



Evaluating the accuracy, quality, and readability of online physical activity, exercise, and sport information for people with schizophrenia



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ABSTRACT

Individuals with schizophrenia are not physically active and experience high rates of obesity, diabetes, and heart disease. Research shows that the Internet is a valuable and convenient source of health information for individuals with schizophrenia. Despite its importance, online physical activity, exercise, and sport information for this population has not been assessed. The purpose of this review was to evaluate the accuracy, quality, and readability of online physical activity, exercise, and sport information for people with schizophrenia. This review followed an adapted methodology proposed by Jetha, Faulkner, Gorczynski, Arbour, and Martin Ginis (2011). Websites were obtained from mental health organizations and following a standardized search protocol. Websites were included in the review if they discussed physical activity, exercise, or sport information and individuals with schizophrenia. Overall, 17 websites were included in the review. Two researchers independently evaluated each website for descriptive characteristics, information accuracy, technical quality, theoretical behavioral quality, targeting strategies, and readability. Information on physical activity, exercise, or sport was mostly provided on websites designed by community organizations (41%) and news agencies (41%). Most websites (59%) did not provide information that was supported by any physical activity guidelines for aerobic or resistance exercises. Nearly all websites (94%) mentioned the benefits and barriers to active living, but few (29%) discussed other cognitive or behavioral aspects that could promote physical activity participation. The majority of websites (88%) required a reading grade level of 10 or higher. More research is necessary to help tailor online physical activity, exercise, and sport information for this population.

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1. Introduction

Individuals living with schizophrenia exhibit low levels of physical activity, which impact their physical and mental health as well as overall quality of life (Gorczynski & Faulkner, 2010). Low levels of physical activity in this population have contributed to a high rate of obesity and obesity related mortality (Laursen, Munk-Olsen, & Vestergaard, 2012). Given that physical inactivity is an independent risk factor for overall mortality (Kokkinos, Sheriff, & Kheirbek, 2011), strategies are needed to help individuals with schizophrenia become and stay active to reduce the high rate of morbidity and mortality in this population.

Despite the high interest in physical activity and exercise, individuals with schizophrenia lack the necessary experience in being active and therefore have low levels of knowledge and confidence to become and stay active (Johnstone, Nicol, Donaghy, & Larie, 2009). Providing individuals with schizophrenia with more information about health, physical activity, exercise, and resources in the community, may be one strategy to help increase levels of physical activity in this population (McDevitt, Snyder, Miller, & Wilbur, 2006). Research shows that the Internet is a valuable, confidential, and convenient source of health information for some individuals with schizophrenia (Schränk, Sibitz, Unger, & Amerin, 2010). Individuals with schizophrenia rely on the Internet to verify symptoms, learn about their medication, and also find information about various services related to their treatment (Schränk et al., 2010). Despite its importance, online physical activity, exercise, and sport information for this population has not been evaluated. The purpose of this review was to examine the accuracy, quality, and readability grade level of online physical activity, exercise, and sport information for people with schizophrenia.

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2. Methods

2.1. Inclusion and exclusion criteria

A methodology used by Jetha, Faulkner, Gorczynski, Arbour, and Martin Ginis (2011) to evaluate websites was adapted for this review. Websites were included in this review if they met the following inclusion criteria: 1) discussed physical activity, exercise, or sport; 2) discussed individuals with schizophrenia (any subtype as defined by the Diagnostic and Statistical Manual for Mental Disorders IV (American Psychiatric Association, 1994)); and 3) presented information in English. For this review, *physical activity* was defined as any bodily movement conducted through skeletal muscles resulting in energy expenditure, while *exercise* was defined as any form of physical activity that is “planned, structured, repetitive, and purposive” where the goal is to improve physical fitness (Caspersen, Powell, & Christenson, 1985, p. 128). *Sport* was defined as “all forms of physical activity, which, through casual or organized participation, aim at expressing or improving physical fitness and mental well-being, forming social relationships or obtaining results in competition at all levels” (Council of Europe, 2001). Websites were excluded if they: 1) only contained external links and 2) provided information for professional healthcare providers only (e.g., academic journals).

