

## Research Article

# Mental Health Needs of Young People with Problematic Drug and Alcohol Use in Manchester

Ruth Marshall,<sup>1</sup> Louise Theodosiou,<sup>2</sup> Prashant Bhat,<sup>3</sup> Anita Ghosh,<sup>4</sup> and Jade Ark<sup>1</sup>

<sup>1</sup> The Winnicott Centre, Manchester M13 0JE, UK

<sup>2</sup> Emerge 16-17 CMHT, Powerhouse, Manchester M14 0ST, UK

<sup>3</sup> Child and Adolescent Psychiatry, Child and Family Service, Tree House Children's Centre, Stepping Hill Hospital, Poplar Grove, Stockport SK2 7JE, UK

<sup>4</sup> Central Manchester University Hospitals, NHS Foundation Trust, M 13 QWL, UK

Correspondence should be addressed to Louise Theodosiou, louise.theodosiou@cmft.nhs.uk

Received 4 April 2012; Accepted 23 May 2012

Academic Editors: A. Bramesfeld, A. R. Mawson, C. Rissel, and A. Rosano

Copyright © 2012 Ruth Marshall et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Background.** Studies have indicated possible links between substance use disorder and other psychiatric disorders and suggested a high prevalence of unmet mental health needs amongst those with substance use disorders compared to the general population.

**Method.** The study investigated the mental health needs of adolescents attending a substance misuse service. Mental health needs were assessed using the Strengths and Difficulties Questionnaire, the Conners screen for Attention Deficit Hyperactivity Disorder and a brief measure ascertaining demographics, drug use, and the service required by young people. **Results.** Young people were found to have higher than normal rates of mental health problems; this was not reflected in referral rates from the service.

**Conclusion.** The findings are relevant to both commissioners and service providers. There is a need for integration between mental health services and those working with young substance users to provide a model of care that caters for dual diagnosis. Furthermore, offering mental health training to teams working with drug-using young people is recommended.

## 1. Background

Healthcare provision in the United Kingdom is at an important junction; the White Paper Healthy Lives Healthy People (2010) emphasises the need to ensure that resources are used effectively, while at the same time embracing the culture of service user feedback. It is of note that the White Paper does not comment on developmental disorders and we are keen to reduce the separation between the evolving evidence base regarding developmental disorders and key national policies. We suggest that adolescent mental health clinicians are ideally placed to elucidate the relationship between mental health and substance use; NICE [1] notes that there is a “lack of evidence on how to prevent substance misuse among particular groups of vulnerable and disadvantaged children and young people,” including “those with mental health problems.” This study sought to address this deficit. Finally, the Government document “Drugs: protecting families and communities” emphasises the need for “producing guidance

for commissioners, service providers and CAMHS to ensure that improved needs assessment and treatment planning processes are in place in all areas.”

Furthermore, as envisaged in the National Service Framework for Children, young people and maternity services (2007), commissioners in Manchester are keen to understand the unmet needs of vulnerable, high-risk adolescents, as exemplified by the young people using the voluntary drug and alcohol support service in Manchester. HM Government [2] “Drugs: protecting families and communities—action plan 2008–2011” prioritises the improvement of specialised treatment systems for young substance users; gathering information about local need and provision is key in the achievement of this objective.

The Institute of Alcohol Studies [3] notes that drinking for effect and intoxication amongst young people grew in the period up to 2003-4 and may now have peaked. The report also notes that there has been a “partial merging of the alcohol and drug scenes in the context of youth culture.”

Notably 519 under 18 year olds were admitted to hospital in Greater Manchester with alcohol-related conditions in 2003-4 and 642 in 2004-5. In 2011, looking across all ages, the Office for National Statistics (ONS) notes that in 2009 there were “8,664 alcohol-related deaths in the UK, 367 fewer than the number recorded in 2008 (9,031).” The ONS also notes that for males, deaths related to drug poisoning rose slightly each year from 2007 to 2009, but fell slightly in 2010 to 1890, while for females rates fluctuated up and down, with a low of 726 in 2007 and a high of 857 in 2010. Finally, drug and alcohol treatment workers communicate via the Alcohol Needs Assessment Research Project that there was a “very large gap” between the provision of treatment for alcohol-related disorders and the demand.

