

Novel Drugs, Novel Solutions: exploring the potentials of web-assistance and multimedia approaches for the prevention of drug abuse

Nuove Droghe, Nuove Soluzioni: esplorare il potenziale della *web-assistance* e proposte multimediali nella prevenzione dell'abuso di sostanze

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Abstract

Objectives: Drug abuse has increased markedly in the last decade especially with the emerging of the unregulated websites selling novel herbal, designer and pharmaceutical psychoactive products. These are advertised online as 'legal' or 'pure' and sold at very low prices. In this respect, the Recreational Drug European Network (ReDNet) aims to pilot various multimedia solutions focused on the prevention of drug abuse, which are based on technical and scientific information. The service is targeted at both professionals and young people.

Methods: (a) monitoring the web for emerging novel drugs of abuse; (b) testing these products using the appropriate analytical techniques and (3) disseminating information via technological tools such as interactive websites, SMS alert, social networking (Facebook, Twitter), Multimedia (YouTube), Smartphone applications (iPhone), and seminars for professionals in the virtual learning environments (Second Life).

Results: Up to date, 500 health professionals are using the interactive website on regular basis. The ReDNet Facebook page has 250 likes. Seminars for professionals on Second Life have started since January 2011. SMS alerts, phone applications and other innovative services will soon be available for health professionals and young people.

Conclusions: The piloting of innovative ICT-based prevention programmes with respect to novel psychoactive drugs is an essential step to tackle their rapid diffusion and promote safer and knowledge-based online environments and healthier life styles.

Abstract

Obiettivi: l'abuso di sostanze nella scorsa decade è cresciuto marcatamente, specialmente con l'emergere di siti web non soggetti ad alcun regolamento che

vendono prodotti di origine vegetale, sintetica o farmaceutica. Queste sono pubblicizzate come 'legali' o come 'pure' e vendute ad un prezzo molto basso. A questo proposito, il Recreational Drug European Network (ReDNet) si propone l'obiettivo di implementare varie soluzioni multimediali focalizzate sulla prevenzione dell'abuso di sostanze utilizzando informazioni tecniche e scientifiche. Il target è costituito da professionisti e giovani.

Metodi: (a) monitoraggio del web in merito all'emergere di nuove droghe d'abuso; (b) testare questi prodotti con le opportune tecniche di analisi e (c) disseminare le informazioni tramite strumenti telematici, quali siti web interattivi, SMS di allerta, social networking (Facebook, Twitter), Multimedia (YouTube), applicazioni per gli Smartphone (iPhone), e seminari per professionisti in piattaforme virtuali (Second Life).

Risultati: in questo momento 500 professionisti del settore della salute stanno usando il sito web interattivo in modo regolare; la pagina Facebook del ReDNet ha realizzato 250 "Mi piace". A partire da Gennaio 2011 sono iniziati i seminari per professionisti nella piattaforma multimediale di Second Life. SMS informativi, applicazioni per cellulari ed altri servizi innovativi saranno presto disponibili per i professionisti della salute e per i giovani.

Conclusioni: testare programmi di prevenzione innovativi basati su strumenti multimediali è un passo essenziale per affrontare la rapida diffusione delle nuove sostanze psicoattive, promuovere un più sicuro e consapevole utilizzo della rete oltre che stili di vita più sani.

Key words: *Designer drugs, Prevention, ReDNet Project, Multimedia approaches, "Legal highs", Web-assistance*

Parole chiave: *Nuove Droghe, Prevenzione, ReDNet Project, Strumenti multimediali, "Legal highs", Web-assistance.*

Introduction

During the last decade there has been a sharp change in the social, cultural, legal and political context of drug addiction, which has led to unprecedented new challenges. It has been documented that an increasing number of unregulated websites were dedicated to the dissemination of novel herbal, 'designer' and pharmaceutical psychoactive drugs [1-4]. These drugs are of particular concern as they are advertised as 'legal' and 'pure' making them more attractive to abusers mainly of the teenage group. More specifically they are:

