

44. Schizophrenia

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Summary

Physical activity cannot replace traditional treatments of serious psychiatric illnesses but plays an important part of the treatment process. However, there is limited documentation and no randomised controlled trials of high scientific quality have studied the effects of physical activity on schizophrenia. Physical activity appears to alleviate negative symptoms and can also be a useful method for keeping positive symptoms under control. Physical activity may contribute to reduced anxiety and depression, and improve the quality of life as well as reduce the risk of relapse. The physical health benefits gained from physical activity are also important. Physical inactivity, smoking and obesity are common among people with schizophrenia, and likely reasons for the increased rate of morbidity and mortality found in this group.

Regular physical activity is an essential factor for maintaining good health and preventing disease, not least in relation to diseases that carry a risk of reduced longevity and greater overall morbidity. For many people, sports and outdoor activities are an important source of happiness in their lives, and there is no reason for people with a serious psychiatric disease not to take pleasure in the same type of activities.

Definition

Schizophrenia is one of the serious psychiatric diseases. The clinical picture of schizophrenia varies from individual to individual. In order to make a diagnosis, the patient must have been psychotic for a certain period of time. There are several types of psychotic symptoms, but the most common are delusions and hallucinations. The patient being convinced that he/she is being followed is one of the more common delusions. Hallucinations are defined as apparent perceptions of external objects when no such objects are present.

Hearing voices or seeing people that do not exist is not uncommon. Incoherent speech or behaviour is less common. These symptoms are called positive symptoms (1).

Negative symptoms are less dramatic but often of a greater significance to the patient's level of function over the long-term. The most common negative symptoms are apathy, passivity, and a lack of initiative and endurance. These symptoms are often difficult to accept for close relatives and caregivers. Schizophrenia is often associated with anxiety and depression, making it difficult to motivate these patients to be physically active

Prevalence/Incidence

Schizophrenia is a serious disease that affects approximately 0.5–1 per cent of the population and is hence as prevalent as insulin-dependent diabetes. Disease onset usually occurs in adolescence and adults aged 15 to 35, and affects both men and women. The prevalence of schizophrenia is noticeably similar irrespective of country or culture.

Causes and risk factors

The causes of schizophrenia are still not fully known but genetic predisposition is a significant factor. Close relatives of a person with schizophrenia have a 10 times greater risk of developing the disease compared to the general population. However, studies indicate that identical twins have a much greater risk of developing the disease than fraternal twins. Psychosocial and environmental factors may therefore also be of significance (1).

Prognosis

Even if there are treatment methods with documented beneficial effects, very few patients fully recover from schizophrenia. Most patients display a reduced functional capacity at school, work and in their social life, with only a small number able to hold regular employment. In the past, many people with schizophrenia spent most of their life in institutions, but recent closures have led to fewer of these institutions, which has led to most schizophrenic patients returning to their local areas (3). A lot of these schizophrenic patients are alone and need some form of help (4). A number of local governments have set up day centres and these have proven to be indispensable for this patient group.

Despite symptoms and suffering, many people with schizophrenia consider themselves to have a good quality of life.

Physical health

There has been a growing interest recently in the physical health of schizophrenic patients. The relative risk of premature death is four times greater in patients with schizophrenia than in the general population, while their life expectancy is at least 10 years shorter. Two thirds of the increased mortality rate may be explained by cardiovascular and respiratory diseases as well as diabetes. In all these diseases, lifestyle factors play an important role (5).

Compared to people without mental illness, a schizophrenic person is twice as likely to smoke, with a 50 per cent greater risk of being overweight or obese owing to an unhealthy diet and physical inactivity (6). In a comparative study of patients with schizophrenia or a serious emotional disorder and the general population, Dickerson and colleagues found that only 1 per cent of schizophrenic people, compared to 10 per cent of the general population, fulfilled the following five health criteria: non-smoker, takes regular physical exercise, good teeth, not overweight/obese and no major physical symptoms (7).

Current treatment principles

It is generally agreed that it is often necessary to use antipsychotic medication in the treatment of schizophrenic patients. The effects are well-documented, both in individual cases of the disease and for the purpose of preventing relapses. When schizophrenia is accompanied by depressive symptoms, the use of antidepressants and mood stabilisers may bring added benefits.

However, medications do not always have the desired effect, and adverse reactions are not uncommon. With the “old” antipsychotics, the most painful side effects were those affecting the neuromuscular functions, i.e. tremors, stiffness and slowness of movement. These are also referred to as drug and chemically induced parkinsonism as the symptoms are very similar to those of Parkinson’s disease. However, these side effects are less pronounced with the latest antipsychotics. Yet, more recent studies indicate that these medications may cause other side effects, such as weight gain, which, if serious, will give rise to additional problems for the individual in question. There is also a risk of the patient developing glucose intolerance, or increased blood fat levels, the ultimate consequence of which is metabolic syndrome and type 2 diabetes (5).

