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Citation for published version:
Laura Orsolini, Giula Francesconi, Ducci Papanti, Arianna giorgetti, and Fabrizio Schifano, 'Profiling online recreational/prescription drugs' customers and overview of drug vending virtual marketplaces', *Human Psychopharmacology: Clinical & Experimental*, Vol. 30 (4): 302-318, July 2015.

DOI:
https://doi.org/10.1002/hup.2466

Document Version:
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Profiling the online drug consumer: a systematic literature review on legal and illegal drug market on the Web

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Abstract

The internet and social networking sites play a significant role in the marketing, sale and the distribution of drugs. The internet is being used both as a source of information and communication but also as a tool to disseminate drug-related websites and sell controlled substances without prescriptions. Our review aims to obtain knowledge concerning the profile of the online drug consumer and the determinants of internet preference. PubMed, Google Scholar and Scopus databases were searched without any language limitations by using a set of keywords. For each set of keywords we evaluated all articles providing socio-demographic characteristics of online drug consumers; reasons for purchasing online drugs; risks related to the online shopping of medicaments and features of illicit/legitimate commercial sites. All data has been analysed and compared for these specified clusters. Results report a majority of Caucasian males in their twenties, both in internet users and drug user/abusers. Several studies reported that the men usually perceive less risks, are more likely to turn to the internet as a source of prescription drugs and, subsequently, more likely to buy drugs and illegal substances online. On the other hand, women were noted as more likely to search for health information. The protection of identity by screen pseudonyms, variety and quality of product listings, selection of vendors based on review feedbacks, reduced personal risks, forum activity and the availability of a service for prescription-only drugs stimulate the growth and development of both OPs and drug marketplaces.

Introduction

The Internet and social networking sites play a significant role in the marketing, sale and distribution of the drugs (ACMD, 2010). The Internet is being used both as a source of information and communication but also as a tool to disseminate drug-related websites data and sell controlled substances without prescriptions. Pharmaceutical websites provide information on how to use and to purchase drugs and on possible side-effects, together with their chemical and pharmaceutical properties and consumers' experiences. The benefits of the Internet include that it enables customers from around the world to shop with relative anonymity in a 24-hour marketplace (Forman et al., 2006).

The use of the Internet has increased over the last few years, specifically among youth. Data from Norway indicate that from 1996 to 2002 the percentage of households that use the Internet has increased from 3% to 72% (Norwegian Group Inter Track, 2002). The *Pew Internet &American Life Project* (2005) reported that approximately 67% of Americans aged 18 years or older use the internet and that 100% of college students, 78% of 12-17-year-olds and 63% of all adult Americans are online at least once a month. In 2009 the same report showed an increase of internet users in America: 93% of 12-17 year olds and 74% of adults ages 18 and above (PEW Internet&Americans Life Project, 2009). Teenagers and young adults now report the internet as their primary source of general information and 75% of a large American youth sample had used the internet at least once to find health information, including information on alcohol and drugs (Rideout, 2001; Gray et al., 2005). A national German survey revealed that almost three-quarters of Internet users reportedly look online for health-related information (Dumitru et al., 2007). Furthermore, several studies have demonstrated a positive association between online information seeking and purchasing drugs via the Internet (Shim et al., 2001; Kim et al., 2008).

Therefore, it is necessary to ask how crucial the role of the Internet is in the initiation of drug use, the maintenance of dependence and the triggering of relapse. A particular concern is the role that "No Prescription" websites (NPWs) might play in initiating drug use among young people since young individuals are the most frequent users of the Internet and are in the age group in which drug use typically begins (Gersteil et al., 1993; Volkow, 2001; Office of National Drug Control Policy, 2004; Lenhart et al., 2005). NPWs can be easily identified through the leading search engines such as Google, Yahoo etc. Furthermore, the recent rapid growth of social networks may promote these websites and increases the market of novel psychoactive substances (NPS). Platforms such as Twitter®, Facebook®, Google+®, LinkedIn®, Tumblr® and YouTube® facilitate the exchange of short messages, via desktop, laptop, tablet or smartphone between members of interrelated groups and, therefore, offer opportunities for people to share opinions, information, links and experiences related to the substance abuse.

There is already evidence that social networks have been employed by drug abusers for the purpose of discussing and obtaining drugs (Boyer et al., 2008; Barratt, 2012). An American preliminary study was conducted to investigate the use of the Internet by patients in a private residential treatment programme in eastern Pennsylvania for drug-related information or to purchase drugs. According to this study, 29% reported knowledge of the Internet as a source of drugs and 11% reported that they had used the Internet to either buy drugs or locate a drug dealer (Gordon et al., 2006).