2.2. Website search protocol and evaluation

Websites were identified using two methods. First, websites were obtained from the websites of prominent mental health organizations (e.g., Canadian Mental Health Association, Schizophrenia Society of Canada). Second, a GOOGLE search protocol adapted from Harland and Bath (2007) was used to search global websites. This strategy called for examining the first four pages of results in GOOGLE for each search term (approximately 40 links per term). The key terms used for this search included: “physical activity and schizophrenia”; “exercise and schizophrenia”; and “sport and schizophrenia”. This procedure represented a realistic approach that an average user would take while searching for information using GOOGLE (Harland & Bath, 2007). Overall, 17 websites were identified for this review. See Appendix A for full list of included websites.

Websites were evaluated for descriptive characteristics, information accuracy, technical quality, theoretical quality, targeting strategies, and readability using a categorical template designed by Scerbo, Besharat, and Faulkner (2006) and Doshi et al. (2003). Descriptive characteristics included website type (e.g., community-based, hospital); accessibility (e.g., number of clicks to access information); availability of other physical activity, exercise, or sport websites; presence of communication outlets (e.g., comment boards); and use of a database to organize information.

Information accuracy pertained to whether the information provided on each website was based on the Canadian Physical Activity Guidelines for Adults 18–64 years (Canadian Society for Exercise Physiology, 2011). Specifically, websites were examined for whether they encouraged individuals to attain weekly recommendations of 150 min of moderate to vigorous intensity aerobic activity and at least two days of resistance training. Exercises were also examined for information pertaining to frequency, intensity, and duration. Presence of guidelines and information pertaining to both aerobic and resistance exercises were rated on a dichotomous scale, where no = 0 and yes = 1.

Technical quality refers to how information is presented online and how information integrity is maintained (Bonnar-Kidd, Black, Mattson, & Coster, 2009). Technical quality was assessed using the Journal of the American Medical Association benchmark

quality rating scale (Bonnar-Kidd et al., 2009; Silberg, Lundberg, & Musacchio, 1997). The items that were evaluated included: authorship; attribution or references; currency; disclosures; endorsements by a major institution; and contact information. The presence of each item was rated on a dichotomous scale, where no = 0 and yes = 1. Scores were evaluated out of six points, with scores greater than or equal to four deemed as high quality (Silberg et al., 1997).

Theoretical quality refers to whether behavioral theories were used to help structure the information. Following the Jetha et al. (2011) methodology, this review concentrated on the health belief model (Becker, 1974), the transtheoretical model (Prochaska & Velicer, 1997), the theory of planned behavior (Ajzen, 1985), and the social cognitive theory (Bandura, 1986). Constructs from individual theories were deconstructed into three categories: knowledge dissemination; cognitive; and behavioral. The presence of each construct was rated on a dichotomous scale, where no = 0 and yes = 1. A total score of 14 was possible for each website.

Targeting strategies refer to whether the information was tailored to meet different demographic needs. For this review, the specific targeting strategies that were evaluated included: duration of illness; age range; gender; and care provider assistance. The presence of each strategy was rated on a dichotomous scale, where no = 0 and yes = 1.

Readability measures the difficulty of reading a written passage by analyzing its syntax and syllabic structure. The Flesch–Kincaid Grade Level Formula [0.39 (total words/total sentences) + 11.8 (total syllables/total words) – 15.59] produces a grade that refers to the United States school grade required to read the passage (Flesch, 1994). To assess readability, the formula was applied to the first multi-sentence paragraph of each website. Material written at a grade level higher than eight would be considered challenging for individuals with schizophrenia (Centre for Addiction and Mental Health, 2012).

2.3. Analyses

Before engaging in the website review, the first and second author met to discuss the evaluation criteria to ensure that websites were evaluated consistently. The authors then independently evaluated each website. Interrater reliability was calculated using unweighted kappa coefficients, which ranged from 0.23 to 1.0. Given the broad range of kappa values, the authors re-examined each website together in order to reach a consensus on each evaluation criterion. Aggregated descriptive statistics are presented in Tables 1 and 2.