Medication treatment on its own is seldom enough and there are a number of scientifically documented psychosocial treatments. Family therapy sessions help the immediate family of the schizophrenic patient to be less critical or overprotective and instead be more supportive of the patient, which appears to reduce the risk of relapse. The purpose of the social training is to help the patient cope with sociable situations, e.g. how to start a conversation, what to do when he/she feels a relapse coming on and, finally, how to handle medication-induced side effects (8). Cognitive behavioural therapy has successfully been used to treat delusions, helping the patient to find an alternative explanation for what he/she is experiencing. Cognitive behavioural therapy has also been shown to benefit patients suffering from hallucinations (9). The majority of patients benefit from talk therapy.

Despite the treatments mentioned above, there is still a need for alternative treatments. Trial studies using physical activity as part of the treatment programme have been carried out, and the following is a summary of the current expertise in this area.

Effects of physical activity

When established psychiatric institutions began operating back in the 19th century, most treatment activities took place at farms in the countryside since moral treatment was the therapeutic approach recommended at that time. The mentally ill were thought to need a structured day and to improve their functional capacity by participating in the work on the farm. The physical work and contact with animals were considered important therapeutic elements.

Later, however, one began to question the therapeutic benefits of this form of treatment. The farm-located treatment programmes were gradually discontinued and for many patients, this meant increased physical inactivity and passivity. It is, however, interesting to note the renewed interest in manual farm work as a form of therapeutic treatment. These days, working with animals has become a therapeutic treatment and research area in its own right (10).

Primary prevention

Cross-sectional studies continuously indicate that the prevalence of psychiatric illnesses is higher in physically inactive than in physically active people, although the studies do not specifically relate to schizophrenia. No prospective studies have yet been carried out but, based on today's knowledge, there are no data indicating that physical activity can prevent schizophrenia.

Treatment

Schizophrenic individuals are generally in poor physical condition (11). Many intervention studies have been published on the effects of physical activity on positive and negative symptoms, depression and quality of life. However, these studies all have methodical limitations and no randomised study using satisfactory study methods has yet been published (12). Physical activity on its own is unlikely to be sufficient treatment. However, there are many sides to a serious disease such as schizophrenia. The following section describes some of the studies carried out on the benefits gained from physical activity.

Positive symptoms

The results of studies using well-documented measurement tools indicate that physical activity can be linked to a reduction in positive symptoms, above all auditory hallucinations (13, 14). One such example was a study carried out by Chamove (13) on 40 schizophrenic patients at a psychiatric nursing home in Scotland, where the staff were trained to assess the patients' symptoms and behaviours using specific scales. On those days when the patients participated in physical activities, a reduction in the extent and seriousness of their symptoms was observed. The patients least affected by the disease demonstrated the greatest change. In another study, Beebe and colleagues put 10 schizophrenic patients

on a 16-week walking schedule in addition to their regular treatment programme (15). Compared with the control group, the training group displayed fewer psychiatric symptoms after the intervention.

Psychotic symptoms rarely disappear completely. Consequently, a realistic treatment objective is to help patients live with their disease in the best possible way. One example of a psychotic symptom is auditory hallucinations, which are common in patients with schizophrenia. Patients with auditory hallucinations are treated with antipsychotics, though 25–30 per cent do not respond to this type of treatment. Falloon and Talbot (16) asked a group of patients with such symptoms which treatment methods they believed to be most beneficial. One of the treatment strategies mentioned most was physical activity, during which the voices or noises became less distressing. Shergill, Murray and McGuire (17) also asked a group of patients which strategy they believed most useful in controlling auditory hallucinations. As a result, they were able to determine that a distractive activity, or when patients were made to concentrate on a single task, had the best effect. The hallucinations did not disappear, but the distractive activities made them feel less difficult. Holmes and colleagues (18) asked a group of patients to describe the strategies they use to control difficult symptoms in general. The most common strategies included physical activity, stimuli reduction and the use of alcohol, narcotics and tobacco.

Negative symptoms

Physical activity can help to reduce negative symptoms. Chamove (13) describes how patients were less irritated, depressed, introverted and tense, as well as more sociable with better social skills on days with increased activity. Higher self-esteem was also reported. Anxiety and depression are common symptoms, and physical activity can be useful for controlling these symptoms in patients (12).

