3mmol/l	30.42	98
Proteinuria negative	NA	NA	98

The pilot study for the questionnaire consisted of three main phases. The questionnaire was first piloted among two nurses and two general practitioners for possible spelling and other language difficulties. The second phase involved ten patients attending the diabetes clinic at Rabat Health Centre. At this stage the phrasing of some questions had to be amended. Reliability testing took place in the third phase. The first reliability test gave a Cronabach alpha of 0.53 but on paired Wilcoxin two questions were identified to have significant difference. These questions tested knowledge where patients were originally given two response options, 'yes' or 'no'. As advised by the statistician the tool was amended to include the third option 'do not know' for all knowledge questions thus avoiding false positives precipitated by simple guesses. The first reliability test had a time-lapse of 3 weeks between the two readings. During this time and triggered by the questionnaire, 2 participants sought professional advice from a nutritionist thus also compromising the reliability of the test. The second reliability test with the amended version rendered a Cronabah alpha of 0. 81 and was accepted as the tool to be used in the audit. In the meantime some sensitivity markers were included to ensure that questions are being correctly interpreted. The nurses were trained on how to assist patients in completing the questionnaire. This questionnaire was accepted by The University of Ulster as a tool to asses Knowledge, Behaviour and Attitude among Type 2 Diabetics in Malta.

Ethical considerations

This project had the approval of the University of Malta Ethical Research Committee. Authorisation was obtained from the Department of Primary Healthcare and the administrators at the two health centres participating in the audit. Signed consents were acquired from the nurses involved in this research as well as the patients.

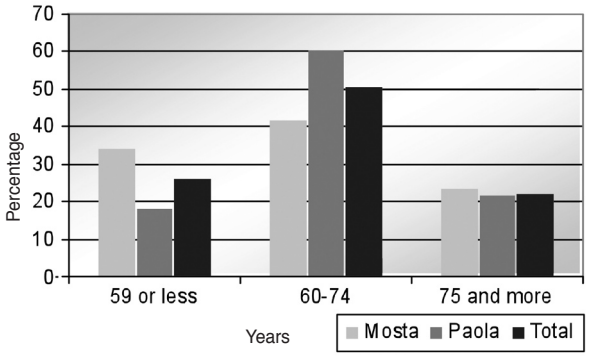
Results

The SPSS programme version 15 was used for statistical analysis of the data. Significant differences were identified with p-values of less than 0.05 and confidence intervals of 95%.

Demographic Data

The audit was based on the results of 110 patients equally divided between Mosta 50% and Paola 50%. On the day of the audit blood investigations were readily available for 94% of participants. The rest were referred for the necessary blood tests.

Figure 1: *Age group distribution*



Age groups distribution included 59 years or less 26.4%, 60-74 years 50.9%, and 75 years or more 22.7% (Figure 1). Gender consisted of 48.1% Males and 51.9% Females. Housewives composed the largest group of participants followed by the categories of manual workers (Table 1). The average school leaving age was approximately at 14 years.

These patients have been aware of their condition for a period ranging between 2 and 40 years (Mean 10.55 years). The mean duration since the previous visit at the diabetes clinic was 24 weeks (Range 8—29 weeks). Over 50% of participants suffer from hypertension and a considerable amount (38%) from dyslipideamia. Table 2 indicates the present treatment of participants including diet (99.1%), oral hypoglycaemic agents (70.9%) and other drugs for related medical conditions.

Physiological parameters

The IDF[7] 'gold' standards were employed in this audit and the overall results are shown in Table 3 and 4. HbA_{1c} was controlled at levels equal to or lower than the standard 6. 5% in 37.3% of patients (Mean HbA_{1c} 7.32%). Systolic blood pressure was controlled in 44. 5% of patients while over two thirds of patients had a controlled diastolic blood pressure (80mmHg). The blood cholesterol level was within the accepted range (standard 5mmol/l) in 30% of patients (Mean 5.54mmol/l) and LDL values were higher than the 2.51mmol/l standard in 89.1% of patients. Further analysis showed that 70% of dyslipideamia cases were not on any lipid lowering treatment. The amount of untreated cases rose to 82% in the youngest age group.