Although problems may not always present until early adulthood, drug use often starts earlier. The Institute of Alcohol Studies identified that 84% of 12-17 year olds have drunk alcohol, with 10% of British 16-17 year olds drinking at least once a week. Pudney [4] examined data from the Youth Lifestyle Survey of English and Welsh 12-30 year olds and found that the average age of first reported cannabis use was 16.6 years, while that of heroin use was 17.5, and 20.2 for cocaine. Other studies propose that initial drug experimentation may begin as early as 13 years of age [5].

Substance misuse among adults with mental disorders is associated with significantly poorer outcomes including worsening of psychiatric symptoms, poor medication adherence, and poor social outcomes in addition to its impact on carers and family [6]. Appleby et al. 2008 identified that 58% of the suicide cases investigated as part of the National Confidential Enquiry were alcohol dependent, while 39% were drug dependent and 29% heavily misused both substances. Furthermore, the Manchester Self-Harm (MaSH) Project identified that of 3098 individuals whose self-harm episode had been recorded by participating accident and emergency departments, 20% of males under 35 had been misusing street drugs.

The role of attention deficit hyperactivity disorder (ADHD) in the development of drug abuse in adolescence is of particular interest. Brook et al. [7] identified that ADHD is an important risk factor in the development of substance use disorders through the correlations between ADHD and conduct disorder and in turn the association between conduct disorder and substance use disorders. Inattention is linked to poor academic achievement and peer difficulties [8, 9]. What may follow is the gravitation away from conventional group values towards nonconformist peer groups where substance use is tolerated and modelled. Also, genetically mediated personality traits such as novelty seeking and impulsivity, common to ADHD and substance misuse, may arise from similar neurological pathways [10, 11]. It has been suggested too that young people with ADHD use addictive substances in an attempt to self-medicate the symptoms of the disorder [12]. Sartor et al. [13] note the role of developmental disorders in the duration of time from alcohol use to dependence. Hence, children with ADHD represent a group at high risk of rapid escalation in substance use. ADHD is amenable to treatment, however, its prevalence among young UK substance users is unknown. Of note,

a meta-analysis [11] concluded that stimulant therapy for ADHD reduced the risk of subsequent drug and alcohol abuse.

The authors are aware that the mental health of the general population of young people has been surveyed, both nationally; Green et al. [14], and locally Hackett et al. [15]. However, because young people who use drugs and alcohol on a regular basis may be missing from household surveys and school, the mental health of the highest risk groups are often much less well known. Indeed, few data concerning the mental health of the most vulnerable young users exist. Crome (2004) noted that “this group of users frequently distances itself from professionals.” This study sought to understand a population engaged with a voluntary sector organisation but currently not reached by CAMHS. The population of inner city Manchester represents a particularly vulnerable and high risk group; the researchers were keen to understand their needs.

## 2. Aim

Our aim is to increase knowledge about the mental health of adolescents who misuse substances, and to begin to explore why they may not access available mental health services. We also aimed to develop relationships with partner agencies and map out the need for consultation and joint working.

## 3. Method

Having obtained ethical approval, all young people who had been using the service of the Manchester young persons' drug and alcohol misuse service for at least a month were invited to participate. Data were collected for 5 weeks. For those under the age of 16, opt-out letters and information sheets were sent out to parents/guardians and those over the age of 16 were given opt-out forms and participant information sheets directly. All participants were given a unique random identification number and questionnaires were anonymized.

The Strengths and Difficulties Questionnaire (SDQ) developed by Goodman [16] is a validated and extensively used screen for mental disorder in young people. Goodman et al. [17] used the SDQ to screen for psychiatric disorders in a community sample, and concluded that the tool had an acceptable sensitivity. Goodman [18] concluded that the reliability was satisfactory. It is a 25-item questionnaire that generates symptom subscales in relation to emotional, hyperactivity, conduct, and peer difficulties as well as prosocial behaviours and a summative score indicative of general mental health need. The SDQ website (<http://www.sdqinfo.com/>) contains population study data for comparison. The tool can be scored online; alternately sheets explaining the scoring process and providing ranges and subscales can be downloaded. Examples of questions include “I fight a lot. I can make other people do what I want” and “I am often unhappy, down-hearted or tearful.” The SDQ is recommended for use on 11-17 year olds.

