Role of Integrated and Multidisciplinary Approach in Combating Metabolic Syndrome in Patients with Severe Mental Illness

Metabolic Syndrome (MS) is a constellation of cardio-metabolic risk factors such as increased waist circumference, hyperglycemia, hypertension, hypertriglyceridemia, and decreased high density lipoprotein (HDL) levels, associated with significant morbidity as well as mortality.[1,2] The prevalence of MS in the general population globally was found to range 20–25%,[3] whereas the pooled prevalence of MS in patients with severe mental illnesses (SMI) was found to be 32.6%.[4] Hence, the presence of MS in patients with SMI could lead to greater disability, considering both MS and SMI being significant contributors to the global burden of disease.[5]

Patients with SMI could be at higher risk of developing MS due to a myriad of reasons. First, an unhealthy lifestyle in the form of sedentary life with less physical activity, intake of carbohydrate- and lipid-rich diet, and substance use could contribute to the development of MS.[6] Second, psychotropic medications, especially second-generation antipsychotics such as clozapine and olanzapine, notoriously increase the risk of MS.[4] Third, by virtue of SMI, the patients could have limited access to medical care and poor health seeking behavior.[7] Thereby, there is an urgent need to address these barriers and combat MS in terms of effective prevention as well as treatment.

Acknowledging these barriers, it is necessary to focus on strategies which can encourage patients to seek medical help, such as sensitizing staff and caregivers, improving knowledge and attitude of the staff, as well as reduction of psychiatric symptoms in the patient.[8] Serial physical monitoring; appropriate selection of drugs; lifestyle modifications, including adequate physical activity, properly balanced diet and cessation of use of substance; and psychoeducation are the various components which need to be incorporated in combating MS.[7,9,10]

At the baseline, in all patients with SMI, proper history must be taken, including past and family history of cardiovascular or metabolic disease and details of substance use, diet and activity. Comprehensive evaluation in the form of complete physical examination, including blood pressure, body mass index and waist circumference, and laboratory investigations such as fasting blood glucose and lipid profile must be done. Psychoeducation about lifestyle modifications should be meticulously done. At week six, it is recommended to review the choice of antipsychotics in patients with a weight gain of more than 7%. Review of physical and laboratory examination and continuing psychoeducation is recommended at weeks 6, 12, and 52. Further physical and laboratory evaluation must be done annually if these were normal until the end of 1 year. In case of any abnormality, the patient must be referred to a physician.[11]

Though an intense monitoring system is recommended, the proportion of patients with SMI being monitored for MS has been found to be low in outpatient as well as community settings.[12,13] Hence, there is a definite need for addressing the unmet physical needs of patients of SMI, keeping in view the time and resources needed for such intense monitoring and the limited number of psychiatrists.[10,14,15]

An integrated and multidisciplinary approach could go a long way in addressing MS in patients with SMI. The concept of integration of mental health care with primary or community care involving nurses and paramedical health professionals is garnering attention in recent times, with parallels drawn between mental illness and physical noncommunicable diseases.[16] In the context of MS, multidisciplinary approach has been defined as interdisciplinary coordination between medicine, endocrinology, psychiatry, psychology, nutritional medicine, and surgery.[17]

American Psychiatric Association also advocates proper coordination between psychiatrists and primary care providers.[18] Further, care managers such as nurses can play a pivotal role in maintaining communication and providing health education.[19] With this background, the current article attempts to provide a viewpoint about the multidisciplinary and integrated approach in addressing components of MS in patients with SMI receiving psychotropic medication.