3. Results

3.1. Descriptive characteristics

Information was found mainly on community-based (41.2%) and news agency (41.2%) websites. Other websites were created by independent sources (11.8%) and a hospital (5.9%). Information was directly accessible from the respective website’s main page for only seven websites (41.2%). For these websites it took approximately 3 clicks to access relevant information. For websites where a search box was available on the main page, it took an average of 2 clicks (plus entering a search term) to access the information. Only four websites (23.5%) provided links to other physical activity, exercise, or sport information for people with schizophrenia. These websites offered one relevant link each. As for communication outlets, the majority of websites (52.9%) offered at least one method to help

Table 1
Descriptive characteristics, information accuracy, technical quality.

Descriptive characteristics	Number	Mean	%
Website characteristics			
Community-based	7		41.2
Hospital	1		5.9
News agency	7		41.2
Independent	2		11.8
Accessibility (number of clicks from main page)		2.9 (SD = 1.9)	
Accessibility (number of clicks from main page if searched)		2.1 (SD = 0.6)	
Sites that offered other PA, exercise, or sport websites links for people with schizophrenia	4		23.5
Number of other PA, exercise, or sport websites links		0.2 (SD = 0.4)	
Available communication outlets	9		52.9
Use of PA, exercise, or sports database	4		23.5
Information accuracy			
Specific PA, exercise guideline recommendations	7		41.2
Aerobic exercise – at least 150 min of moderate or vigorous PA per week			
Frequency	7		41.2
Intensity	7		41.2
Duration	7		41.2
Resistance exercise – at least 2 times per week of comfortable intensity			
Frequency	1		5.9
Intensity	1		5.9
Duration	0		0.0
Technical quality			
Authorship	9		52.9
Attribution or references	11		64.7
Currency	11		64.7
Website disclosure	1		5.9
Endorsements by major institution	1		5.9
Contact information	14		82.4

users communicate with each other. In total, four websites (23.5%) used a database to store relevant information.

3.2. Information accuracy, technical quality, theoretical quality, targeting strategies, readability

Seven websites (41.2%) relied on physical activity guidelines to provide information. These websites described specific aerobic exercise recommendations with respect to frequency, intensity, and duration. Only two websites (11.8%) mentioned resistance training guidelines.

Technical quality scores ranged between one and five points. The average technical quality score was 2.8 points (SD = 1.3) with most websites (64.7%) scoring below four points.

Theoretical quality scores ranged from one to 12, with an average score of 4.1 (SD = 3.3). The majority of websites scored poorly, with 14 websites (83.5%) scoring five points or lower.

No websites addressed illness duration. One website (5.6%) discussed age differences, while two websites (11.8%) mentioned issues related to gender. Information for care providers was the most prevalent of all strategies, with seven websites (41.2%) providing this information.

The majority of websites reviewed (88.2%) was above the recommended reading level of grade 8. Grade reading levels ranged from 5 to 23 with a mean grade of 13.7 (SD = 4.3).

Table 2
Theoretical quality, targeting strategies, readability.

Descriptive characteristics	Number	Mean	%
Theoretical quality			
Knowledge dissemination			
PA, exercise instructions	9		52.9
Accessibility information	1		5.9
Aids or assistive devices	0		0.0
Cognitive			
Perceived benefits	16		94.1
Perceived barriers	16		94.1
Perceived risks	5		29.4
Self-efficacy	2		11.8
Self-talk	2		11.8
Perceived social norms	3		17.6
Behavioral			
Modeling	2		11.8
Social support	3		17.6
Goal setting	3		17.6
Motivational readiness	4		23.5
Self-monitoring	3		17.6
Targeting strategies			
Duration of illness	0		0.0
Target age range	1		5.9
Target gender	2		11.8
Care providers assistance	7		41.2
Readability			
The Flesch–Kincaid grade level		13.7 (SD = 4.3)	

4. Discussion

The purpose of this review was to examine the accuracy, quality, and readability grade level of online physical activity, exercise, and sport information for people with schizophrenia. This is the first review of websites that provide information on physical activity, exercise, and sport for people with schizophrenia. This review shows that accessing high-quality online information is a challenge for people with schizophrenia in order to help them become and stay active.