Body image perception

Sell (19) was interested in how schizophrenic patients perceive their own body and, in order to find this out, he asked them to draw a picture of a human being. Many schizophrenic people have a distorted body image and their drawings often feature the following characteristics: the figures are lifeless, often grotesque, stylised and static. Sell asked the schizophrenic patients to draw human figures before and after a 12-week fitness programme with exercise 3 times a week. Before the programme started, many of the drawings produced were distorted. For example, the proportion of various body parts was wrong and details such as mouths, eyes, fingers and toes were missing. At the end of the fitness programme, the drawings had become more normal, despite the patients not having any drawing lessons. This could be an indication that, by being more physically active, the patients got to know their body better and, as a result, their body image perception improved.

Quality of life

Borge and colleagues (4) studied long-term patients at a psychiatric hospital in Sogn og Fjordane one year after the number of patient spaces had been reduced significantly, with many of the patients returning to their home communities. They were interested in the patients' quality of life and the factors that could explain the variations in this. The factors that emerged from the study related to the patients' degree of loneliness, relationship with their neighbours and local surroundings and whether they participated in meaningful activities during the day. For many of these patients, holding regular employment is unrealistic. Physical activity during the day is thus a constructive alternative that may contribute to an enhanced quality of life.

Relapse prevention

In a Spanish study (20), researchers followed 40 patients with schizophrenia over a period of 10 years. The patients were divided into an exercise group and a control group, the latter of which received treatment as usual. Both groups received standard medication. During this 10-year period, significantly fewer relapses occurred among the patients in the exercise group.

Functional mechanisms

It is unlikely that a single factor can explain all of the psychological effects of physical activity, but there are a number of hypotheses that endeavour to explain the health benefits gained by physical activity in people with schizophrenia (12). The following physiological, neurobiological and psychological hypotheses have been put forward:

- People in a good physical condition generally have better health and greater resistance to disease and other loads. Well-trained individuals cope better with the challenges of everyday life by using a lower percentage of their maximal heart rate, and the heart rate normalises more rapidly after physical load.
- The basis for treating schizophrenia with medication is to influence neurotransmitters in the brain, in particular dopamine. Results from animal studies indicate that physical activity has an effect on these systems.
- Increased secretion of beta-endorphins appears to have a calming effect.
- Reduced interaction among the hypothalamus, pituitary gland and adrenal glands (the "HPA" axis) – which is important for how we respond to and tolerate stress.

Distraction and mastery are the most prominent psychological explanations. A number of studies indicate that patients suffering from auditory hallucinations have fewer and less difficult symptoms during physical activity, which could be explained by diversion or distraction. Physical activity does not make the hallucinations go away, but they become less dominant when the patient is concentrating on something else and, as a result, the patient feels more in control of the problem.

Many mentally ill people feel isolated and lonely, and have few interests or hobbies. In addition, they often lack social competence, which leads to a low self-esteem when in the company of other people. Physical activity can add meaning to their lives and contribute to an enhanced quality of life.

Indications

Primary prevention

People who are physically active tend to be less prone to developing mental disorders than inactive people, but there is no clear evidence to suggest that this relates specifically to schizophrenia.

Secondary prevention

Physical activity cannot be recommended as the only treatment for schizophrenia, but there are good reasons for integrating physical activity into the treatment process. Physical activity can reduce negative symptoms, improve the control of positive symptoms, lead to a better quality of life and a normal body image perception, and reduce the risk of relapse. Regular physical activity is also important for the prevention of somatic diseases, such as obesity, type 2 diabetes, hypertension, cardiovascular disease and metabolic syndrome.

Prescription

Special circumstances

A group of Swedish researchers was the first to evaluate the physical condition in schizophrenic patients (21). They found that patients were in poor physical condition but that they responded normally to fitness training. One exception was people on high doses of antipsychotics (chlorpromazine), who did not respond as well to physical activity. Individual differences in physical condition vary considerably from patient to patient, and it is therefore essential that the intensity and duration of physical activity be adapted to the capacity of the individual. It is easy to aim too high at the start, and it is often surprising how little activity is needed to have an effect on untrained individuals.

Dosage

Normal guidelines for health-promoting physical activity can also be used for schizophrenic people, and most of the health benefits can be achieved with a half hour of activity most days of the week. However, individuals who wish to lose weight should be physically active for one hour a day. It is important to remember that, even in small doses, regular physical activity is beneficial, and it is the overall time spent being physically active that counts.

Functional tests/Need for health check-ups

It is not necessary for schizophrenic patients to undergo any specific examinations before starting regular physical activity or exercise, unless the patient in question has other conditions, e.g. heart disease.

How and when should the effects gained be assessed?

Regular fitness assessments and controls are essential, as they serve to encourage the patient and are also an indication of whether the increased physical activity has the desired effect. In addition, there are simple, readily available tests for measuring mental health changes, including anxiety and depression, and quality of life.