BMI of 25 or less was registered in 27. 3% of subjects while 44. 5% were overweight weight and 28. 2% were obese (Figure 2). The mean BMI for this population was 27.3. Measurements of

Table 5: *Mean scores for knowledge, behaviour and attitude*

Statistic value	*Overall*	*Mosta*	*Paola*	*p value*	*n value*
Knowledge	71.06%	74.1%	64.3%	0.000	98
Behaviour	84.11%	85.4%	82.6%	0.595	98
Attitude	95.2%	94.8%	95.5%	0.597	98

p values equal to or less than 0.05 are statistically significant, values above 0.05 are non-significant

Figure 2: Results distribution of BMI

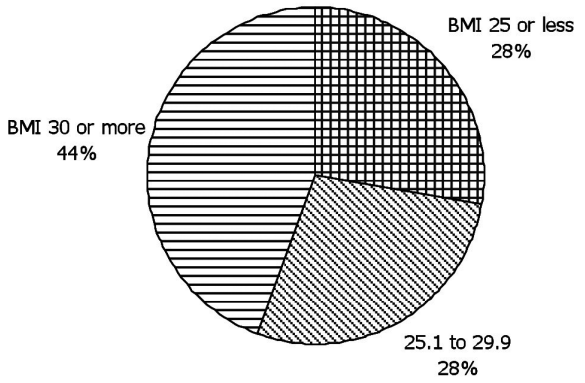
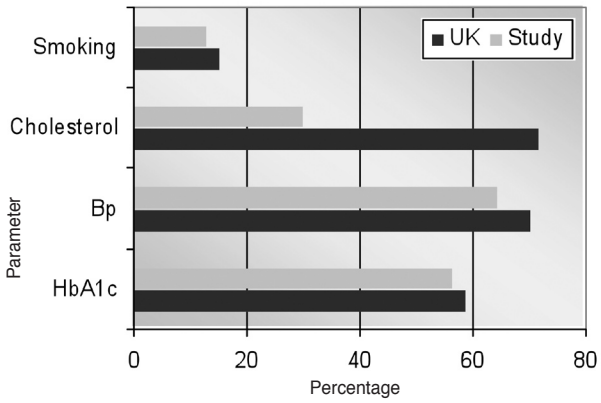


Figure 3: Comparisons between local project data and UK QOF 06



waist circumference were abnormally high in 96.3% of females and 64.3% of males (standard WC values; Males 94cm, Female 80cm). The mean WC for females was 100cm. Creatinine levels were below the threshold 84mmol/l in 60.9% of participants and 3% of the total patients tested positive for proteinuria.

Pearson test confirmed the correlation between HbA_{1c} and fasting blood glucose (p = 0.0001) and with serum creatinine (p=0.04). Independent Samples T-test carried out for normal and abnormal BMI and HbA_{1c} was significant at p-value 0.038. Multivariate analysis once again showed strong correlations of HbA_{1c} with FBG (p-value 0.0001) and with serum creatinine (p-value 0.031).

Knowledge, Behaviour and Attitude

More than half the participants (55%) were unable to give a correct approximate value for fasting blood glucose level. Patients were assessed on their knowledge regarding diabetes complications. High correct scores were obtained for ophthalmic (91.8%), cardiac (74.5%), renal (72.7%) and peripheral vascular complications (85.5%). Most respondents believed incorrectly that diabetes causes arthritis (83.6%) and asthma (66%). One in every two participants (54%) did not know the amount of physical activity they should be doing. The great majority of participants (90%) were aware that blood sugar level is affected by the type of food and the quantity of food or portion size in their diet. Participants were asked to indicate how healthy a number of food items are. The answer was correct for bread, pasta, potatoes, fish, grapes and chicken in over 90% of subjects. Low correct scores (below 50%) were obtained for cereals and rice. Most subjects (83.6%) incorrectly believe that they can eat unlimited amounts of oranges and apples. Almost all patients (94%) knew that smoking complicates diabetes.