The number of online pharmacies (OPs), including the NPWs, has increased substantially over the past decade (Forman, 2006; Weiss, 2006). OPs (also known as *cyber-pharmacies*, *e-pharmacies* or *virtual pharmacies*) can be defined as pharmacies which sell drugs through the Internet (Orizio et al., 2010), having mainly developed in the late 1990s (Gallagher and Collaizi, 2000). They are computerised systems having the potential role of real pharmacies and handling business transactions remotely with no physical proximity between consumers and drug retailers (Gondim and Falcao, 2007). Alongside the e-pharmacies a phenomenon of "*self-medication market*" has emerged that describes a market for only non-prescription drugs (also known as "over-the-counter" or OTC drugs). A US survey showed that prescription of OTC drugs was the fifth health topic searched on the Internet in 37% of cases (Fox, 2004).

Several OPs also sell "*prescription-only medicines"* which, by law, require a valid prescription and risk-benefit assessment by a trained healthcare professional before they can be supplied. Most OPs offer a prescription service but often provide prescriptions for patients despite clear contraindications (Weiss, 2006). Many OPs ask potential buyers to fill in a medical questionnaire, and its typical incompleteness has been reported (Orizio et al., 2009). The online questionnaire is evaluated by a so-called cyber-doctor but it is difficult to establish whether a cyber-doctor is a real person or merely a computer program designed to guide patients towards responses needed to justify a prescription.

Unfortunately, the market of NPWs that sell prescription-only medications without requiring a legal prescription is also growing, and hence it is increasing the risk of prescription drug abuse (Lineberry et al., 2004; Bostwick et al., 2007; Levaggi et al., 2009). In a recent analysis of 365 websites offering controlled substances for sale online, 42% explicitly stated that no prescription was needed, 45% offered an "online consultation" and 13% made no mention at all of a prescription (CASA, 2009). Even synthetic opioids such as tramadol can easily be obtained online; one study showed that most of the advertised links on Google for that pain medication did not require any prescription (Hubbard, 2001).

Moreover, in recent years, a dramatic increase has been also observed in the sale of 'legal highs' via the Internet (Dick et al., 2010; Shmidt et al., 2011) and in the diffusion of *cyber illegal drug markets* also due to the development of electronic currencies and anonymous transacting infrastructure for the retail of drugs and pharmaceuticals (Corazza et al., 2011; Corazza et al., 2012; Davies, 2012; Forsyth, 2012; Solberg et al., 2012).

This systematic review aims to obtain information concerning the profile of the online drug consumer as well as to give an overview of the critical determinants of Internet use for obtaining drug information and purchasing drugs. The main purposes are merely exploratory, informative and preventive.

Methodology

PubMed, Google Scholar and Scopus databases were searched without any language limitations by using the following sets of keywords: "*online* AND (*drug* OR *drugs*) AND (*shopping* OR *consumer* OR *buyer*) AND *characteristics"*; "(*online* OR *Internet*) AND (*drug* OR drugs) AND *forum", "online* AND *pharmacies* AND *user* AND *profile", "online* AND *pharmaceuticals* AND *consumer", "online* AND *pharmacies* AND *web", "socio demographic* AND *Internet* AND *drug*

AND *user", "controversies AND drug* AND *Internet", "drug* AND *availability* AND *online", "intentions* AND *consumer* AND *buy* AND *medicaments", "purchase* AND *medication* AND *income* AND *Internet", "psychoactive* AND *drug* AND *Internet", "Internet* AND *psychoactive* AND *substance* AND *drug* AND *user", "drug* AND *consumer", "website* AND *buy* AND *drug", "illicit* AND *drug* AND *market", "online* AND *drug* AND *anonymous* AND *user", "Internet* AND *drug* AND *sales",* "*legal high* AND *buy* OR *purchase*", "*legal high* AND *consumer* AND *buy*", "*legal high* AND *end user* AND *Internet*", "*drugs* AND *youth* AND *internet*", "*source* AND *prescription* AND *drug",* "*prescription* AND *drug* AND *Internet",* "*prescription drugs* AND *users* AND *Internet*", "*online* AND *selling* AND *prescription* AND *drug",* "*prescription drugs* AND *purchase* AND *online*", "*prescription drug* AND *patients who* AND *purchase*", "*prescription* AND *drug* AND *online",* "*non-prescription drug* AND *purchase* AND *online*", "*consumers* AND *purchase* AND *Internet*", "*who* AND *buy* AND *internet* AND *drugs*", "*consumer* AND *profile* AND *online* AND *drug* AND *pharmacies", "enhancing* AND *drugs* AND *consumer* AND *online", "Internet* AND *steroids* AND *consumer", "Internet* AND *steroids", "steroids* AND *buy* AND *Internet", "Internet* AND *antiobesity* AND *use", "smart* AND *drug* AND *Internet", "Silk road", "Silk Road* AND *Ebay".*