- Not approved for human consumption and might well have unknown pharmacological effects and unpredictable side effects and adverse reactions on users [5-6].
- Legal and thus perceived as 'safe' by users/potential users [7].
- Often sold as something else, like mystical incenses, plant chemicals and bath salts [7-8].
- Unknown to health and other professionals who constantly need to receive updated and accurate information about these new substances. For instance, according to one of our survey 69% of health professionals in the UK are seeing patients who are taking 'legal highs' and 57% judged their knowledge of legal highs 'poor' or 'basic' [9].
- Not mentioned in the scientific literature, generally restricted to studies in animals [5-7].
- Are increasingly accepted as part of a lifestyle rather than being considered as a misuse of drugs [6].
- Are just a 'click away' from our homes and thus potentially available to everyone, especially young people who are amongst the most at risk in taking advantage of information and products available online [7, 10].

The situation is even more alarming if it is considered that an estimated 78% of young people aged between 16 to 24 years in the European Union (EU) already use the Internet at least once a week and 60% of parents are worried about their online use [11]. For instance in Italy, about one-third of children ages 2 to 11, three-fourths of adolescents and adult women, and over four-fifths of adult men access the Internet on a monthly basis. Children spend an average of 22 hours/month on the computer, with a jump to 87 hours/month for adolescents [12].

In this respect, a variety of Internet-based programs that aims to educate and prevent drug abuse among young people have been attempted. However, the impact of these forms of intervention are relative inconclusive. In general these educational resources appear to be negatively appraised by those who might be considered at risk of becoming users. We suggest here that these forms of intervention are unsatisfactory because they are:

- Fear-based and moralistic.
- Inherently theoretical and didactic.
- These forms are only focused on traditional psychoactive substances such as heroin, cocaine and alcohol.

Recreational Drugs European Network (ReDNet)

The Recreational Drugs European Network (ReDNet; www.rednetproject.eu) is a research project that aims to develop and pilot innovative and effective information communication technologies (ICT) preventive approaches focused on novel psychoactive compounds and combinations (Figure 1). Piloted ICT tools include the use of interactive websites, SMS alert, social networking (Facebook, Twitter), Multimedia (YouTube), Smartphone applications (iPhone), and seminars for professionals in the virtual learning environments (Second Life) [13-15].

All these tools are developed through the use of technical/scientific information, appropriately adapted and updated, that have been previously identified and carefully monitored by our research centres. It relies here on the experience of two previously EC-funded research projects (Psychonaut I, II; www.psychoanutproject.eu; [16-17]), which focused on web monitoring and developed a search engine in various languages. Particular attention is also given to health professionals working directly with young people showing problematic behaviours who constantly need to receive updated and accurate information about these new substances.

The project is funded by the European Commission Executive Agency for Health and Consumers in the framework of the Public Health Programme and has a network operative in ten research centres across eight EU countries: the UK, Spain, Germany, Italy, Belgium, Poland, Hungary, Norway.

The main objectives of the ReDNet are:

- To design an innovative and effective ICT-based model to share knowledge and information with health/other professionals and raise awareness of the potential harms associated with new drugs.
- To identify and disseminate key recommendations relevant to the development of the awareness on novel compounds initiatives across the EU.

- To identify any remaining gaps in knowledge and methodological lessons learned.
- To inform future projects in the field of drug prevention using ICT tools.

Methods

The project's methodology is articulated in three main phases (Figure 2):

1. Monitoring.
2. Testing.
3. Informing via ICT tools.

1. Monitoring

Monitoring is mainly focused on the observation of the web sources including websites, chat rooms and news groups for any emerging novel synthetic and herbal drugs of abuse. A specific methodology for a qualitative multi-lingual assessment of the material available on the Internet has been previously developed during two previous Psychonaut Projects [16]. Such qualitative searches are now carried out on a regular basis across the research centres. Monitoring is made in two main steps:

1. The first step is to carry out a multilingual (English, German, Norwegian, Spanish, Italian, Dutch, Hungarian, Polish) qualitative assessment of about 200 websites, drug-forums and other online resources (e-newsgroups, chatrooms, mailing lists, e-newsletters, and bulletin boards) using the Google search engine.
2. The second step is to carry out a technical evaluation of all the available information on the novel drugs and trends of abuse emerged during the web monitoring as well as a qualitative and quantitative analysis of the literature found with a particular consideration to the cases of drug abuse in the *Accident and Emergency Departments* of hospitals. This is essential especially in absence of both 'classical' laws enforcement data and formal peer reviewed medical literature documents.