Full adherence to medical treatment was claimed by 97.5% of participants. Over 75% of patients indulge in physical exercise of adequate frequency and duration while 90% described a good meal pattern. Appropriate intake of butter, fish, red meat, eggs, soft cheese, sweets, fruit and vegetables was shown by 90% of participants. Approximately 40-45% over indulge in pasta and potatoes. A significant amount of participants do not include cereals (59.1%) and rice (64.5%) in their normal diet. About 87% of subjects were non-smokers.

Almost all respondents (95.9%) demonstrated concern as regards physical exercise, calorie/portion control, weight control and smoking habits. About 40% of participants are mainly preoccupied with their diet and 41% try primarily to focus their efforts on exercise. Only 16% consider their bodyweight as their main concern. From a total of 17 smoking participants 35% show no intention to stop their habit.

Variation between Locations

Analysis for possible significant variation by location was performed using Chi-Square Tests incorporated in the SPSS. Table 3 illustrate the results of the physiological parameters. Table 5 compare the mean scores in the two locations as well as the overall mean for knowledge, behaviour and attitude. Variables with statistical significance are being reported in this section.

The variation between the two clinics was significant for fasting blood glucose levels at p-value 0.008 with Mosta presenting a smaller percentage of controlled cases. A significant difference at p-value 0.002 was shown for blood pressure measurements whereby a higher percentage of uncontrolled blood pressure cases were deducted at Paola. T-test also showed significant variation for knowledge (p- value 0.0001) and behaviour (p-value 0.0001) with patients from the Mosta clinic registering more correct scores. PHC had a significantly larger female representation in age group 60-74 years than in MHC (p-value=0.009). No significant differences were elicited in the duration of illness, duration from last visit and education level.

Audit according to the UK Diabetes QOF Criteria

When analysed with the more lenient United Kingdom QOF targets[26], the percentages of controlled cases rose to 56. 4% for HbA_{1c} (Target 7.4%) and 64.5% for systolic blood pressure (Target at 145mmHg). Figure 3 illustrates the comparative analysis of the data from this audit with the QOF outcome in 2006. Results show less control on HbA_{1c}, blood pressure and more markedly in the cholesterol levels among participants in the study. There are fewer smokers among people with diabetes locally.

Discussion

Health Status and Clinical Outcome

Two thirds of participants have inadequate control of HbA_{1c} with levels above the 6.5% IDF threshold. Contrastingly, analysis based on the QOF criteria resulted into a more positive picture with HbA_{1c} in the majority of cases below the target 7.4%. However both the mean HbA_{1c} for the population under study as well as the QOF target are above the 7.0% which is the cut off level shown to correspond directly to future incidence of diabetic complications[16 27]. The majority of participants are hypertensive according to the IDF standards. About two from every three participants have concurrent dyslipideamia and most are overweight demonstrating that in general patients are suffering from the metabolic syndrome[32]. The renal function in patients attending the diabetes clinic is well preserved while evidence indicates that screening for renal impairment is being performed.

Knowledge, Behaviour and Attitude

After average illness duration of 10 years more than half the patients still do not know what their fasting blood glucose level should be. The only complications they are aware of involve those that form part of the care being provided by the diabetes clinic otherwise patients are burdened by several misconceptions. There is also lack of information concerning physical activity. In contrast participants are better informed on the current trends in nutrition. In fact their nutrition knowledge in relation to the local cuisine is impressive. Diabetes UK[26] declares that the day-to-day responsibility for diabetes management rests with the individual living with diabetes and his/her family, a challenge that is enabled and supported by information and education. Piette[28] explains that self-care can only be possible if patients possess knowledge on all aspects of their condition, risk factors, complications and management. The knowledge limitations of these patients as revealed by the audit therefore should not be overlooked.