They were selected all peer-reviewed articles, reports and data from institutional websites providing one or more of the following information: socio-demographic characteristics of online drug consumers (i.e. age, gender, marital status, ethnic group, employment status, health care coverage, level of education and income); reasons for purchasing online drugs (advantages); reasons for avoiding online shopping of medicaments (risks) and/or main characteristics of illicit and legitimate commercial sites (how to search; how to buy, the appearance, the best-selling drugs). The literature search covered the period up to March 2014. All data were been collected, analysed and compared using a specifically designed Excel spread-sheet. Finally, data were been divided in two macro-categories: consumers who purchase in illegal market (or market of 'legal highs') and those who purchase in legal OPs.

Results

A total of 71 articles (22 survey, 5 reports, 2 case-report, 11 reviews and 31 studies based on systematic observation of websites) were included and reviewed. Twenty studies were selected for the profiling of users of illegal market (summarized in ***Table 1***) and 51 studies for the users of OPs (summarized in ***Table 2***).

Socio-demographic characteristics

The consumer of the illegal cybermarket

According to what obtained by a literature search, the majority of both Internet users and drug user/abusers are youths (Halperne et al., 2001; Wax, 2002; Boyer et al., 2005; Forman, 2006; Mutschler et al., 2007; Ivanitskaya et al., 2010; Vardakou et al., 2011; Walsh, 2011; Chiauzzi et al., 2013; Van Hout et al., 2013a, 2013b). This is even more significant if we analyse data regarding the use of new psychoactive substances and legal highs, such as mephedrone, whose use was reported as involving mainly a population of 12-14 years old (Vardakou et al., 2011). Further, young people are interested in experiencing new and unexpected effects of innovative drugs, whilst developing

their own "pick-and-mix drugs", and this is now possible due to the increase in websites offering substances (Vardakou et al., 2011; Walsh et al., 2011).

Respondents to a survey of an online drug forum were typically Caucasian males in their twenties (Barratt et al., 2012; Chiauzzi et al., 2013). In a single case report, the SilkRoad experienced user was male, aged 25 (Van Hout et al., 2013b). Accordingly, it is possible that "*young people in addiction treatment will know about and use the internet with greater frequency*" (Gordon et al., 2006).

Two recent studies involving the users of Silk Road reported that participants were predominantly male (Barratt et al., 2012; Van Hout et al., 2013a). The SilkRoad users were, mainly, employed. In addition, one of the motivations for using online sources of drugs was the intention not to affect their work/professional status (Van Hout et al., 2013a; Van Hout et al., 2013b). The SilkRoad users had predominantly a tertiary education (Van Hout et al., 2013a) and online drug users of drug forum seem to have at least high standards of education (Chiauzzi et al., 2013; Van Hout et al., 2013b).

The consumer of the Online Pharmacies

A particular study (Gurau, 2005) divided consumers of OPs into 4 categories: consumer A (young, with low revenues, less interested in online service quality and less sensitive to online risks, but concerned about price and online payment security); consumer B (middle-aged, with good purchasing power, requiring privacy and discreetness of delivery); consumer C (middle-aged, high-revenue customer that requires a high service quality, anonymity, rich online information and choice) and customer D (old-aged, with low or medium purchasing power, attracted by the convenience of online shopping and home delivery, but highly concerned about online transaction risks"). In fact, there are several determinants and variables to take into account to profile the 'generic online drug consumer' (Atkinson et al., 2009).

While 63% of adults have access to the Internet, the regular users of the Internet are disproportionately young, including nearly 100% of college students and 78% of 12- to 17-year olds (CASA, 2004). Equally, although growing in popularity among older populations, ages of 18 to 29 are more likely to use Social Networking Sites (SNS, such as MySpace, Facebook, LinkedIn) for health-related activities (Thackeray et al., 2013). Several studies showed the mean age as early as 20, reporting that this type of population has the "*requisite computer skills related to using email, navigating websites, and conducting basic searches in popular search engines*"(Lenhart et al., 2005; Ivanitskaya et al., 2010; Cicero et al., 2011). In an online survey, tramadol Internet users were primarily white and female, as the traditional users who do not use the Internet to purchase the drugs, but younger (Cicero et al., 2012).