The Abbreviated Conners Questionnaire [19] includes versions for adolescents' self-report and for professionals

involved in the young person's care. It comprises a 27-item scale which can be used to generate an ADHD indicator score which is gender and age specific. It has been used in practice [20, 21] and sample questions include "Sticking with things for more than a few minutes is difficult." The Conners is recommended for use on 11–17 year olds.

Demographic details such as age, gender, and ethnicity were collected, as were the young people's account of their drug use and their opinions on the services they felt they needed. The same data were collected from workers. The survey took place at "Eclypse" (<http://www.lifeline.org.uk/about.php?idnum=16>), a service for young people with substance-related problems based in Manchester, a UK city with relatively large population of adolescents and young adults. Ethics mandated that the questionnaires should be given out by Eclypse staff not the research team. When young people attended, they were given a questionnaire pack and the staff completed a questionnaire pack on the young person at the same time.

#### 4. Findings

There were 210 open cases at commencement of the study period. Over the period of data collection, 117 cases were closed, disengaged, or declined participation leaving 93 eligible cases. Data were successfully collected regarding 55 (51.2%), 30 males and 25 females. The Eclypse managers identified that many of the young people referred to them lead chaotic lives and have an ambivalent attitude towards changing their drug and alcohol use. Furthermore, not all of the eligible cases attended consistently enough to allow data completion. Age was distributed between 10 and 19, most being 14–16. Four people were Afro-Caribbean, 36 were Caucasian, 10 people were of dual heritage, one Pakistani, and in 4 cases ethnicity was missing. Of these, 14 reported that they had been in hospital due to drug and alcohol use. Finally, 7 young people reported living with their mother and father, 28 with their mother, 1 with other family members, 6 in children homes, 1 in a foster home, 2 in a hostel, and in 10 cases this question had not been answered. Conditions of ethical approval prevented the researchers to obtain data about the overall demographics of the 210 cases; however, the Eclypse management reported that the 55 respondents were broadly representative of the overall sample.

Notably, 19 replies from workers reported that the young person had received previous help for "emotional/behavioural difficulties," while workers believed that 35 people required help for "emotional/behavioural difficulties." Additionally, young people were asked whether or not they wanted help for "emotional/behavioural difficulties" and 26 responded that they did.

Workers reported that 96% of young people were using cannabis and 78% alcohol (Table 1); although young people reported slightly lower levels of use for most drugs aside from ecstasy and cocaine, figures were largely consistent.

Conners self-report tools indicate that 23.6% of the sample scored in the clinically significant range for ADHD, and 27.8% on the worker-rated measure. There was almost complete consistency between these two groups.

TABLE 1: Reported drug use.

|              | Worker frequency | Percentage | Young person frequency | Percentage |
|--------------|------------------|------------|------------------------|------------|
| Cannabis     | 53               | 96.4       | 52                     | 94.5       |
| Alcohol      | 43               | 78.2       | 36                     | 65.5       |
| Nicotine     | 12               | 21.8       | 9                      | 16.4       |
| Ecstasy      | 11               | 20.0       | 13                     | 23.6       |
| Cocaine      | 15               | 27.3       | 18                     | 32.7       |
| Amphetamine  | 4                | 7.3        | 6                      | 10.9       |
| Ketamine     | 1                | 1.8        | 1                      | 1.8        |
| Amyl Nitrate | 2                | 3.6        | 3                      | 5.5        |

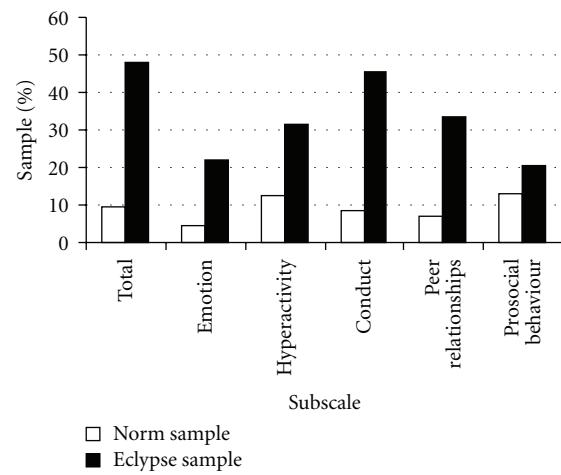


FIGURE 1: Worker-rated SDQs compared to normal population data.

