Evaluation of the efficacy of WhatsApp through a harm reduction intervention group for injecting drug users

Evaluación de la eficacia de WhatsApp en un programa grupal de reducción de daños asociados al consumo inyectado de drogas

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Abstract

This study aims to analyse the use of an instant messaging app (WhatsApp®) as a means of communication for reaching people who inject drugs. An eight-week prospective longitudinal and observational study with three observations was designed for five addiction centres in Catalonia. The participants were 105 people who inject drugs, distributed in five intervention groups. The results of the Risk Assessment Battery (RAB) were compared in the three levels of analysis pre-test, post intervention and one month after the intervention. The main results indicate a significative reduction in RAB scores after the intervention. The main conclusion was that the WhatsApp® intervention has great potential for developing harm reduction interventions and to reduce the HIV contagion risk.

Keywords: Needle exchange program; street drugs; drug dependence; eHealth; harm reduction; homeless persons; WhatsApp®; online social networking.

Resumen

El presente estudio analiza el uso de una aplicación de mensajería instantánea (WhatsApp®) como canal de acceso a personas que se inyectan drogas. Se diseñó un estudio observacional longitudinal prospectivo de ocho semanas y tres observaciones en cinco centros de adicciones en Cataluña. Participaron 105 personas que consumían drogas por vía parenteral, distribuidas en cinco grupos de intervención grupal. Se compararon los resultados de la escala Risk Assessment Battery (RAB) (después de ser traducida al español y analizada su consistencia interna) en las tres fases de análisis pre test, post intervención y un mes después de la intervención. Los resultados indican una disminución significativa de las puntuaciones RAB tras la intervención a través de WhatsApp®. Se concluye que la intervención grupal a través de WhatsApp presenta grandes potencialidades para realizar intervenciones en reducción de daños y reducir el riesgo de contagio del VIH.

Palabras clave: Programa de intercambio de jeringuillas; drogas en la calle; dependencia de drogas; eSalud; reducción de daños; personas sin-hogar; WhatsApp®; mensajería instantánea; redes sociales en línea.

Introduction

The concept of harm reduction (HR) refers to interventions, programs and policies with the aim of minimising the harmful effects of drug use (Martínez-Luna et al., 2018; Mira, Llinás, Lorenzo & Aibar, 2009). It is one of the four pillars of drug addiction care alongside supply control policies, prevention and treatment of addictive behaviours. HR is an alternative to the more demanding models of specialized care based on abstinence, the necessary commitment to which cannot be met by some patients and which mostly require the retention of injection drug users (IDUs) in health centres (Erickson, 1995).

In Spain, HR has managed to reduce IDU mortality linked to the problems of injected heroin use, the increase in human immunodeficiency virus (HIV) infections and the mortality associated with acquired immune deficiency syndrome (AIDS) (Barrio et al., 2012). Despite this positive impact, IDUs in Spain have the highest rates of HIV infection and hepatitis C virus (HCV) in Western Europe (30.6% and 79.6% respectively) (Stone, 2014 and 2016). Although far from the dramatic figures of HIV-associated mortality among young people in the mid-1990s, 15.4% of IDUs are currently dying as a result of HIV and HCV infection, with coinfection being one of the main risk factors (Lozano, Domeque, Perálvarez, Torrellas & Gonzalo, 2019). Risk practices related to drug injection, whether direct (sharing used needles) or indirect (sharing injection paraphernalia such as filters, containers, water or loading the syringes with shared dissolved doses) are frequent, especially in the young population (Folch et al., 2016). The exposure to risk factors of contagion through sexual intercourse among IDUs is very high, and 34% have unprotected sexual intercourse, claiming to be aware of the risks and taking them anyway because of a dislike of using condoms (Calvo-García, Turró-Garriga & Giralt-Vázquez, 2014). Extreme social exclusion and homelessness are among the main risk factors for initiating injected drug use among young people (Calvo, Carbonell & Badia, 2018; Folch et al., 2016). Consequently, many authors raise both the need to revitalize HR programs and to incorporate new approaches which complement those already in operation (Bosque-Prous & Brugal, 2016; Fuente et al., 2006; Trujols et al., 2010).

One of the most significant changes in the organization of health care in recent years is the progressive incorporation of information and communication technologies (ICTs). EHealth, defined as the use of ICTs for the development of health and mHealth, defined as health care supported by the incorporation of mobile devices such as smartphones, tablets and other devices, form a growing part of the health care options available in European Union member states (World Health Organization, 2011).

