IMPACT OF PHARMACIST ADVICE ON METABOLIC SYNDROME

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Abstract

OBJECTIVES The aim of this study was to determine the effect of pharmacist intervention on lifestyle modifications and pharmacological treatment in overweight and obese patients suffering from metabolic syndrome.

METHOD Patients were recruited from the community setting according to the International Diabetes Federation definition inclusion criteria for metabolic syndrome. Anthropometric and biochemical tests were performed at baseline (t=0). Patients were assessed for medication compliance, occurrence of side-effects, lifestyle and risk factors using a questionnaire. Patients were re-assessed three months after pharmacist intervention (t=1).

KEY FINDINGS A total of 35 patients participated in the study. Following pharmacist intervention there was a statistically significant improvement in compliance to medications (p=0.005) and statistically significant reduction in occurrence of side-effects (p=0.009), weight (p=0.005), waist circumference (p=0.000), body mass index (p=0.005), fasting blood glucose (p=0.015), total cholesterol (p=0.001) and triglyceride (p=0.000) levels.

CONCLUSION Pharmacist intervention improved patient motivation to change their lifestyle. Pharmacists can play an important role in the management of metabolic syndrome.

KEYWORDS Lifestyle Modifications, Medication Compliance, Metabolic Syndrome, Pharmacist Intervention, Side-Effects

Introduction

Metabolic syndrome is a major health threat and public health challenge causing a financial burden globally. It is associated with a five-fold increase in type 2 diabetes mellitus (T2DM) and a two-fold increase in cardiovascular complications.[1] The primary cause of metabolic syndrome is obesity. Obesity causes insulin resistance or hyperinsulinaemia, which in turn results in activation of the sympathetic nervous system and an increase in appetite and over-eating. It also exerts negative actions on the cardiovascular and renal systems, resulting in hypertension. Hyperinsulinaemia enhances predisposition to T2DM and hypercholesterolaemia.[2]

Various institutions have defined metabolic syndrome, however the one most commonly used is the International Diabetes Federation (IDF) definition which states that obesity is a criterion to classify patients as suffering from metabolic syndrome. Obesity is measured using waist circumference (WC), however if body mass index is > 30 kg/m² central obesity can be assumed and WC measurement is not required. This definition also states that patients also need to be suffering from two of the following conditions namely raised triglycerides, reduced high-density lipoprotein cholesterol (HDL-C), raised blood pressure (BP) and/or raised fasting plasma glucose (FBG) and are receiving treatment for these conditions.[3]

The aim of this study was to determine the effect of pharmacist intervention on lifestyle modifications and pharmacological treatment in overweight and obese patients suffering from metabolic syndrome.[1]

Method

Approval from the University of Malta Research Ethics Committee was granted. Thirty-five patients were recruited by means of posters displayed in prominent places at a community pharmacy clinic and using flyers which were personally distributed to obese patients. Informed consent was obtained from each patient prior to pharmacist intervention. The inclusion criteria were: WC ≥ 94cm in males and ≥ 80cm in females and suffering from two or all of the following conditions, namely T2DM, hypertension and hypercholesterolaemia, according to the IDF definition.

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During the pre-intervention (t=0), a questionnaire was administered to patients to collect information about medical check-ups and medication-taking patterns, occurrence of side-effects, self-monitoring of blood pressure (BP), blood glucose and cholesterol, family and social history as well as dietary and exercise patterns. Patients' anthropometric and biochemical parameters were measured. WC and height measurements were taken using a measuring tape, with WC measured mid-way between the lower margin of the last palpable rib and the top of the iliac crest. Weight was recorded using the Beurer® BF Limited Edition 2013 electronic scale. The point-of-care (POC) Beurer® BM 55 BP monitor was used to obtain systolic and diastolic BP and pulse readings. The POC AccuTrend® Plus device was used to quantitatively measure blood triglycerides (TGs), blood total cholesterol (TC) and fasting blood glucose (FBG). Subsequently pharmacist intervention was undertaken by the investigator (SLM) where patients were advice on diet and exercise was provided and information booklets on metabolic syndrome, cardiovascular diseases, cholesterol, diabetes, diet, exercise and obesity were given to patients.

After three months, the patients were contacted by telephone and a post-intervention appointment was set (t=1). A questionnaire to assess change in treatment and lifestyle since the first intervention was administered. Measurement of anthropometric and biochemical parameters was repeated using the same equipment. Statistical analysis was performed with IBM SPSS® version 20. The chi-square (X^2) test was used to assess the association between two categorical variables, the paired-sample t-test was used to compare the pre- and post-intervention results, the independent sample t-test was used to compare mean parameter scores between the two groups clustered by age or gender, and the Pearson correlation test was used to measure the strength of the relationship between any two anthropometric and/or biochemical parameters. A p value less than 0.05 was considered statistically significant.