Studies in a hospital setting

A large body of evidence in the form of numerous reviews, including systematic reviews and meta-analyses, exists which report feasibility and efficacy of such multidisciplinary and integrated approaches in reducing components of MS in person with SMI.[20-25] These interventions were delivered by psychiatrists, nurses, dieticians, psychologists, and counselors, alone or in liaison across the interventions.[20-25] The interventions delivered can be classified into weight management/physical activity approaches,[20-25] dietary approaches,[20,22,25] psychoeducational approaches,[22] cognitive behavioral therapy approach[21,23,25] and a holistic approach called "wellness program."[26]

Dietary/nutritional approach involved providing education about promoting a healthy diet, discouraging maladaptive food practices, and emphasizing appropriate dietary intake, calorie restriction, and healthy diet.[20,22,25] Weight management involved physical activity through exercise or yoga and modification of dietary habits.[20-25] Psychoeducation encompassed providing information to the patients about the illness, medication, need for lifestyle modifications, cessation of substance, and need for relapse prevention.[22] The wellness program was a holistic approach involving monitoring of physical health, exercise, nutritional counselling, advice for cessation of substance use, and an emphasis on improving quality of life.[26]

The earliest systematic review, dating back to 2003, found that behavioral interventions by diet and (or) exercise could lead to only smaller reduction of weight in patients with schizophrenia on antipsychotics, with at least 5% weight loss being demonstrated in only three of sixteen studies.[20]

In 2008, a meta-analysis of 10 randomized controlled trials (RCT) demonstrated the feasibility and efficacy of nonpharmacological interventions (behavioral, cognitive behavioral, nutritional) in producing a significant reduction of antipsychotic-induced weight gain. There was no significant difference between the results of the nonpharmacological interventions by type or type of delivery.[21]

In 2012, a narrative review of 42 studies of interventions for MS in schizophrenia noted that comprehensive interventions including nutritional, physical activity, psychoeducational components had better outcomes in weight reduction compared to nutritional advice alone. The authors also highlighted the role of nurses in delivering these interventions.[22]

A meta-analysis of seventeen studies assessing the effect of nonpharmacological interventions (behavioral, nutritional, or cognitive behavioral interventions) in schizophrenia found a significant reduction in weight, body mass index, waist circumference, fasting blood glucose, total cholesterol, low density lipoprotein, and triglycerides across the studies. However, no acute, as well as long-term effects were noted in HDL or systolic blood pressure. Significant improvement in body mass index (BMI) failed to persist after 12 months of intervention. Another interesting finding was that this improvement was significantly better in the outpatient setting compared to the inpatient setting. No significant difference was noted between various types of nonpharmacological interventions.[23]

In 2015, a systematic review and meta-analysis of 20 studies assessing the effect of exercise in patients with schizophrenia found that moderate to vigorous exercise was associated with a significantly greater reduction in psychiatric symptoms and waist circumference and improvement in the quality of life. However, no significant reduction in BMI was noted. The study also noted that aerobic form of exercise had significantly better outcomes.[24]

A recent systematic review of eleven studies, conducted in 2018, found that in patients with schizophrenia, interventions providing exercise, dietary advice, and education, singly or in combination, led to a significant reduction in weight, BMI, waist circumference, and blood glucose. The study also highlighted the role played by the dietician, nurse, and clinical psychologists in providing the interventions.[25]

The studies[20-26] are summarized in Table 1.

There is minimal literature on interventions from the lower and middle-income group setting. There is a single published study from India assessing the role of psychoeducation on MS. A psychoeducational intervention program comprised of psychoeducation about SMI, side effects of medication, risk of metabolic abnormalities, role of healthy diet, exercise and weight control measures. Fifty percent of the patients (who had MS at baseline) who were followed up after 6 months did not qualify for MS.[27]

Studies in the community setting

Limited studies exist on integrated models of care in the community setting. There is only one RCT, which assessed the efficacy of integrated medical care for patients with SMI compared to usual care at a community care center. Integrated medical care was derived from a nurse practitioner and nurse care

manager. Nursing case managers promoted advocacy and communication with physicians and provided health education, and this was compared to treatment as usual. The integrated medical care approach was associated with significantly higher utilization of services, better quality of care, as well as significant reduction of cardiovascular risk factors at the end of 12 months.[28] The outpatient psychosis clinic managed at community level by nurses (psychiatric and assistant) and occupational therapists, under liaison with mental health professional and physician, is an existing successful model in monitoring and management of MS in Sweden.[29]