One report analysing the German population ranked the customers of online pharmacies into 4 groups, e.g. enthusiastic experts, risk-averse traditionalists, convenience-oriented rationalists and inexperienced opponents. It showed that the cluster 1 (29% of the sample) was typically made by (54.5%) females, with a mean age of 38.7 years (Wiedmann et al., 2010). It was also noticed that "*although pharmaceuticals are mainly used by the elderly, this group typically has little experience with and a general lack of trust in online shopping*" (Fittler et al., 2010).

There is no general agreement between different studies regarding the main gender involved (Gurau, 2005). In fact, several studies reported that the men usually perceive less risks, are more likely to report the Internet as a source of prescription drugs (Inciardi et al., 2010) and, subsequently, more likely to buy drugs online (Rajamma et al., 2009; Chiauzzi et al., 2013). Men are also the purchasers of internet sexual dysfunction drug Viagra (Trissler et al., 1999; Jones et al., 2010; Orizio et al., 2010). On the other hand, women were noted as more likely to search for health information and as the main consumers (Atkinson et al., 2009; Fittler et al., 2010; Svorc et al., 2012; Thackeray et al., 2013). However, women who use the online resources to obtain contraceptives seem to be older than the clinic-based group, and this is probably related to the need of a credit card (Kaskowitz et al., 2007).

Caucasians seemed to represent the majority (Menon et al., 2002; PEW&Internet, 2004; Chiauzzi et al., 2013).

The absence of a form of insurance was detected more commonly in Internet users of tramadol (Cicero et al., 2012), while better insured women were more likely to buy contraceptives online (Kaskowitz et al., 2007). Studies found that older people, without a Medicare prescription drug benefit (Fung et al., 2004), and, in the case of Americans, those who lack health insurance, may look at the Internet as a source of more accessible and more competitively priced prescription drugs (PEW, 2004).

Higher levels of education, or "*at least some college*" (Chiauzzi et al., 2013) seemed to be connected with the behaviour of accessing the Internet, searching for health information or buying drugs online (PEW, 2004; Gordon et al., 2006; Kaskowitz et al., 2007; Kishimoto et al., 2009; Rajamma et al., 2009) even if one study reported that "*individuals with low literacy and those with less formal education are expected to be susceptible to making a purchase from a rogue Internet pharmacy*" (Ivanitskaya et al., 2010).

Higher income (in the case of Americans $50,000+ annually) seemed also to be connected with the online purchasing drugs' experience, while low-income probably represent a barrier towards using computers and technologies and don't allow consumers to choose between health care options because of lack of insurance (PEW, 2004; Kaskowitz et al., 2007; Thackeray et al., 2013).

Reasons for purchasing online drugs

Several determinants were observed as probably connected with the perception of the Internet as a favourite source of drug information, and also with the purchasing of prescription/non-prescription/OTC drugs (Eysenbach, 1999; Trissler et al., 1999; Halpern et al., 2001; Henney, 2001; National Drug Intelligence Center, 2002; Menon et al., 2002; Miller et al., 2001; Bessell et al., 2002; Wax, 2002; Bessell et al., 2003; Bruckel et al., 2003; Fung et al., 2004; Lineberry et al., 2004; Pew Internet&American Life Project, 2004; Boyer et al., 2005; Koong et al., 2005; CASA, 2006; Forman, 2006; Gordon et al., 2006; Weiss, 2006; Drug Strategy, 2007; Mutschuler et al., 2007; Cicero et al., 2008; Hoover et al., 2008; Schepis et al., 2008; Atkinson et al., 2009; Kishimoto et al., 2009; Levaggi et al., 2009; Orizio et al., 2009a; Orizio et al., 2009b; Raine et al., 2009; Rajamma et al., 2009; Adams et al., 2010; Fittler et al., 2010; Ivanitskaya et al., 2010; Jones, 2010; Orizio et al., 2010; Schnetzler et al., 2010; Shmidt et al., 2010; Wiedmann et al., 2010; Cordaro et al., 2011;

Orizio et al., 2011; Vardakou et al., 2011; Walsh et al., 2011; Barratt, 2012; Campbell et al., 2012; Cicero et al., 2012; Davey et al., 2012; Holtgräfe et al., 2012; Khan et al., 2012; Levaggi et al., 2012; Liang et al., 2012; Mazer et al., 2012; McDonald et al., 2012; Svorc et al., 2012; Sugiura et al., 2012; Yegenogiu, 2012; Bachhuber et al., 2013; Brennan et al., 2013; Chiauzzi et al., 2013; Fittler et al., 2013; Gelatti et al., 2013; Thackeray et al., 2013; Van Hout et al., 2013a; Van Hout et al., 2013b). All analyzed factors are summarized in **Table 3**.