Results

Out of the total 35 patients recruited, 31 were female and 4 were male. The mean age was 70 years, ranging from 41 to 86 years. The most common combination of metabolic syndrome components was hypertension and dyslipidaemia (n=18), followed by hypertension, diabetes and dyslipidaemia (n=9), hypertension and diabetes (n=6) and diabetes and dyslipidaemia (n=2). The most common medication prescribed for hypertension, dyslipidaemia and T2DM was perindopril (n=19), simvastatin (n=21) and metformin (n=16) respectively.

Prior to pharmacist intervention 14 out of the 35 patients experienced side-effects, where 9, 7 and 10 patients reported side-effects from their hypertension, T2DM and dyslipidaemia treatment respectively. Side-effects reported in patients suffering from hypertension included dizziness (n=4), increased frequency of urination (n=4) and swollen ankles (n=5). Patients on treatment for hyperglycaemia reported diarrhoea (n=5) and patients on treatment for dyslipidaemia reported musculoskeletal-related side-effects, including muscle weakness (n=4), muscle cramps (n=3) and muscle pain (n=3). After pharmacist intervention, 10 patients claimed to have stopped experiencing side-effects. The X^2 test showed a p-value of 0.009, implying that pharmacist intervention decreased incidence of side-effects (Table 1).

Number of patients experiencing side-effects at t=0		Number of patients experiencing side-effects at t=1	
Yes	No	Yes	No
14	21	4	31
$X^2(1)=6.774$, $p=0.009$			

Table 1: Comparison of side-effect occurrence before (t=0) and after (t=1) pharmacist intervention (N=35)

Number of patients compliant to medication at t=0		Number of patients compliant to medication at t=1	
Yes	No	Yes	No
20	15	30	5
$X^2(1)=7.778$, $p=0.005$			

Table 2: Comparison of medication compliance before (t=0) and after (t=1) pharmacist intervention (N=35)

Parameters	t=0 (mean ± SD)	t=1 (mean ± SD)	p-value
Weight (kg)	78.65 ± 18.81	77.43 ± 18.26	0.005*
BMI (kg/m^2)	31.37 ± 6.78	30.84 ± 6.30	0.005*
WC (cm)	104.34 ± 11.49	98.11 ± 11.33	0.000*
SBP (mmHg)	151.61 ± 23.10	147.30 ± 18.43	0.075
DBP (mmHg)	89.86 ± 11.30	88.13 ± 12.52	0.224
FBG (mmol/L)	5.45 ± 1.61	4.89 ± 1.61	0.015*
TC (mmol/L)	5.39 ± 0.9	5.05 ± 0.90	0.001*
TGs (mmol/L)	1.73 ± 1.13	1.45 ± 1.09	0.000*

*p-value < 0.05 is considered statistically significant; SD: Standard Deviation

Table 3: Comparison of anthropometric and biochemical parameters before (t=0) and after (t=1) pharmacist intervention (N=35)

Mean weight, BMI, WC, FBG, TC and TGs decreased significantly in all patients after pharmacist intervention

As regards medication compliance, before pharmacist intervention 15 patients stated that they rarely or occasionally miss a dose of their medication. The most common reasons for missing a dose were forgetfulness (n=11) and feeling well with or without medication (n=2). Patient compliance to medication increased post-pharmacist intervention since the number of patients who stated that they miss a dose decreased to 5 (p=0.005) (Table 2). The anthropometric and biochemical findings are compared in Table 3. Mean weight, BMI, WC, FBG, TC and TGs decreased significantly in all patients after pharmacist intervention. The mean readings for systolic and diastolic BP decreased after pharmacist intervention, however improvement was not statistically significant (p>0.05).

Discussion

A study conducted by Tavares et al., stated that compliance to medications tends to be lower in patients with a higher number of comorbidities, especially elderly patients.[4] Most patients who claimed to miss medication doses in this study claimed to do so due to forgetfulness (n=11). Given the age of the participants, cognitive impairment is expected. Tavares et al., stated that older people were found to be less compliant to their treatment due to forgetfulness and complicated dosage regimens.[4]

Occurrence of side-effects decreased significantly after pharmacist intervention, indicating that pharmacists could have an important role in advising patients on how to reduce and manage their side-effects. With their knowledge and expertise in pharmacology, pharmacists are in a position to effectively manage patients to reduce side-effects and increase medication compliance, improving quality of care. Furthermore, the findings indicate that pharmacists have an important role in promoting lifestyle changes through patient education and advice.

This study is limited by the small sample size and challenges in patient recruitment since testing was invasive. Questionnaire responses may not be accurate since they depend on truthfulness of patients.

Conclusion

The findings indicate that pharmacists are in a position to play an important role in the management of patients suffering from metabolic syndrome through provision of advice and education about their disease states, beneficial effects of pharmacological treatment, side-effects which can be expected and their prevention and effective management, as well as on lifestyle modifications. Pharmacists have the potential to reduce morbidity and mortality in patients suffering from metabolic syndrome.

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