As can be seen in Figure 1, adolescents in this study were scored higher workers than the normative data available on the SDQ website in all six domains. Scores for externalizing problems such as hyperactivity and conduct problems were markedly high; 45.5% (25) on the conduct subscale compared to 8.3% in the general population and 31.5% (17) on the hyperactivity subscale compared to 12.7%.

This same pattern is displayed in the self-report SDQs (Figure 2), where young people themselves identified that they had problems with conduct and hyperactivity; 41.5% (22) on the conduct scale, compared to 10.6%, and concerning hyperactivity 43.4% (23) compared to 11.5%.

Over half of all the young people who were taking cocaine scored in the "clinically significant" to "being of clinical concern" range on both the worker-rated and the young person-rated versions of the Conners Questionnaires.

#### 5. Discussion

This is one of the few studies to examine the mental health of young people attending a substance misuse service. Obtaining help with substance misuse involves high levels of insight and commitment; over half of the potential cases did not engage with Eclypse. We suggest that this demonstrates how difficult it is for young people to address their problems, and also how important it is to ensure that they are provided

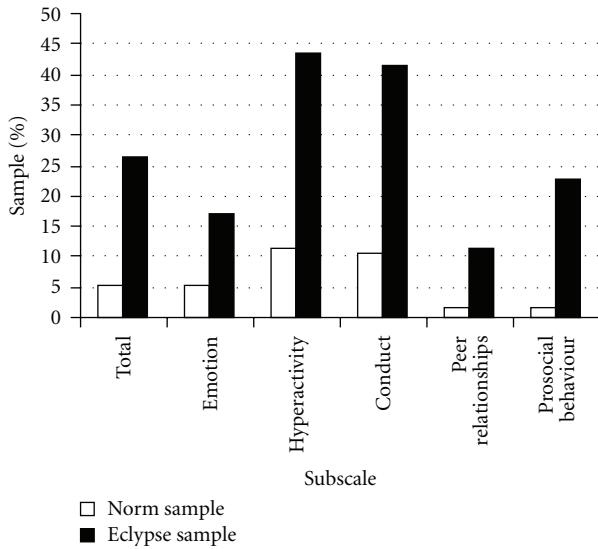


FIGURE 2: Self-rated study SDQs compared to normal population data.

with a high-quality service that can address multiple needs when they are able to attend. A clear weakness of this study is the fact that of the 93 possible cases, workers returned only 55 questionnaires, with time pressures and concerns about engagement cited as reasons. It is of note that DiClemente et al. [22] acknowledge that research can be difficult to understand even as an adult and that adolescents with mental health problems may be unwilling to disclose these for fear of stigma.

Most young people in the sample were living in single-parent (mother only) families. Minty and Anderson [23] note that children of single parents have higher rates of nonattendance at initial CAMHS appointments. It is possible that young people in the Eclypse sample had been referred to CAMHS outpatients but had not engaged with services. Sprich et al. [24] identified that the biological parents of adopted children displayed higher rates of hyperactivity than adoptive parents. Thus, parents of children with ADHD may struggle to take them to appointments and we could posit that adolescence represents a time when young people can access help for themselves.