Role of health professionals in screening for MS

In contrast to the abundant literature on interventions, there is limited literature on the role of health professionals in screening for MS. A dramatic increase in the frequency of monitoring the BMI (from 2% to 67%), waist circumference (from <1% to 68%) and sending referrals to the general physician (from 0 to 37) was noted after employing a nurse practitioner in an acute inpatient unit in Australia.[30] A single educational intervention session to the nurses was found to result in increased reporting of waist circumference by almost 40–50% of the case files in Australia.[31]

The feasibility of nurses or pharmacist administering a metabolic screen checklist for components of MS was demonstrated as a part of "Point of care metabolic screening program" in an outpatient setting in the United States of America. The checklist consisted of height, weight, BMI, waist and hip circumference, blood glucose, blood pressure, personal history of substance use, diet, activity, past as well as family history of diabetes mellitus or hypertension and current treatment, and would provide recommendations to the treating psychiatrist.[32] There is a tremendous need for training nurses regarding MS, as a survey revealed that the proportion of nurses who did not know that low HDL and elevated blood pressure are risk factors of MS were about one third and one fourth respectively.[33] Further, it is also disappointing to know that a significant proportion of the mental health nurses in the United Kingdom did not receive training in physical health needs of the patient and expressed ambiguity about their role in managing physical needs.[34]

Methodological issues

It is important to interpret the existing study findings in the background of their methodological limitations. Majority of the studies included in the reviews were poorly powered, had a lower sample size, and a shorter duration of assessment.[23,25] Even the RCT lacked proper elaboration of randomization, concealment, and imputation analysis.[21,25,35] The method of delivery of the intervention was not clearly elaborated in some of the studies.[25] Due to heterogeneity in the study methodology, a quantitative analysis could not be conducted in many of the reviews.[24,36] The generalizability of some of the studies was compromised due to the limited representation of ethnic groups.[36]

Newer strategies: The way forward

There is an immense need for RCT of rigorous methodology to generate further evidence for nonpharmacological interventions. More studies assessing an integrated model of care involving active liaison between mental health professionals, physicians, nurses and allied health professionals, especially from the community setting, are needed as the only published study dates back to 2010. More studies assessing components of MS as outcome parameters are required.

Further, there is a tremendous need for studies from the lower and middle-income group (LAMIC) setting as the majority of the studies were from higher income countries. The interventions adopted in the developed countries might need to be customized to the needs of the LAMIC in the background of the varying working profile of health professionals.

Quality improvement intervention (QI) program could be a feasible intervention for better screening of MS by sensitization and training of health professionals as well as the development of a template for the screening of MS. Training residents about using MS screening bundle template (assessing BMI, blood pressure, fasting glucose and lipid profile) was found to result in about 3.5- to 10-fold increased rate of screening of MS.[37]

"Metabolic Clinics" could be a one-stop avenue for meeting the physical health needs of the persons with SMI, where the psychiatrist can work in close liaison with a physician, psychologist, nurse, dietician, occupational therapist, and social worker. Establishing community mental health clinics (CMCH) with integrated mental health care and medical care could help in better accessibility and availability of services. Cost analysis of a model CMCH at the United States of America was carried out, and it was found to be highly cost-effective with a mean of 74$ being spent on each patient annually.[38] Further training of the undergraduates in such clinics at the hospital as well as community level can help in sensitizing them to the physical health issues of persons with SMI.

Table 1: Summary of reviews assessing the multidisciplinary and integrated treatment approaches in combating metabolic syndrome in patients with severe mental illness