Barriers to knowledge can arise from inadequacies in the organisational interventions[37], health care professionals or providers[29 30] or patients[31]. It was not the purpose of this study to investigate the underlying causes of such limitations. However the education level among participants does not seem to be the problem. Based on the age distribution of the sample, the schooling system in Malta at the respective period and the data from the school leaving age, the absolute majority of patients have acquired secondary education. Moreover there was no correlation between the education level and the HbA_{1c} of participants. Consequently it can be assumed that the educational interventions available for these patients are incomplete even perhaps inadequate in the circumstances.

While participants are reasonably well informed on the latest dietary recommendations, analysis produced some contrasting evidence when it comes to their eating habits. For instance participants overindulge in pasta and potatoes even though they are aware that these food items should be consumed in moderate amounts. The BMI and waist circumference results also strongly suggest overindulgence in food irrespective of the positive scores obtained in the diet knowledge section. The knowledge-behaviour divide is highly evident among the participants and this outcome is consistent with that reported in other countries[28 33 34]. The significant difference registered for knowledge but not for behaviour between the two locations is interesting and provides additional evidence of the knowledge-behaviour gap. Being knowledgeable and having the correct attitude towards nutrition is not enough for these patients since they have not undergone the necessary changes in their eating habits. Diabetes UK[26] and Piette[28] explain that patients need different level of support at different times to ensure ongoing healthy lifestyles. It is clear that the patients attending the diabetes clinics require additional support beyond the dissemination of dietary information

Marrero et al.[31] argue that patient-based problems are significant barriers to proper nutrition. Lack of personal interest to regulate diet was identified as the most common underlying cause and less frequent is the lack of knowledge. Both explanations can be applied to the local context. Results concerning cereals and rice suggest that lack of knowledge may be the underlying reason for their limited inclusion in the patients' diet even though these food items are considered to be very healthy[35]. Personal or cultural food preference seems a more plausible reason for the overall eating pattern in view of the results obtained with pasta and bread. Evidently more research is indicated to analyse the eating behaviour and nutritional preferences among the local patients. In the meantime it is encouraging to note that most patients are more compliant when it comes to their medication and participate more in physical exercise.

According to the high positive responses registered in the attitude section, patients acknowledge the risk factors associated with their lifestyle. Efforts are being made when it comes to diet and exercise. On the contrary only about 1 in five patients seem preoccupied by his or her body weight even though obesity can be considered as a universal problem among participants.

Type 2 diabetes patients in this audit have shown serious limitations in their knowledge and displayed inappropriate

behaviour vis-à-vis their chronic condition. Limitations in knowledge and behaviour contribute to poor control of the illness thus exposing patients to greater risks of complications.[18,28,34]

Variation between locations

The clinical outcome between the two locations has shown very little variation indicating that the type of care provided is quite uniform. The difference in the FBG levels between the two locations was not supported by variation in the HbA_{1c} levels, the latter being the international accepted parameter of glycaemia control.[7] A significant difference for systolic blood pressure was registered between the two locations. In depth analysis showed a considerable larger representation of females aged between 60 and 74 years at Paola (Table 6). According to the National Health Survey[25] the prevalence for hypertension among Maltese females (40.1%) in this particular age group rises sharply and doubles that for females in any other age groups while it is also twice as much as that for males in this same age group. It is therefore possible that the demographic difference in the samples have precipitated the difference in systolic readings.

The only other variation between the two health centres concern knowledge. There was no difference in the school leaving age between the two locations and no correlation between education level and blood glucose control. There was also a lack of correlation between gender and age with HbA_{1c}. Hence the difference in knowledge can be due to differences in the education interventions at the two clinics.

Evaluation of the structured care

The audit revealed that in the major health centres the framework for structured care is in place and good compliance for all process measures was evident. Patients are followed-up at the diabetes clinic with regular review of all physiological parameters including the screening for risk factors and complications. According to the IDF[7] criteria, the over all service can therefore be classified as 'Standard' meaning that care is being delivered from a well-developed and well-resourced service base.