Hackett et al. [15], undertook an assessment of the mental health needs of secondary school children in Manchester; 200 teachers and 127 parents completed the SDQ and a needs assessment tool designed for the study. Teachers identified that 18% of pupils had mental health needs as did 13.4% of parents. Furthermore, the teacher-rated hyperactivity subscale in the previous Manchester study suggested 9% had hyperactivity. In the present study, this was true of 31.5% of responses from drug service workers and 43.4% of young person SDQs. Furthermore, on the more rigorous Conners questionnaire workers placed 27.8% of young people in the clinically significant range, while 23.6% of young people scored themselves in this range. This is in stark contrast to the data from Green et al., [14], who identified that 2% of children in the United Kingdom met the criteria for a diagnosis of hyperkinetic disorder.

As noted previously, ADHD may be both a risk factor for development of substance use disorders and also exacerbate the trajectory of both the substance use problems, and subsequent problematic coping mechanisms and interaction styles. Furthermore, young people and their workers perceived higher than normal levels of difficulties on all aspects of the SDQ. One explanation for the fact that only four such cases were referred into CAMHS in the past four years would be the fact that young people with untreated ADHD and limited family support may struggle with the formality of attending appointments with CAMHS, collecting prescriptions, communicating concerns, and negotiating treatment regimes. While the more informal “drop-in” style work of a voluntary sector substance misuse service may prove accessible. The fact that almost half of young people identified that they wanted a service for unmet emotional and behavioural problems strengthens this argument. The authors have shared these findings with the commissioners and propose that basing clinicians with expertise in assessing and managing ADHD within substance misuse services presents a way to meet this important need.

The majority of the sample scored in the abnormal range on the peer-relationship subscale of the SDQ. Peers not only can be “models” for substance use behaviour, but also can influence attitudes favouring substance use and the pressure to use substances. These factors have been found to be strong correlates and predictors of adolescent substance abuse [25].

The results of the study displayed as posters in the Eclypse building and report was presented to the commissioners. Additionally, the data was presented to the Eclypse workers and discussed in the context of Dual Diagnosis Good Practice Guide a recommendation that young people should be routinely screened for mental health and substance misuse problems. The first two authors offered a day of training on core psychiatric conditions and have become contact points for Eclypse staff who are struggling to access CAMHS. Regular consultation meetings in Eclypse are being offered by the first two authors. Finally, there will be an audit of referral rates from Eclypse to CAMHS before and after the start of the regular consultation.

We are aware that this is a study with limitations, and lessons have been learned. Return rates may have been higher if the research assistant had been based within the drug and alcohol team for the duration of data collection. This would have enabled the workers to keep the study in mind and provided them with an accessible point of contact for questions and confusions about the study. However, the authors are now known to all the drug and alcohol workers, and the local CAMHS have now changed their referral policy to accept cases directly from the drug and alcohol team. Finally, there is now regular representation from the drug and alcohol team in the weekly staff meetings in the CAMHS team for 16-17 year olds. Thus, we would argue that the systems in place to keep the most vulnerable adolescents safe have been strengthened by this exercise.

## Conflict of Interests

The authors declare no conflict of interests.