Author	Study methodology	Chief findings
Faulkner *et al*. 2003[20]	A systematic review of 16 studies was carried out assessing the effectiveness of interventions to control body weight in patients with schizophrenia There were eight studies with pharmacological interventions (*n*=311) There were eight studies with behavioral and dietary interventions (*n*=142)	-A small reduction of weight (less than five percent of body weight at baseline) was achieved in five studies employing pharmacological interventions and all the studies with behavioral interventions -A multimodal intervention involving diet, dietary counselling and exercise had the greatest effect size of 2.52.
Papanastasiou, 2012[22]	A narrative review of interventions improving physical health and decreasing cardiovascular risk factors of MS in subjects with severe mental illness was done There were 44 studies with pharmacological interventions There were 42 studies with behavioral interventions There were nine studies with both pharmacological and behavioral interventions	-Wellbeing programmes incorporating health check-up, exercise and dietary advice, cognitive behavioral therapy, nutritional education, weight management (exercise+dietary modification), psychoeducation were the various behavioral interventions studied -Wellbeing programs were found to improve physical health -Restricted consumption of calories alone or with nutritional education and behavioral techniques were found to control weight gain across several studies.
Caemmer *et al*. 2012[23]	Meta-analyses of seventeen RCTs was carried out assessing the effectiveness of non-pharmacological interventions to control weight gain by antipsychotics as well as metabolic abnormalities (*n*=810)	Compared to treatment as usual, non-pharmacological interventions had significantly: -Greater weight loss (-3.12 kgs; 95% CI: -4.03- -2.21; *P*<0.0001) -Decrease of BMI (-0.94 kg/m^2; 95% CI: -1.45- -0.43; *P*=0.0003), weight circumference, total cholesterol, LDL, TG -No significant difference was noted with respect to HDL and Systolic blood pressure -Significant changes in weight and BMI were noted only in studies with outpatients -No significant difference was noted between individual versus group approach and CBT versus dietary counselling
Firth *et al*. 2015[24]	Systematic review and meta-analyses of twenty RCTs was carried out assessing the effectiveness of exercise interventions on physical and mental health in patients with nonaffective psychosis (*n*=659)	-No significant improvement was found in BMI in subjects receiving exercise intervention -Significant improvement was noted in waist circumference as well as cardiovascular fitness -Moderate-vigorous exercise of about 90 min per week was found to significantly improve psychiatric symptoms
Guruswamy *et al*. 2018[25]	A systematic review of eleven RCTs was carried out assessing the effectiveness of exercise, educational and dietary interventions on risk factors of MS in patients with Schizophrenia (*n*=614)	-Modest weight loss was noted with adjunctive interventions with a duration of less than three months and as well as more than four months compared to treatment as usual -Significant reduction of weight, BMI, waist circumference, blood glucose were noted across studies -The feasibility of the interventions being carried out by nurses, dieticians was also demonstrated

BMI: Body Mass Index, CBT: Cognitive behavioural therapy, CI: Confidence interval, H: High density lipoprotein, LDL: Low density lipoprotein, MS: Metabolic Syndrome, N: Sample size, RCT: Randomised controlled trials, TG: Triglycerides

CONCLUSION

There is positive evidence for an integrated and multidisciplinary approach in the management of MS in the form of weight management/physical activity approaches, dietary approaches, psychoeducational approaches, and/or cognitive behavioral therapy approach, delivered through psychiatrists, nurses, dieticians, psychologists, and counsellors, alone or in liaison. Hence, there is a need for sensitizing all the health personnel to the physical health issues of persons with SMI.

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Conflicts of interest

There are no conflicts of interest.

Pooja Patnaik Kuppili, Naresh Nebhinani

Department of Psychiatry, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India

Address for correspondence: Dr. Pooja Patnaik Kuppili
Department of Psychiatry, All India Institute of Medical Sciences, Jodhpur - 342 005, Rajasthan, India.
E-mail: poojapatnaik.aiims@gmail.com