Reasons for avoiding online shopping of medicaments

Other studies have analyzed the potential risks related to an online purchase of drugs (Eysenbach et al., 1999; Trissler et al., 1999; Henney, 2001; Miller et al., 2001; Bessell et al., 2002; National Drug Intelligence Center, 2002; Wax, 2002; Bessell et al., 2003; Bruckel et al., 2003; Fung et al., 2004; Lineberry et al., 2004; CASA, 2006; Forman et al., 2006; Gordon et al., 2006; Weiss, 2006; Drug Strategy, 2007; Cicero et al., 2008; Department of Justice, 2008; Hoover et al., 2008; Schepis et al., 2008; Levaggi et al., 2009; Liang et al., 2009; Orizio et al., 2009a; Orizio et al., 2009b; Rajamma et al., 2009; Raine et al., 2009; Adams et al., 2010; Fittler et al., 2010; Jones, 2010; Ivanitskaya et al., 2010; Orizio et al., 2010; Schnetzler et al., 2010; Schmidt et al., 2010; Wiedmann et al., 2010; Cordaro et al., 2011; Orizio et al., 2011; Vardakou et al., 2011; Campbell et al., 2012; Cicero and Ellis, 2012; Khan et al., 2012; Levaggi et al., 2012; Liang et al., 2012; McDonald et al., 2012; Sugiura et al., 2012; Svorc et al., 2012; Yegenogiu, 2012; Bachhuber et al., 2013; Brennan et al., 2013; Fittler et al., 2013; Gelatti et al., 2013). Among these factors are included: - economic reasons (fear of extra costs, fear of non-delivery); - unavailability of the desired drug (e.g. cocaine or other illegal drugs) because there are time periods when sites are offline or not all the products are available; - lack of information about side-effects and properties that encourages an inappropriate use and/or abuse in dosage/mode for prescription-drugs and/or for illegal ones; - legal reasons (many products can be counterfeit, unapproved or illegal or there is the possibility to be identified by authorities) and – lack of health professional intervention. For every study are summarized these determinants in **Table 1** and **Table 2**.

Main characteristics of illicit and legitimate commercial sites

How to search

Most of the patients and customers reported looking at pharmacies and websites selling products through Internet search, or unsolicited emails (PEW&Internet, 2004; Gordon et al., 2006; Levaggi et al., 2009). Many times potential customers just get caught in advertisements (Fittler et al., 2013). Social media, social networking sites, online ranking and reviews are other possible sources of health information, though less than 15% of people reported doing so (Thackeray et al., 2013). Obviously, social media are more common between younger drug users and online seekers. Also, online forums may be the perfect place for the black online market: they transmigrate into street corners, and there have even been reports of a helpful crack dealer locator service online (Walsh, 2011). Furthermore, sites such as YouTube are being used by young people “to broadcast their friends taking the drug and experiencing the hallucinogenic effects” (Walsh, 2011).

Appearance

It was showed that websites selling controlled drugs have an extremely high turnover, fluidity in the layouts, multiple names and addresses, elements that are occasionally changed. Further, they may go offline, disappear for a certain period of time, and this is probably connected with the aim of being hardly recognized and closed down as rogue sites. After being deactivated, some sites come back online selling different drugs or products from the previous ones (for example, offered other prescription medications for sale without a prescription).

International design seemed to be a key-point for the layout of the websites, which were, in many cases, characterized by extreme dynamism and changeability (CASA, 2004; Lineberry et al., 2004). High levels of similarity, with regard to appearance of the homepage, site organization, sold products, purchase conditions, and registrants' data, were also revealed, as if one website was copying from the other one (Cordaro et al., 2011). Other studies (Kaskowitz et al., 2007; Orizio et al., 2010; Bachhuber et al., 2013) showed that some websites are quite stable overtime; in a survey, 75.4% were still active 1 year later and 79% were still operational six months after the first internet research.