## References

- [1] National Institute for Health and Clinical Excellence, "Community-based interventions to reduce substance misuse among vulnerable and disadvantaged children and young people," Public health intervention guidance; no. 4, National Institute for Health and Clinical Excellence, London, UK, 2007.
- [2] H. M. Government, "Drugs: Protecting Families and Communities Action Plan," 2008, <http://www.bdat.org.uk/documents/drug-action-plan-2008-2011.pdf>.
- [3] Institute of Alcohol Studies, "Adolescents and Alcohol," 2010, <http://www.ias.org.uk/resources/factsheets/factsheets.html>.
- [4] S. Pudney, "The road to ruin? Sequences of initiation into drug use and offending by young people in Britain," Home Office Research Study 253. Home Office Research, Development and Statistics Directorate, 2002, <http://webarchive.nationalarchives.gov.uk/20110218135832/http://rds.homeoffice.gov.uk/rds/pdfs2/hors253.pdf>
- [5] OFSTED, *Drug Education in Schools: An Update*, Office of Her Majesty's Chief Inspector of Schools, London, UK, 2000.
- [6] Changing Habits North West Dual Diagnosis Intelligence Report, "Informing the Commissioning, Management and Provision of Integrated Service Provision for Dual Diagnosis Treatment Populations," Care Services Improvement Partnership, North West Development Centre, 2007, <http://www.nmhdu.org.uk/silo/files/changing-habits.pdf>.
- [7] D. W. Brook, J. S. Brook, C. Zhang, and J. Koppel, "Association between attention-deficit/hyperactivity disorder in adolescence and substance use disorders in adulthood," *Archives of Pediatrics and Adolescent Medicine*, vol. 164, no. 10, pp. 930–934, 2010.
- [8] B. S. G. Molina and W. E. Pelham, "Childhood predictors of adolescent substance use in a longitudinal study of children with ADHD," *Journal of Abnormal Psychology*, vol. 112, no. 3, pp. 497–507, 2003.
- [9] R. A. Barkley, M. Fischer, L. Smallish, and K. Fletcher, "Young adult follow-up of hyperactive children: antisocial activities and drug use," *Journal of Child Psychology and Psychiatry and Allied Disciplines*, vol. 45, no. 2, pp. 195–211, 2004.
- [10] R. A. Chambers, J. R. Taylor, and M. N. Potenza, "Developmental neurocircuitry of motivation in adolescence: a critical period of addiction vulnerability," *American Journal of Psychiatry*, vol. 160, no. 6, pp. 1041–1052, 2003.
- [11] T. E. Wilens, S. V. Faraone, J. Biederman, and S. Gunawardene, "Does stimulant therapy of attention-deficit/hyperactivity disorder beget later substance abuse? A meta-analytic review of the literature," *Pediatrics*, vol. 111, no. 1, pp. 179–185, 2003.
- [12] T. E. Wilens, J. Adamson, S. Sgambati et al., "Do individuals with ADHD self-medicate with cigarettes and substances of abuse? Results from a controlled family study of ADHD," *American Journal on Addictions*, vol. 16, no. 1, supplement, pp. 14–23, 2007.
- [13] C. E. Sartor, M. T. Lynskey, A. C. Heath, T. Jacob, and W. True, "The role of childhood risk factors in initiation of alcohol use and progression to alcohol dependence," *Addiction*, vol. 102, no. 2, pp. 216–225, 2007.
- [14] H. Green, A. McGinnity, H. Meltzer, T. Ford, and R. Goodman, "Mental health of children and young people in Great Britain," 2004, <http://www.ons.gov.uk/ons/index.html>.
- [15] L. Hackett, L. Theodosiou, C. Bond, C. Blackburn, F. Spicer, and R. Lever, "Understanding the mental health needs of primary school children in an inner-city local authority," *Pastoral Care in Education*, vol. 28, no. 3, pp. 205–218, 2010.
- [16] R. Goodman, "The strengths and difficulties questionnaire: a research note," *Journal of Child Psychology and Psychiatry and Allied Disciplines*, vol. 38, no. 5, pp. 581–586, 1997.
- [17] R. Goodman, T. Ford, H. Simmons, R. Gatward, and H. Meltzer, "Using the Strengths and Difficulties Questionnaire (SDQ) to screen for child psychiatric disorders in a community sample," *British Journal of Psychiatry*, vol. 177, pp. 534–539, 2000.
- [18] R. Goodman, "Psychometric properties of the strengths and difficulties questionnaire," *Journal of the American Academy of Child and Adolescent Psychiatry*, vol. 40, no. 11, pp. 1337–1345, 2001.
- [19] C. K. Conners, K. C. Wells, J. D. A. Parker, G. Sitarenios, J. M. Diamond, and J. W. Powell, "A new self-report scale for assessment of adolescent psychopathology: factor structure, reliability, validity, and diagnostic sensitivity," *Journal of Abnormal Child Psychology*, vol. 25, no. 6, pp. 487–497, 1997.
- [20] C. Keith Conners, G. Sitarenios, J. D. A. Parker, and J. N. Epstein, "Revision and restandardization of the Conners Teacher Rating Scale (CTRS-R): factor structure, reliability, and criterion validity," *Journal of Abnormal Child Psychology*, vol. 26, no. 4, pp. 279–291, 1998.
- [21] C. K. Conners, "Clinical use of rating scales in diagnosis and treatment of attention- deficit/hyperactivity disorder," *Pediatric Clinics of North America*, vol. 46, no. 5, pp. 857–870, 1999.
- [22] R. J. Diclemente, M. S. Ruiz, and J. M. Sales, "Barriers to adolescents' participation in HIV biomedical prevention research," *Journal of Acquired Immune Deficiency Syndromes*, vol. 54, no. 1, supplement, pp. S12–S17, 2010.
- [23] B. Minty and C. Anderson, "Non-attendance at initial outpatient appointments at a hospital-based child psychiatric clinic," *Clinical Child Psychology and Psychiatry*, vol. 9, no. 3, pp. 403–418, 2004.
- [24] S. Sprich, J. Biederman, M. H. Crawford, E. Mundy, and S. V. Faraone, "Adoptive and biological families of children and adolescents with ADHD," *Journal of the American Academy of Child and Adolescent Psychiatry*, vol. 39, no. 11, pp. 1432–1437, 2000.
- [25] J. P. Allen, J. Chango, D. Szwedo, M. Schad, and E. Marston, "Predictors of susceptibility to peer influence regarding substance use in adolescence," *Child Development*, vol. 83, no. 1, pp. 337–350, 2012.



