

# Head Shop Compound abuse amongst attendees of The Drug Treatment Centre Board

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## Abstract

The use of 'Head Shop' compounds has received much media attention lately. There is very little research in the current literature with regard to the extent of the usage of these substances amongst the drug using population in Ireland. We conducted a study to examine the extent of the usage of Mephedrone, Methylone and BZP amongst attendees of Methadone maintenance programs at the DTCCB. Two hundred and nine samples in total were tested. The results showed significant usage of these compounds amongst this cohort of drug users, with 29 (13.9%) of samples tested being positive for Mephedrone, 7 (3.3%) positive for Methylone and 1 (0.5%) positive for BZP.

## Introduction

Much attention has focused lately on the use of 'Head Shop' compounds or 'Legal Highs' amongst the general population. There is grave concern over the adverse effects that these are having on the individuals that have taken them<sup>1,4</sup>. The issue has received much media coverage and has been debated in both the Dáil and the Seanad. On 26th January 2010, Minister Mary Harney stated that Minister John Curran, Minister of State at the Department of Community, Rural and Gaeltacht Affairs, who has responsibility for coordinating the National Drugs Strategy, has identified head shops as an area of concern, and is currently considering the options available to more effectively control the activities of head shops. Under the National Advisory Committee on Drugs, a Research Advisory Group has been established to identify possible options for the regulation of head shops.<sup>5</sup>

There are numerous compounds available in products which are not currently illegal from these so called Head Shops. The products are generally marked as 'Bath Salts' or 'Plant Feeder' and 'Not for Human Consumption'. The compounds that have been getting the most media coverage are members of the beta keto Cathinone group. These compounds are derivatives of phenylethylamines, the family of compounds, which include MDMA or ecstasy. Cathinone is a pharmacologically active alkaloid extracted from leaves of the Khat plant. Human metabolism of Cathinone produces Cathine and Norpseudoephedrine, compounds which are structurally similar to Amphetamine and Adrenaline. Cathinone is currently controlled. Mephedrone is illegal in Sweden, Denmark, Finland, Israel and Germany. Table 1 is a list of the compounds that have been reputed to be present in the head shop products.

## Methods

The aim of our study was to determine the chemical content of some of the Head Shop products and then determine the extent of their usage amongst the drug using cohort at the DTCCB. It is difficult to source certified reference standards for these various compounds and this therefore limits and delays the testing for these compounds. At the time of writing the Drug Treatment Centre Board Laboratory had managed to source Methylone and Mephedrone from LGC Standards in the UK. Very little is known of the metabolism of these head shop compounds, however it is known that Methylone is almost completely metabolized with the main metabolite being 4-Hydroxy-3-methoxymethcathinone (HMMC). Unfortunately this compound is not available for purchase and very little of the parent compound is left in urine 24 hours after taking the drug.<sup>6</sup> Mephedrone is not metabolized as completely as Methylone and is present in the urine in sufficient amounts to detect it.<sup>7</sup> It is not known how long any of these compounds remain detectable in urine after a typical ingestion.

Samples were analysed for Head Shop compounds by LC/MS (Liquid Chromatography/Mass Spectrometry) which is a confirmatory analytical technique which allows the unambiguous identification of the compounds present in a sample. Samples were also subjected to routine immunoassay screening for drugs of abuse. This technique identifies the class of drug for which the drug is positive but does not confirm a specific drug. Samples were chosen for the study as follows: A total of 209 samples submitted to the DTCCB laboratory for drugs of abuse screening were analysed. Of these 209 samples, 46 were from patients of the DTCCB who had admitted to using Head Shop compounds or who were behaving erratically and therefore were suspected by the clinical team at the DTCCB of using these compounds. The other 163 samples were taken at random from samples submitted for routine drugs of abuse analysis. A previous study carried out by the DTCCB before BZP was placed under control, found that 7.5% of patients tested were positive for BZP.<sup>8</sup> This current study concentrated on analysing methadone maintenance patient urine samples for Methylone, Mephedrone and BZP.

## Results

The DTCCB laboratory analysed 209 samples of urine for Methylone, Mephedrone and BZP by LC/MS. Of these 209 samples, 46 were from suspected users of headshop compounds, 163 were random samples. Of the random samples 7.4% were positive for Mephedrone and 1.2% positive for Methylone. Of the total 209 samples, 13.9% were positive for Mephedrone, 3.3% for Methylone, and 0.5% for BZP. Seven (3.3%) of the 209 tested were co-abusing both Methylone and Mephedrone. The figures for Methylone usage may be an underestimate due to the fast metabolism of this drug. Products sold in head shops were also analysed for their content with the following results: 'Blow' contained Mephedrone, 'Snow' contained Methylone, 'Diablo' contained Mephedrone and 'Charge' had indications of Mephedrone. All 29 samples testing positive by LC/MS for Mephedrone and Methylone were also subjected to the laboratory's routine immunoassay screening, however, not all were tested for every class of drug.

All of the 29 samples that tested positive for head shop compounds were tested for Opiates, Benzodiazepines and Cocaine by immunoassay, 21 (41%) tested positive for Opiates, 21 (72.4%) tested positive for Benzodiazepines and 4 (13.8%) tested positive for Cocaine. Of the 29 positive for head shop compounds, 10 were tested for Amphetamines and 2 were positive, 12 were tested for Cannabis with no positives and 17 were tested for Alcohol with 1 positive. The age range of the patients who tested positive for head shop compounds was 21 to 52 years with the average age being 32 years.

## Discussion

The poly substance nature of drug misuse noted previously<sup>9</sup> is again evident in these results. All of the patients tested are methadone maintenance patients and many are currently being prescribed benzodiazepines. Co-abuse of head shop compounds with opiates is significant with 12 (41%) of the 29 head shop positive patients also abusing opiates. The low number of BZP abusers indicates that placing it under control has decreased its usage when compared to the study conducted in the DTCCB laboratory in 2008.<sup>4</sup> Males were more likely than females to be taking these compounds, with an approximate ratio of 70:30 male to female. The parent drug is looked for in these analyses, as very little is known about the metabolism of these drugs. There may be metabolites of these compounds that are present in higher concentrations than the parent in the urine and present for a longer time than the metabolite. It is not known how long any of these compounds are present in the urine. Because of these factors the results shown could actually be an underestimation of their usage.

These drugs are most commonly administered orally or by insufflation, they have also been known to be injected. Users report effects such as euphoria, increased energy, and openness, some users have likened the effect to that of Cocaine. Negative physical effects reported have been tiredness, nose bleeds, increased heart rate, chest tightness. Negative mental effects reported are nervousness, hallucinations, and paranoia.<sup>10</sup> They have also been linked to a suicide<sup>11</sup> and a number of deaths.<sup>12-14</sup> On the 3rd March, 2010 the Dept. of Health and Children announced the control of the following substances: Synthetic Cannabinoids (SPICE products), Benzylpiperazine (BZP) derivatives, Mephedrone, Methylone and related Cathinones and GBL and 1,4 BD.<sup>15</sup> These are expected to come under control in June, 2010. This should decrease their usage, however, unfortunately as one drug is placed under control, other drugs are produced to replace it in the market. Newer groups of drugs such as the Aminoindanes e.g. 5,6-Methylenedioxy-2-aminoindane (MDAI) and 5,6-Methylenedioxy-N-methyl-2-aminoindane (MDMAI) are probably already lined up to replace these compounds.

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