Online social networks (OSNs) are included in eHealth and mHealth because they are Internet-based utilities which allow the creation and exchange of multimedia content generated by the users themselves (Kaplan & Haenlein, 2010). Their applicability to health is based on the Web 2.0 philosophy, the main potential of which lies in how it contributes to collaborative and open health models, offering the patient more capacity to manage their own process, thus empowering them in dealing with their own health (Armayones et al., 2015). The use of OSNs in eHealth has proven effective in promoting the use of condoms among homeless drug users (Rice, 2010), in reducing direct harm related to the consumption of alcohol and other drugs (Rice, Milburn & Monro, 2011) and in facilitating the acceptance of harm reduction and prevention programs (Rice, Tulbert, Cederbaum, Barman Adhikari & Milburn, 2012). Psychoeducational interventions aimed at showing people in situations of social exclusion how to use them have already had psychological benefits in themselves (Calvo & Carbonell, 2018).

Taking into account the importance of psychosocial interventions to improve the quality of life of patients injecting drugs (Fernández, González, Saiz, Gutiérrez & Bobes, 1999), this research aims to analyse the potential usefulness of using a mobile instant messaging service (WhatsApp®) as a complementary communication channel in the organization of discussion groups for harm reduction.

Method

Design

Prospective longitudinal observational study.

Population

Active injection drug users treated in harm reduction centres, addiction treatment centres or specific centres for homeless people.

Sample

Convenience sample from five centres (two addiction treatment centres, two harm reduction centres and a centre for the care of the homeless). Given the estimated number of IDUs in the five participating centres (n = 300) and assuming the principle of maximum indetermination, p = q = 50, with a margin of error of 8% and a confidence level of 95%, the sample size requirement was set at 101 participants.

The inclusion criteria for participants were having injected drugs in the last year and possessing a smartphone. During participant recruitment, the supervisor in each of the centres asked potential candidates whether they would be interested in participating. If the inclusion criteria were met, they were put on the list and at the start of the inter-

vention itself, it was confirmed that they were still interested and that they still met the inclusion criteria. They then received printed information about the objectives of the study, its methodology and possible results, and their right to abandon at any time was also explained. They subsequently signed the informed consent. Exclusion criteria were expressly stating that they did not wish to continue in the study, voluntarily abandoning the WhatsApp® group and refusing to complete the test at any of the three assessment points.

Procedure

After analysing the use of mobile devices and smartphones by people in situations of extreme social exclusion and injected drug use (Calvo, Carbonell, Turró & Giralt, 2018; Genz et al., 2015), an eight-week group intervention was designed with the aim of reducing the impact of the harm associated with injected drug use based on harm reduction treatment, which prioritizes keeping patients in the intervention program as the key element for facilitating change (Little, Hodari, Lavender & Berg, 2008). The participants were distributed across seven WhatsApp groups with the aim of facilitating discussion, as in face-to-face groups. The intervention featured a weekly thematic proposal based on some of the issues most relevant to reducing the risk of HIV infection. In the WhatsApp groups, participants interacted with each other or addressed professionals directly by asking questions, making suggestions, explaining experiences, clarifying doubts among themselves, and interacting. Researchers intervened minimally in an attempt to have the group mediate in answering questions and taking advantage of the described potential regarding peer support in discussion groups, following the usual procedure for managing groups of this type. The intervention was designed in the form of a discussion group, the effectiveness of which has been widely demonstrated (Calvo, Pérez, Sacristán & Paricio, 2009; Cheung et al., 2015). An in-depth analysis of this content and the proposed group intervention methodology has been described previously (Calvo, Carbonell, Giralt, Lloberas & Turró, 2017).

The research was approved by the CEI-Girona Research Ethics Committee, code *XSO_2017,* June 7, 2017.

Study variables and evaluation instruments

An ad hoc questionnaire was used to determine age, sex, HIV infection, homelessness, participation or not in a methadone maintenance program -MMP- and the main drug injected in the last month.

Dependent variable: Data on drug use typology and HIV risk practices were obtained with the Risk Assessment Battery (RAB) (Navaline et al., 1994), which consists of 29 items, 17 of them scoreable with a score range from 0 to 40 points (ratio 0-1). The remaining items provide descriptive information about drug use, sexual activity, the

level of concern regarding the possibility of HIV infection and patients' level of knowledge about their most recent analysis and serological status. The scale yielded internal consistency of 0.82 in its standard version and 0.86 in its electronic version (Navaline et al., 1994). The scale underwent translation and back-translation into Spanish and was adapted to the Spanish population with internal consistency of 0.81 calculated on the total observations of the participants (105 participants x 3 observations = 315). The original scale does not present specific data on factorial structure, cut-off points or sensitivity and specificity. Appendix 1 shows the original scale which was translated into Spanish for the study.