Only a few websites publish a retailer legitimacy claim, the owners' or directors' names, or a telephone number (Bessell et al., 2002). To give the appearance of legitimacy, websites could either post logos of professional and governmental agencies or display the logos of major credit cards (Liang et al., 2013).

The majority of the sites had ".com" extensions and were in English language (CASA, 2004). Regarding geographical data, indications on the website and domain registration rarely agree. The majority of the websites did not show or declare either an address or any geographical details, although this seemed to be more common with non-prescription pharmacies, which were often just virtual interfaces (CASA, 2004; Levaggi et al., 2009; Orizio et al., 2011). Further, it seems that the domain name could mask the country of registration (Bachhuber et al., 2013).

Many sites can also show information about how to use at home easily available products (National Drug Intelligence Center, 2002). Other websites, such as Erowid, provided instructions for use and synthesis of specific drugs, or supply details about substances, such as botanical and synthetic hallucinogens, or "synthol" (Halpern et al., 2001; Schepis et al., 2008; Brennan et al., 2013).

Some studies focusing the features of the illegal market places, describe the aspect of Silk Road site as a professional, if minimalist, look offering a variety of goods (e.g. books, digital currency etc.) but having a clear focus on drugs (Christin, 2012). Its visual layout appear to be really similar to Ebay or Amazon, though its use seems more complicated than common online pharmacies (Barratt, 2012; Van Hout et al., 2013a; Van Hout et al., 2013b). SilkRoad is only accessible through the anonymising network, TOR, which masks a user's tracks on the site. The only accepted method of payment is Bitcoins, because credit cards, Paypal or other forms can be traced or blocked. 'Bitcoins' is used as currency within a peer to peer network (Barratt, 2012; Van Hout et al., 2013a; Van Hout et al., 2013b).

Prescription service

On most occasions, there is a no prescription required approach to purchase drugs and substances (Levaggi et al., 2009). Otherwise, people are just asked to complete a questionnaire, a telephone interview, or a simple online order without any interaction with a licensed healthcare professional (CASA, 2004; Drug Strategy, 2007; Orizio et al., 2010). On other occasions, it is possible to apply to so-called 'cyberdoctors', to prove the need of medications (National Drug Intelligence Center, 2002; Fung et al., 2004; Weiss, 2006).

In the questionnaires, what was typically asked included: -drug allergies and other allergies (70-90%); - present or past particular illness (90-100%); - pregnant or breastfeeding status (70%); - consumer's family doctor awareness of intention of buying online (52%); - past surgery history (40%); - if the purchase was based on a medical diagnosis made by a physician (19.3%); - name, address, or telephone number of the consumer's family doctor (less than 20% of cases) (Orizio et al., 2009).

Lack of information or misleading information issues

Many Internet sites can mislead consumers by explaining how to use drugs, implying that if the drugs are used properly (by following the instructions provided) they pose no risks to the user (National Drug Intelligence Center, 2002; Levaggi et al., 2009; Orizio et al., 2010; Cordaro et al., 2011), state that certain drugs are legal (Schepis et al., 2008), do not report side effects or support that the dangers of some drugs were "*grossly exaggerated by incompetent physicians, biased scientists, and government bureaucrats*" (Brennan et al., 2013) or do not report interactions between substances and drugs.

Marketing strategies

The language proposed by online pharmacies is technically heuristic, since the information on therapeutic quality of drugs is overshadowed by the apparently satisfactory method of purchase (Orizio et al., 2010). Aggressive marketing strategies were noticed in the majority of the sites (Bessell et al., 2002; National Drug Intelligence Center, 2002; CASA, 2004; Forman et al., 2006; Levaggi et al., 2009; Rajamma et al., 2009; Orizio et al., 2010; Cordaro et al., 2011; Fittler et al., 2013; Gelatti et al., 2013; Liang et al., 2013; Van Hout et al., 2013b), as shown in **Table 4**.

How to purchase

Studies reported that most of the websites required the creation of a personal account to access products (Cordaro et al., 2011). Relationships between vendors and consumers were described as based on cyber levels of trust and professionalism, and supported by 'stealth modes', user feedbacks, reviews, comments, ratings (Barratt, 2012; Van Hout et al., 2013b).

Most prescription or non-prescription online pharmacies seemed to accept or require payments via credit cards or Western Union or MoneyGram (National Drug Intelligence Center, 2002; Cordaro et al., 2012). Use of credit cards was also the favourite form of payments among consumers, while a few had the insurance company pay directly (Mazer et al., 2012). The exact

amount of shipping costs was often not known until the end of the transaction and other costs had sometimes been added to the bill (Levaggi et al., 2012).