REFERENCES

1. Ardern CI, Janssen I. Metabolic syndrome and its association with morbidity and mortality. Appl Physiol Nutr Metab Physiol Appl Nutr Metab 2007;32:33-45.
2. Lakka HM, Laaksonen DE, Lakka TA, Niskanen LK, Kumpusalo E, Tuomilehto J, *et al*. The metabolic syndrome and total and cardiovascular disease mortality in middle-aged men. JAMA 2002;288:2709-16.
3. Alberti KGMM, Zimmet P, Shaw J. Metabolic syndrome—A new world-wide definition. A Consensus Statement

from the International Diabetes Federation. Diabet Med 2006;23:469-80.
4. Vancampfort D, Stubbs B, Mitchell AJ, De Hert M, Wampers M, Ward PB, *et al*. Risk of metabolic syndrome and its components in people with schizophrenia and related psychotic disorders, bipolar disorder and major depressive disorder: A systematic review and meta-analysis. World Psychiatry 2015;14:339-47.
5. Saha S, Chant D, McGrath J. A systematic review of mortality in schizophrenia: Is the differential mortality gap worsening over time? Arch Gen Psychiatry 2007;64:1123-31.
6. Hennekens CH. Increasing global burden of cardiovascular disease in general populations and patients with schizophrenia. J Clin Psychiatry 2007;68(Suppl 4):4-7.
7. Padmavati R. Metabolic syndrome, serious mental illnesses & lifestyle. Indian J Med Res 2016;143:395-7.
8. Roberts SH, Bailey JE. Incentives and barriers to lifestyle interventions for people with severe mental illness: A narrative synthesis of quantitative, qualitative and mixed methods studies. J Adv Nurs 2011;67:690-708.
9. Toalson P, Ahmed S, Hardy T, Kabinoff G. The metabolic syndrome in patients with severe mental illnesses. Prim Care Companion J Clin Psychiatry 2004;6:152-8.
10. Richardson CR, Faulkner G, McDevitt J, Skrinar GS, Hutchinson DS, Piette JD. Integrating physical activity into mental health services for persons with serious mental illness. Psychiatr Serv 2005;56:324-31.
11. Ho CSH, Zhang MWB, Mak A, Ho RCM. Metabolic syndrome in psychiatry: Advances in understanding and management. Adv Psychiatr Treat 2014;20:101-12.
12. Motsinger C, Slack M, Weaver M, Reed M. Physician patterns of metabolic screening for patients taking atypical antipsychotics: A retrospective database study. Prim Care Companion J Clin Psychiatry 2006;8:220-3.
13. Saloojee S, Burns JK, Motala AA. Very low rates of screening for metabolic syndrome among patients with severe mental illness in Durban, South Africa. BMC Psychiatry 2014;14:228.
14. Saxena S, Thornicroft G, Knapp M, Whiteford H. Resources for mental health: Scarcity, inequity, and inefficiency. Lancet Lond Engl 2007;370:878-89.
15. Ganguli R, Strassnig M. Prevention of metabolic syndrome in serious mental illness. Psychiatr Clin North Am 2011;34:109-25.
16. Anwar N, Kuppili PP, Balhara YP. Depression and physical noncommunicable diseases: The need for an integrated approach. WHO South-East Asia J Public Health 2017;6:12.
17. Keck T, Adamo M, Laudes M, Marjanovic G, Mueller B, Schmid SM, *et al*. Metabolic syndrome: An interdisciplinary approach. Visceral Med 2016;32:363-7.
18. Lehman AF, Lieberman JA, Dixon LB, McGlashan TH, Miller AL, Perkins DO, *et al*. Practice guideline for the treatment of patients with schizophrenia, second edition. Am J Psychiatry 2004;161(2 Suppl):1-56.
19. Viron M, Baggett T, Hill M, Freudenreich O. Schizophrenia for primary care providers: How to contribute to the care of a vulnerable patient population. Am J Med 2012;125:223-30.
20. Faulkner G, Soundy AA, Lloyd K. Schizophrenia and weight management: A systematic review of interventions to control weight. Acta Psychiatr Scand 2003;108:324-32.
21. Álvarez-Jiménez M, Hetrick SE, González-Blanch C, Gleeson JF, McGorry PD. Non-pharmacological management of antipsychotic-induced weight gain: Systematic review and meta-analysis of randomised controlled trials. Br J Psychiatry 2008;193:101-7.