Interaction with drug therapy

Large doses of antipsychotics may reduce the effects of a training programme (21), but there are no risks associated with training while on therapeutic doses of psychotropic drugs (22).

Contraindications

There are no contraindications to physical activity for individuals with schizophrenia unless other physical disease is present.

Risks

For patients without co-existing physical disease for which physical activity is contraindicated, there are no specific risks involved with physical activity.

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4. edition, Washington (DC): American Psychiatric Association; 1994.
2. Malt UF, Retterstøl N, Dahl AA. Lærebok i psykiatri. [Handbook of Psychiatry] Oslo: Gyldendal; 2003.
3. Martinsen EW, Ruud T, Borge L, Watne Ø, Friis S. The fate of chronic in-patients after closure of psychiatric nursing homes in Norway. A personal follow-up 6 years after. *Acta Psychiatrica Scandinavica* 1998;98:360-5.
4. Borge L, Martinsen EW, Ruud T, Watne Ø, Friis S. Quality of life, loneliness and social contacts among long-term psychiatric patients. *Psychiatric Services* 1999;50:81-4.
5. Connolly M, Kelly C. Lifestyle and physical health in schizophrenia. *Advances in Psychiatric Treatment* 2005;11:125-32.
6. Compton MT, Daumit GL, Druss BG. Cigarette smoking and overweight/obesity among individuals with serious mental illnesses. A preventive perspective. *Harvard Review of Psychiatry* 2006;14:212-22.
7. Dickerson FB, Brown CH, Daumit G, Lijuan F, Goldberg RW, Wohlheiter K, Dixon LB. Health status of individuals with serious mental illness. *Schizophrenia Bulletin* 2006;32:584-9.
8. Nathan PE, Gorman JM. A guide to treatments that work. Oxford: Oxford University Press; 2007.
9. Trower P, Birchwood M, Meaden A, Byrne S, Nelson A, Ross, K. Cognitive therapy for command hallucinations. Randomised controlled trial. *British Journal of Psychiatry* 2004;84:312-20.
10. Berget B. Animal-assisted therapy. Effects on persons with psychiatric disorders working with farm animals. *Philosophia Doctor Thesis*. Oslo: Norwegian University of Life Sciences; 2006.
11. Carlsson C, Dencker S, Grimby G, Heggendal J. Circulatory studies during physical exercise in mentally disordered patients. I. Effects of large doses of chlorpromazine. *Acta Medica Scandinavica* 1968;184:499-509.
12. Faulkner GEJ. Exercise as an adjunct treatment of schizophrenia. In: Faulkner GEJ, Taylor AH, Eds. *Exercise, Health and Mental Health. Emerging relationships*. London: Routledge; 2005.
13. Chamove AS. Positive short-term effect of activity on behaviour in chronic schizophrenic patients. *British Journal of Clinical Psychology* 1986;25:125-33.
14. Lukoff D, Wallace CJ, Lieberman RP, Burke K. A holistic program for schizophrenic patients. *Schizophrenia Bulletin* 1986;12:274-82.
15. Beebe LH, Tian L, Morris N, Goodwin A, Allen SS, Kuldau J. Effects of exercise on mental and physical health parameters of persons with schizophrenia. *Issues in Mental Health Nursing* 2005;26:661-76.
16. Falloon IRH, Talbot RE. Persistent auditory hallucinations. Coping mechanisms and implications for management. *Psychological Medicine* 1981;11:329-39.

17. Shergill SS, Murray RM, McGuire PK. Auditory hallucinations. A review of psychological treatments. *Schizophrenia Research* 1998;32:137-50.
18. Holmes H, Ziemba, J, Evans T, Williams CA. Nursing model for psychoeducation of the seriously mentally ill patient. *Issues on Mental Health Nursing* 1994;5:85-104.
19. Sell H. *The Effect of Physical Training on Psychiatric Patients*. Odense: [Published by the author]; 1994.
20. Torres-Carbajo A, Olivares JM, Merino H, Vazquez H, Diaz A, Cruz E. Efficacy and effectiveness of an exercise program as community support for schizophrenic patients. *American Journal of Recreation Therapy* 2005;4:41-7.
21. Carlsson C, Dencker S, Grimby G, Heggendal J. Circulatory studies during physical exercise in mentally disordered patients. I. Effects of training in patients with and without administration of chlorpromazine. *Acta Medica Scandinavica* 1968;184:511-6.
22. Martinsen EW, Stanghelle JK. Drug therapy and physical activity. In: Morgan WP, Ed. *Physical Activity and Mental Health*. Washington (DC): Taylor & Francis; 1997 p. 81-90.