It was found that some of the sites use professional carriers like FedEx, DHL, UPS and most of the pharmacies offer to deliver internationally or provide multiple options for purchasing by mail from overseas; this means that national barriers do not exist for consumers and that the creation of a global village allow people to obtain "prescription" medicines from countries with markedly different drug laws (Bessell et al., 2002; National Drug Intelligence Center, 2002; Drug Strategy, 2007; Orizio et al., 2011; Brennan et al., 2013).

What to purchase

Every type of drug can be found on the Net, including: legal highs, illegal substances and prescription drugs (Bessell et al., 2002; National Drug Intelligence Center, 2002; PEW&Internet, 2004; Forman et al., 2006; Inciardi et al., 2010; Orizio et al., 2010; Cordaro et al., 2011; Barratt et al., 2013; Brennan et al., 2013; Van Hout et al., 2013b). The main substances are summarized in **Table 5**.

In the majority of the studies where analysis on the ordered drugs were executed, the drug quality was reported as poor (Gelatti et al., 2013). Sometimes, medicinal products were not approved by the FDA or had been taken off the market because of safety concerns (Weiss, 2006; Kaskowitz et al., 2007). Some products contained no active ingredients or inconsistent doses of active ingredients (Cordaro et al., 2011). "*FDA investigations found that drugs purchased through the Internet are more likely to be contaminated, counterfeit, or inherently ineffective*" (National Drug Intelligence Center, 2002). Nevertheless, this is not always perceived by the consumers.

Discussion

Generally, ever more Internet users report looking online for health-related information bu, t according to the studies reviewed so far, it is also contradictory the role of Internet in purchasing drugs, especially among the drug-addicted patients. One study showed that in an urban emergency department population, a significant percentage of patients were aware of online pharmacies, but only 5% of patients obtained medications using this method (Mazer et al., 2012). Twenty-six per cent of American adults have researched prescription drugs online, but only 4% of US Americans have ever purchased prescription drugs on the internet (Pew Internet&American Life Project, 2004; Drug Strategy, 2007; Atkinson et al., 2009; Fittler et al., 2013).

There is a lack of studies focusing on socio-demographic characteristics of users of illegal marketplaces compared to those that analyse the consumers of the online pharmacies. Several studies show how the young people are more susceptible in purchasing online of prescription-drugs and/or illegal drugs, underlining the potential role of Internet in the promoting the onset of addictive behaviours.

It was reported that drugs can be ordered at any time of day or night, and patients don't need to spend time at the doctors when requesting "*refills*" (Fung et al., 2004; Weiss, 2006). Direct mail delivery helps people living in remote rural areas and those who have trouble getting to pharmacies (Fung et al., 2004; Weiss et al., 2006; Raine et al., 2009), so a key role of the Internet is to support

areas where a lack of access to appropriate medical treatment is reported. Online drugs appeared to be a cheaper alternative than "*seeing a physician, paying for an office visit, and filling a prescription at a local pharmacy*", especially where individuals lack medical insurance (Pew Internet&American Life Project, 2004; Cicero et al., 2012; Van Hout et al., 2013b).

Some drug users were found to have two separate dimensions in their life: "*drug identity is very separate from my non drug identity*", according to a 'SilkRoad user'. He described the "*fear of too many unknowns when drug taking within a group*" (Van Hout et al., 2013b). For these reasons, the anonymity becomes a fundamental determinant both to protect own identity by the law both to avoid the embarrassment/fears of social stigma, especially for sexual dysfunction drug Viagra, hair-loss drug Alopecia, weight-loss drug Xenical or Sibutramine (Trissler, 1999; Jones, 2010; Orizio et al., 2010; Sugiura et al., 2012; Van Hout et al., 2013).

The consumer of online drugs often belongs to community health blog/forum. Being part of a community and subsequently sharing information, helping other people seems to encourage the online purchase of medicaments (Halpern et al., 2001; Adams et al., 2010; Sugiura et al., 2012; Chiauzzi et al., 2013; Van Hout et al., 2013b). In particular for illegal drug consumers, Erowid is particularly popular for the possibility of creating a participatory culture and a sense of community that is more important for those involved in relatively obscure psychedelic drug use and/or domiciled in remote locations (Walsh, 2011).