Mephedrone

The ReDNet/Psychonaut research groups were for instance the first to identify the emerging of mephedrone [13]. Mephedrone is a psychoactive chemical of the cathinone family (Figure 3) with similar activity to amphetamine, cocaine and MDMA. Its use has increased markedly since 2009 especially in the online market since the decrease in availability of ecstasy and cocaine [18].

Pregabalin

In addition, the ReDNet research group was the first to identify the recreational use of Pregabalin (Figure 3) pharmaceutical product, which has not been identified by EMEA as a drug of abuse [19-20]. Pregabalin is a prescription medicine used for the treatment of anxiety, partial epilepsy and neuropathic pain. It is sold under the trade name of Lyrica 75 mg capsules and manufactured by Pfizer. It was sold heavily by illegitimate websites at discount prices. It induced benzodiazepine-like effect mixed with euphoria [20].

'Spice drugs'

Another drugs identified by the ReDNet include herbal drugs of abuse such as 'Spice' products, which are often sold online as herbal incense [7]. These are often herbal smoking blends sold as legal substitute to cannabis. Listed ingredients of these products indicated the presence of bioactive herbs or compounds as JWH-018 [21-22] (Figure 3).

Bromo-DragonFLY

The research group has also studied the effects of Bromo-DragonFLY, or simply 'B-Fly', a powerful, long lasting (2-3 days), LSD-like, hallucinogenic drug, which has been associated with a number of recent intoxications and fatalities in a number of countries. Although the substance is almost unknown to the scientific literature, discussions on the Internet have been identified since 2003 [6].

2. Testing

Testing is made through ordering these drugs from Internet websites and identifying them through the appropriate analytical techniques. In this respect, few questions need to be answered:

- Does the sample contain the drug stated? If yes, at which concentration does it contain?
- If not, what other compound does it contain?
- Are the batches of the same drug consistent?

The analytical techniques include: spectroscopic, spectrometric, chromatographic and elemental analysis techniques. Products are advertised as high purity drugs; however, other substances or impurities are often encountered in these drugs. Thus, in some cases these drugs analysed contained inorganic impurities, anesthetics (as benzocaine or lidocaine), caffeine or even other pharmaceutical products [23-27]. For identity of drugs, spectroscopic techniques such as nuclear magnetic resonance (NMR) can identify the chemical identities of the drugs. Mass spectrometric techniques can detect the masses of the components in the drug. Purity of the components can be confirmed using chromatographic techniques, which can be efficient even at low concentrations. In addition, elemental analysis can detect elemental impurities in drugs. Most of the references that identified legal high products from the Internet concentrated on the identity of these products [24, 26, 5]. However, there is still gap in quantifying the concentration of these drugs when they are purchased in tablet or capsule form or when several components exist in a powder form.

Technical folders and reports

From these sources (both monitoring and analysis), a preliminary report and/or technical folder for each drug is generated. Each of these consists of: key points, chemical characteristics of active constituents, appearance, available information on purchase price, modalities of intake, legal status, current use/ medicinal use, information on recreational use/ misuse in the EU (or elsewhere), use in combination with other compounds, pharmacological characteristics, toxicological effects, desired psychoactive effects, physical/ medical untoward effects, psychopathological disturbances associated with its use, clinical advice, related fatalities, Youtube videos, Google Insights, online marketing strategies, bibliography and sitography. These

reports are stored in a password protected database, which currently contains information on more than 400 novel substances.