Several possible reasons may exist as to why online physical activity, exercise, and sport information for people with schizophrenia is of low quality. First, several researchers who study physical activity and exercise in schizophrenia have noted that most interventions for this population are not designed or evaluated using rigorous methods and often lack any behavior change theory (Gorczynski & Faulkner, 2010). Given that a lack of behavioral theory is used in scientific research for people with schizophrenia with respect to physical activity and exercise, it is no surprise that it does not appear on the websites in this review. Second, the Internet, despite recently being promoted as a credible and useful source of health information for people with schizophrenia (Borzekowski et al., 2009; Schrank et al., 2010), may still not be recognized by healthcare providers as a valuable method to transmit physical activity, exercise, and sport information. Those who construct websites may simply point to recent findings that approximately a third of individuals with serious mental illness own a computer or have access to the Internet (Borzekowski et al., 2009). This may result in limited resources being devoted to designing and improving websites for this population.

The results of this review are similar to previous reviews that have evaluated websites providing health information for people with schizophrenia. A review of 33 websites that provide information on antipsychotic medication for people with schizophrenia showed that websites gave vague and incomplete details of potential side-effects and poor explanations of prognosis (Akram,

Boyter, & Thomson, 2010). Although 79% of the reviewed websites provided no authorship details, 61% of websites were constructed within the last three years and provided a disclaimer that instructed individuals to consult a primary healthcare professional with any questions about antipsychotics. Another review that examined the readability of 20 websites that delivered health information to people with schizophrenia showed that the reviewed websites had an average reading grade level of 12 (Kalk & Pothier, 2008). The study authors concluded that information was difficult to read and recommended that website authors receive accreditation from health information quality organizations that specialize in writing readable language, such as the Plain English Campaign (www.plainenglish.co.uk).

The results of this review show that simple steps can be taken to improve the quality of online physical activity, exercise, and sport information for people with schizophrenia. In general, online information should be made more accessible by being one to two clicks from the main page. Discussion forums and databases should help users connect with each other and information about available services. Physical activity and exercise information should be based on current recommended guidelines and discuss both aerobic and resistance training exercises.

Regarding technical quality, information should identify authors along with their credentials and affiliations, be referenced, and be date stamped (Silberg et al., 1997). All disclosures and sponsors should be prominently posted and users should have a manner in which to contact the authors for more information. With respect to the use of behavioral strategies, websites could post information about simple strategies that could help users increase their confidence, find social support, set goals, or develop self-monitoring skills. Regarding readability, authors should ensure that their information is written at a grade 6 through 8 level by using words that are short and easy to understand (Kalk & Pothier, 2008).

Several steps were taken to ensure that the review was conducted in a consistent and rigorous manner. Despite these steps, there are limitations with this review. First, the results of this review depict what was accessible on the Internet on the day this review was conducted. It is possible that the reviewed websites have since changed or have been removed altogether. Second, this review only examined the constructs of four behavior change theories. Future reviews may wish to examine other behavioral theories and their related constructs. Third, Kappa coefficient values ranged from 0.23 to 1.0 illustrating the difficulties of assessing a constantly evolving medium like the Internet.

The Internet presents new opportunities for individuals with schizophrenia to not only acquire knowledge about physical activity, exercise, and sport, but also provide new ways to socialize with others, especially for younger people with early signs of psychosis (Borzekowski et al., 2009). Given the stigma that is often associated with schizophrenia, finding high quality health information on the Internet is an ideal first resource to connect individuals and their families to community services to increase levels of activity and improve overall health (Kalk & Pothier, 2008).

Appendix A. Websites included in the review.

Centre for Addiction and Mental Health (2012). *Centre for Addiction and Mental Health website*. Retrieved January 9, 2013, from <http://www.camh.ca/>.
 Channel 4 (2013). *Channel 4 website*. Retrieved January 9, 2013, from <http://www.channel4embarrassingillnesses.com/>.
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 Live Strong (2011). *Live Strong website*. Retrieved January 9, 2013, from <http://www.livestrong.com/>.
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