Sites that facilitate drug use seemed to be often directed toward a younger audience. Their curiosity can lead them to research drugs online and, then, to be exposed to thousands of sites that display positive effects of the drugs, with no reference to drug-adverse reactions (National Drug Intelligence Center, 2002). Some evidence showed that web sites offering to sell controlled stimulants over the Internet were specifically targeting adolescents through their appearances or content (Schepis et al., 2008).

Overall, the methods used in the articles here reviewed spread into different directions. In fact, for what concerns the information about the websites, the most used methodology is an 'online search and analysis of the websites themselves', associated or not with a literature search, without an analysis of received products ordered on those sites to identify the good/poor quality of the drugs and the reliability of the Internet as a source of controlled and not controlled substances. Other studies also provided information about the drug quality after having ordered and analyzed a number of substances from a certain website. The literature review was also useful in order to identify prevalence data (ref).

Appearance of sites is well described in the OP websites analysis, while little data is extracted from the questionnaires, compatibly with the type of questions that authors of the articles chose to propose to the public. The evidence of the "*no need of prescription*" was showed in almost the totality of the articles analyzed, with low or no differences between the methods used. Marketing strategies can be deduced from the direct analysis of the websites, from literature reviews, but also highlighted by questionnaires. The same could be said about "*how to purchase*" and "*what was purchased*".

In terms of type of information, no significant differences could be seen between online and offline questionnaires and surveys. Whilst determinants and reasons to use the Internet are well documented and identified, epidemiological data have proved to be more difficult to be inferred

from here. This is due to a number of issues, including: - sampling strategies (i.e. a sample collecting patients between 30 and 60 years, for example, will not be able to understand the typical behavior of younger people); - the difficulties identified in administering questionnaires to people under age; - the reluctance of drug users and buyers to answer questionnaires, especially when surveys are focused on personal data; and the natural difference between consumers of illegal, prescription and non-prescription drugs. So, these reasons makes "*profiling a single consumer*" difficult.

All the epidemiological elements here discussed should be better analyzed with a range of offline or online questionnaires. From this point of view, it seems that using the Internet for the distribution and collection questionnaires seems to be sensible for this research, because it is topic related. The computer-knowledgeable individuals, who are potential on-line shoppers, are likely to be reached. This approach may reduce the possible occurrence of uninformed response by people, "*who don't know much the topic due to the infrequent use of the internet*" (Cicero et al., 2008; Svorc et al., 2012).

Bluelight.ru, a recreational drug use website, was selected to make the online survey and, working with the website's administrators, it was possible to develop a banner link on the entry page and to increase participation. This could be a reasonable approach to set an online survey. Erowid.org is one of the most visited websites and could be a possible alternative. SilkRoad was targeted by a previous questionnaire, but "*recruitment of site users was hampered by negative and suspicious reactions by forum participants*", so that the related article actually became a single case report (Van Hout et al., 2013b). Moreover, SilkRoad has been recently shut down (http://www.thetimes.co.uk/tto/technology/internet/article3885426.ece), although possibly replaced. These enforcement activities may be associated with the creation of new websites or with the shift of this illegal market into others places (Chiauzzi et al., 2013).

Furthermore, the type of drug used should be better/more thoroughly investigated. In some articles, participants were asked only about lifetime, past-year, and current (past 30-day) use of alcohol, prescription opioids, and illicit drugs, as well as their history with different types of substance abuse treatment (Cicero et al., 2012; Chiauzzi et al., 2013). Finally, it is possible to use a data collection software, as, for example, Vovici 6 Enterprise Edition (Vovici Corporation, Herndon, VA, 2012), that was used in one of the studies and data could be stored in a database (Chiauzzi et al., 2013).

Conclusion

Several studies showed that the patient is 'no longer a patient but a consumer. The consumers of online drugs seem to be mainly well-educated adults and teenagers, who are avid users of the Internet. Young people are, also, a population of inexperienced, noncritical, individuals easily persuaded by the idea of safe, cheap and legal drugs, an idea which is exploited by advertising and marketing's strategies. This is probably the reason why, while controlled substances abusers are seen as 'guiltier', the typical online pharmacy consumer is often seen as a victim and "*the purveyors are portrayed as ruthless criminals targeting the vulnerable*" (Walsh et al., 2011).

Finally, it is here considered of paramount importance the need to improve the levels of knowledge of the online drug-related sources, in particular among the public opinion, beyond

among the mental health and addiction specialists, in order to develop new targets for prevention interventions, increase the control strategies in these websites and promote the diffusion of controlled information.