3. Informing via ICT tools

A preliminary survey informed the dissemination of the results derived from both the monitoring and the testing activities via a number of ICT tools [9], which are currently being piloted. These include:

- An interactive website, where health and other professionals (e.g. drugs workers, police, etc) can register and receive full up-to-date access to the technical folders and reports on new compounds. Up to date more than 500 professionals have joined and are using such information on a regular basis, including cases of emergency.
- social networking (Facebook, Twitter). Facebook is used by over 606 million people around the world [28]. This makes it a very important tool to target young people. ReDNet has a Facebook page which helps in the increase of awareness of the drug issues. So far the page has 250 likes. Up to date drug threads, videos and meetings are posted on this page on a regular basis.
- SMS alerts. SMS alerts for health professionals are an important tool, which will be used in the increase of drug awareness. The service will provide instant messages for health and other professionals regarding the up to date novel drugs.

Multimedia

YouTube

Youtube videos are an important tool for publishing online data and presentations. It targets both professional and non-professional people and audience of various age groups. ReDNet have so far a presentation on LinkedIn [29]. Yet, more presentations and videos will be published on YouTube. In this respect, various videos focused on 'drug-free lifestyles' are in the progress of being developed by the students at the Film Department at University of Hertfordshire in the UK.

Smartphone applications

Mobile phone applications are replacing laptops as a technological tool. Smartphones offer the advantage of convenience and rapidity in accessing the Internet. They can provide a lot more data in a short time.

Seminars for professionals in the virtual learning environments

Second Life seminars represent a very important tool in increasing drug awareness. It gathers the advantages of both targeting the youth audience who are using technological tools extensively and are not aware of the threat of drugs and researchers who are in different parts of the World but cannot meet occasionally. Thus, collaborative work from various parts of the world can be gathered. On Wednesday the 26th of January 2011 the virtual studio of the ReDNet project in Second Life was launched with participants from various countries. The title of the seminar was: 'Promoting Active Life and Positive Attitude: Tasks, Methods and Proposal for New Drug Legislation'. Figure 4 shows the invitation of the Second Life seminar.

Consultation with the target groups

For the development of target and age appropriate content, consultation groups with young people are involved. The ReDNet research project values the opinion of the young participants, their creativity and their knowledge of new technologies.

Consultation groups with groups of young advisors may become fundamental not only for the promoting innovation in the didactic process, but also for preparing high quality educational resources to be distributed via ICT-tools. In addition such working groups stimulate a mutual positive attitude among students/participants, who learn new ways of expressing themselves and relating to their teachers. In other terms, the discovery of the individual and of the common potential for the benefit of society goes together with the development of the quality of the learning process [30, 10].

Consultation groups of health and other professionals working with at-risk groups are also taking place.

Expected outcomes

The expected outcomes of this project will be both immediate and long lasting. It will constitute the first EU-wide ICT-based preventative programme designed for novel psychoactive compounds/combinations targeted at young and vulnerable individuals and professionals working with them. In this sense, it will not only inform and stimulate a much-needed discussion on the rapid and almost unpredictable diffusion of novel compounds, but also contribute to an enhanced scientific understanding of recreational drugs. Furthermore, it is hopeful that the project will be able to offer proper advice to both international agencies and national policy makers.

In addition, the proposed model is a cost-effective prevention and education model that could potentially help to reduce National Health Services costs. In fact, one of the problems of the novel psychoactive drugs is that they are almost completely unknown to the medical community and to the Medline. As a consequence, both the diagnosis and the management of these acute/chronic intoxications are problematic indeed. With a better understanding of these drugs, it is hopeful that the clinical management levels will improve. Furthermore, if the present project will be associated with smaller number of youngsters taking recreational drugs/research chemicals/legal highs, then smaller number of drug related near misses/fatalities will be arguably recorded.

In conclusion, it is believed that the monitoring of the web with respect to drug-related issues as well as the use of ICT tools for the dissemination of information on risky substances and health promotion messages is not only important, but also necessary to tackle the rapid diffusion of these new psychoactive substances and contribute to a safer and knowledge-based online environment in order to improve the quality of public health on a global level.

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