Table 6: *Gender distribution by age, group and location*

Age	***% females***		***% males***	
	Mosta	***Paola***	***Mosta***	***Paola***
59 or less	37.0	11.1	32.1	25.0
60-74	37.0	77.8	46.4	42.0
75 or more	25.9	11.1	21.4	32.1

In the meantime it is the health status and clinical outcome that reflects the effectiveness of the care delivered from these clinics. Comparison of the clinical picture with that of the UK where a similar framework is in place provides encouraging results. The level of performance registered in the management of blood glucose and blood pressure has been described as amongst the current best quality of care available for people in the UK.[10] However the local patients are under threat from a cluster of risk factors and evidence has shown that the concurrent presence of risk factors has a synergistic negative effect on the health of these patients.[16,7,32,38] In this particular local clinical scenario a high level of clinical effectiveness in all physiological components is mandatory and care should aim towards the more ideal IDF targets.

Therefore control on most of the clinical parameters namely glycaemia, blood pressure and serum profile is insufficient. While 70% of patients are on oral hypoglycaemic agents, HbA_{1c} level in two thirds of participants is still exceedingly high. A tighter control in blood pressure is also more desirable in the circumstances and a significant portion of hypertensive patients are not on any treatment. Studies[32,38] and guidelines advice statins for all people over 40 years of age with diabetes even without the assessment of cardiovascular risk.[7-9]. Management of these cardiovascular risk factors locally seem to differ greatly from such recommendations and 70% of patients with dyslipideamia are on not being treated. In view of the disturbing body weight and waist circumference results among participants, the components of care that should be addressing body weight and nutrition are highly debatable.

Limitations of the Study

Stratified randomisation sampling would have provided a more robust framework for the discussion and conclusions. Due to ethical considerations convenience sampling was employed in this project. To overcome possible limitations analysis was extended for more in-depth information when indicated.

Patients in possession of knowledge may have introduced bias by giving false positive response in the behaviour section of the questionnaire. Assessing and quantifying the amount of food intake in the questionnaire proved difficult since this element is quite subjective. A more qualitative approach based on observations could have been considered. However the physiological parameters BMI and WC provided triangulation of data to support the behavioural analysis.

Due to resources limitations the audit was performed at Mosta and Paola health centres. Results and conclusions are specific to the diabetes clinic in these health centres. One must note that the participating health centres are the two major centres with the largest populations represent the north and the south geographical catchment areas of the island.

Type 2 diabetes patients who are only seen by general practitioners in the private sector were not represented in the sample. The sample included patients that attend the diabetes clinics so results can only be extended to this specific population. However situations of shared care are very likely to be present.

Conclusion and Recommendations

The diabetes clinic at the primary care setting is delivering type 2 diabetes structured care that is compatible to that provided in other developed countries. The health status of type 2 diabetes patients is under imminent threat by the concurrence of various risk factors with overweight and dyslipideamia being the most predominant. In this particular clinical scenario tighter control is essential on blood glucose and blood pressure levels while cholesterol, LDL and body weight management demand serious consideration. These patients showed limitations in their knowledge and have failed to do the correct lifestyle changes in the context of type 2 diabetes. Therefore improvements in all components of present care are indicated while additional investments must target cardiovascular risk factors, body weight and lifestyle management.

The introduction of clinical guidelines for type 2 diabetes care at the Healthcare Centres can improve the management and outcome of all components of care. Clinical guidelines will ensure protocol driven care, provide tools for clinician to assess care and have been shown to enhance clinical effectiveness.

The magnitude of the obesity problem and the discrepancies in lifestyle management justify the need of a multifaceted strategy. Such a strategy must aim at strengthening both the educational and behavioural components of care, involve professional educator and nutritionist as part of the multidisciplinary team at primary care level and include different forms of interventions.

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Code: .....