22. Papanastasiou E. Interventions for the metabolic syndrome in schizophrenia: A review. Ther Adv Endocrinol Metab 2012;3:141-62.
23. Caemmerer J, Correll CU, Maayan L. Acute and maintenance effects of non-pharmacologic interventions for antipsychotic associated weight gain and metabolic abnormalities: A meta-analytic comparison of randomized controlled trials. Schizophr Res 2012;140:159-68.
24. Firth J, Cotter J, Elliott R, French P, Yung AR. A systematic review and meta-analysis of exercise interventions in schizophrenia patients. Psychol Med 2015;45:1343-61.
25. Gurusamy J, Gandhi S, Damodharan D, Ganesan V, Palaniappan M. Exercise, diet and educational interventions for metabolic syndrome in persons with schizophrenia: A systematic review. Asian J Psychiatry 2018;36:73-85.
26. Attux C, Martini LC, Elkis H, Tamai S, Freirias A, Camargo MD, *et al*. A 6-month randomized controlled trial to test the efficacy of a lifestyle intervention for weight gain management in schizophrenia. BMC Psychiatry 2013;13:60.
27. Suthar N, Nebhinani N, Tripathi N, Purohit P. Assessment of metabolic abnormalities in patients with Schizophrenia: A longitudinal study with Psycho-educational intervention. Indian J Psychiatry 2018;60(Suppl S1):S70.
28. Druss BG, von Esenwein SA, Compton MT, Rask KJ, Zhao L, Parker RM. The Primary Care Access Referral, and Evaluation (PCARE) Study: A randomized trial of medical care management for community mental health settings. Am J Psychiatry 2010;167:151-9.
29. Bergqvist A, Karlsson M, Foldemo A, Wärdig R, Hultsjö S. Preventing the development of metabolic syndrome in people with psychotic disorders--difficult, but possible: Experiences of staff working in psychosis outpatient care in Sweden. Issues Ment Health Nurs 2013;34:350-8.
30. Brown T, McKenna B, Furness T. Impact of a nurse practitioner role on metabolic monitoring completion and referrals for consumers admitted to the intensive care area of an acute inpatient psychiatric unit. Int J Ment Health Nurs 2018;27:341-8.
31. Rosenbaum S, Nijjar S, Watkins A, Garwood N, Sherrington C, Tiedemann A. Nurse-assessed metabolic monitoring: A file audit of risk factor prevalence and impact of an intervention to enhance measurement of waist circumference. Int J Ment Health Nurs 2014;23:252-6.
32. Schneiderhan ME, Batscha CL, Rosen C. Assessment of a point-of-care metabolic risk screening program in outpatients receiving antipsychotic agents. Pharmacotherapy 2009;29:975-87.
33. Bolton PS, Knight M, Kopeski LM. Metabolic syndrome: Psychiatric-mental health nurses' knowledge of risks and care practices. J Psychosoc Nurs Ment Health Serv 2016;54:44-53.
34. Blythe J, White J. Role of the mental health nurse towards physical health care in serious mental illness: An integrative review of 10 years of UK literature. Int J Ment Health Nurs 2012;21:193-201.
35. Druss BG, von Esenwein SA, Glick GE, Deubler E, Lally C, Ward MC, *et al*. Randomized Trial of an Integrated Behavioral Health Home: The Health Outcomes Management and Evaluation (HOME) study. Am J Psychiatry 2017;174:246-55.
36. Cabassa LJ, Ezell JM, Lewis-Fernández R. lifestyle interventions for adults with serious mental illness: A systematic literature review. Psychiatr Serv Wash DC 2010;61:774-82.
37. Wiechers IR, Viron M, Stoklosa J, Freudenreich O, Henderson DC, Weiss A. Impact of a metabolic screening bundle on rates of screening for metabolic syndrome in a psychiatry resident outpatient clinic. Acad Psychiatry 2012;36:118-21.

38. Mangurian C, Niu G, Schillinger D, Newcomer JW, Gilmer T. Understanding the cost of a new integrated care model to serve CMHC patients who have serious mental illness. Psychiatr Serv 2017;68:990-3.

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