The Scientific  
World Journal

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



Gastroenterology  
Research and Practice

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



MEDIATORS  
of  
INFLAMMATION

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



Journal of  
Diabetes Research

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



Disease Markers

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



Journal of  
Immunology Research

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



PPAR Research

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



Hindawi

Submit your manuscripts at  
<http://www.hindawi.com>



International Journal of  
Endocrinology

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



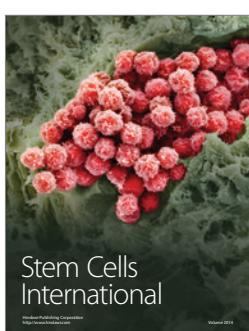
BioMed  
Research International

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



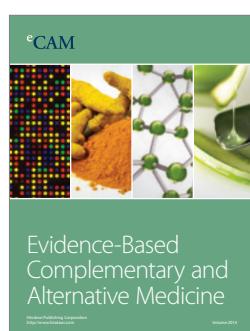
Journal of  
Ophthalmology

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



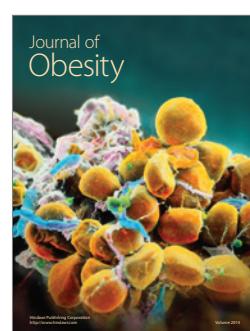
Stem Cells  
International

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



eCAM  
Evidence-Based  
Complementary and  
Alternative Medicine

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



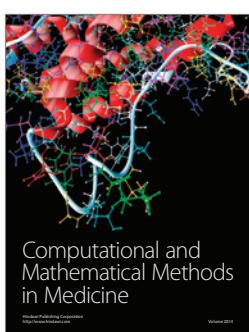
Journal of  
Obesity

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



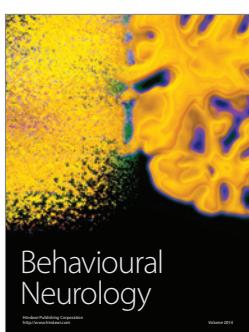
Journal of  
Oncology

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



Computational and  
Mathematical Methods  
in Medicine

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



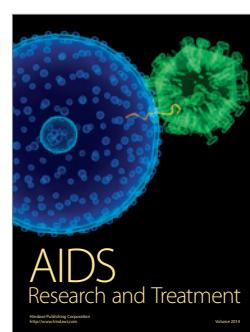
Behavioural  
Neurology

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



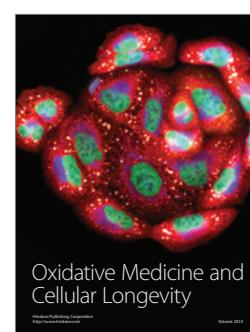
Parkinson's  
Disease

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



AIDS  
Research and Treatment

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014



Oxidative Medicine and  
Cellular Longevity

Hindawi Publishing Corporation  
<http://www.hindawi.com>  
Volume 2014