Appendix 1 Questionnaire

An assessment of the knowledge, attitude and behaviour regarding self-care of type 2 diabetes

Please tick (√) the right answer or tick the correct box

Diabetes and Treatment

1. How long have you been aware of your diabetes? (D) ..... years

2. What approximately should your fasting blood glucose level be? (K)

(a) ..... (b) Do not know ☐

3. What kind of health problems can you get with diabetes? Tick appropriate box or boxes (K)

	Yes	No	Don't know
(a) Asthma			
(b) Poor circulation of the feet and hands			
(c) Heart attack			
(d) Back pain			
(e) Eye problems			
(f) Bronchitis			
(g) Kidney problems			
(h) Arthritis			

4. Are you on any medication as part of your diabetes care?(D)

(a) Yes ☐ (b) No ☐

5. How many times you miss on your medication as instructed by the doctor? (B)

Never	
Rarely	
3 times or less in a week	
3 times or more in a week	

Physical Activity

(Brisk walking, aerobics, fitness, swimming, gym work out and exercises)

6. 6. Do you think physical exercise is important for a person with diabetes? (A)

(a) Yes ☐ (b) No ☐ (c) Don't know ☐

7. How many times during the week do you take part in physical exercise? (B)

Never	
Rarely	
3 times or less	
3 times or more	

8. How much time you spend in every session of this physical activity? (B)

Approx 15 min	
Approx 30 min	
Approx 45 min	
60 minutes or more	
Don't know	

9. What should be the least amount of physical activity that you do every day? (K)

Approx 15 min	
Approx 30 min	
Approx 45 min	
60 minutes or more	
Don't know	

Body Weight and Diet

10. Does the type of food in your diet effects your blood sugar level? (K)

(a) Yes ☐ (b) No ☐ (c) Don't know ☐

11. 11. Does the amount of food/ portion size affect your blood sugar level? (K)

(a) Yes ☐ (b) No ☐ (c) Don't know ☐

12. Do you count your calories of food in your diet? (B/A)

(a) Yes ☐ (b) No ☐

13. Do you try to control your weight? (A)

(a) Yes ☐ (b) No ☐

14. Which of these meals do you have during the day? (B)Tick all the relevant boxes

Breakfast	
Lunch	
Dinner	

15. How many times do you snack between these meals? (B)

1-2	
3 or more	
Rarely	
Never	

16. How healthy are these food for your diabetes? (1=least, 2=moderate, 3=more healthier than other food) (K) Tick the appropriate boxes

	Low	Moderate	More than other food
(a) Rice			
(b) Chocolate			
(c) Cheesecakes			
(d) Fish			
(e) Cereal			
(f) Fresh grapes/figs			
(g) Oranges and apples			
(h) Pasta			
(i) Fruit juice			
(j) Light yogurt			
(k) Bread			
(l) Soft cheese			
(m)Chicken			
(n) Potatoes			
(o) Vegetables			

17. How many times during the week do you consume this type of food? (B)

Food Group	Number of days during the week			
	Never	Rarely	2 or less	More than 3
(a) Rice				
(b) Pasta				
(c) Potatoes				
(d) Fish, poultry, rabbit				
(e) Alcohol				
(f) Soft butter, margarine				
(g) Eggs				
(h) Soft cheese				
(i) Red meat				
(j) Sweets, biscuits				
(k) Cereals				
(l) Vegetables				
(m) Fruits				
(n) Soft drinks (not diet), fruit juices				

Smoking

18. Do you smoke?

(a) Occasional/Regular ☐ (b) Never ☐

19. Does smoking affect your diabetes? (K)

(a) Yes ☐ (b) No ☐ (c) Don't know ☐

20. If you do smoke, do you intend to stop? (A)

(a) Yes ☐ (b) No ☐

21. Which of these you think can affect your diabetes more? (A) (Mark in order of priority 1 most important, 5 least important)

a. Smoking	b. Weight	c. Diet	d. Alcohol	e. Excercise

General Information

22. Age ..... years

23. Gender

(a) Male ☐ (b) Female ☐

24. At what age did you finish your schooling? ..... years old.

25. What is your occupation?

.....

26. When was your last visit to this Diabetes Clinic? ..... weeks

Thank you very much for your participation and cooperation