Finally, for additional qualitative information, participants were asked at the end of the eight weeks of intervention about the possibility of answering three open questions as feedback on the intervention: i) evaluation of the information proposed in the intervention groups; ii) evaluation of WhatsApp as a communication channel for people who inject drugs; and iii) evaluation of the use of groups as part of the treatment or harm reduction process that they were following during the program.

Statistical analysis

For the description of the data, measures of central tendency and dispersion, and the analysis of absolute and relative frequencies was used for quantitative and qualitative data respectively. Pearson correlations were used for comparing quantitative variables, and statistics comparing the means of quantitative variables between groups according to normality criteria, and contingency tables for the comparison of qualitative variables. Observations were carried out at the beginning of the training (T^1), at the end of the program (T^2) and one month afterwards (T^3). Student's t was used for related samples to analyse the difference in means in intra-group scores. The index of intra-group score differences between T^1 and T^3 [$(T^1 - T^3/T^1)*100$] was calculated, and this was used as a dependent variable in the adjusted linear regression model in order to determine the variables associated with the greatest difference. A mixed linear regression model was adjusted to determine whether this difference in the score was attributable or not to the centre or the specific individual variables.

Results

Sample description

A total of 130 IDUs were recruited, of which 11 were excluded as they lacked a smartphone and 14 left the WhatsApp group; the final sample thus comprised 105 IDUs.

Men made up 86.7% of the participants, with a mean age of 41.3 years (SD = 6.7). All participants had used a drug during the month prior to the intervention, although they reported not having used opioids (apart from meth-

adone), amphetamines, methamphetamine or hallucinogens. Of the sample, 32.4% reported being infected with HIV (n = 34). Of the remaining 71 participants who did not know if they were infected, 88.7% (n = 63) reported some level of concern about the possibility of being infected and 97.2% (n = 69) about the possibility of having been exposed to the virus. Fifty-four of the participants (76.1%) reported having taken a blood test to check for the presence of HIV on average 1.9 times (SD = 2.8) and 1.7 years before the pre-test (SD = 1.7). A large majority (88.6%) of the participants were on an MMP.

Participants who said they were homeless made up 39.6% of the sample. Differences were found between people who were homeless and those who were not, especially in the type of drug use in the previous month. As Table 1 shows, homeless people had higher rates of using cannabis (100% vs. 80.6%), alcohol (100% vs. 89.5%) and cocaine (81.6% vs. 55.2%), especially injected (73.7% vs. 66.1%) and lower rates of injected heroin (42.1% vs. 88.1%) and injected speedball (21.1% vs. 58.2%) use. A greater proportion of the homeless were in MMPs (94.7% vs. 82.1%).

Table 1. *Sample descriptives at pretest.*

Variables, *n (%)*	Total	Homeless	Housed	Values		
	(n = 105)	*(n = 38)*	*(n = 67)*	*X² / t*	*gl*	*p*
Sex Male	91(86 7)	31 (81.6)	60 (89.6)	1.33	1	0.195
Age, M (SD)	41.3 (6.7)	40.5 (9.2)	41.8 (4.8)	-0.913	103	0.364
Drug use [a]						
Cannabis (smoked)	92 (87.6)	38 (100)	54 (80.6)	8.41	1	0.002
Alcohol (oral)	98 (93.3)	38 (100)	60 (89.5)	11.2	1	0.001
Cocaine [b]	68 (64.8)	31 (81.6)	37 (55.2)	7.38	1	0.005
Snorted	11 (10.5)	3 (7.9)	7 (10.4)	1.21	1	0.292
Smoked	22 (21.0)	7 (18.4)	15 (22.4)	0.97	1	0.576
Injected	51 (48.6)	28 (73.7)	45 (66.1)	7.92	1	0.005
Benzodiazepinas (oral)	42 (40.0)	12 (31.6)	30 (44.8)	9.82	1	0.005
Heroin [b]	63 (60.0)	20 (52.6)	43 (64.2)	1.36	1	0.170
Smoked	12	4 (10.5)	8 (11.9)	0.83	1	0.457
Injected	51	16 (42.1)	59 (88.1)	17.8	q	‹0.001
Speedball (injected)	47 (63.8)	8 (21.1)	39 (58.2)	18.6	1	‹0.001
HIV positive	34 (32.4)	13 (34.2)	21 (31.3)	1.03	1	0.521
In MMP[b]	93 (88.6)	36 (94.7)	55 (82.1)	7.68	1	0.004

Note. [a] In the last month. [b] Any route of administration.

Comparison of intra-group measures

The mean RAB scores at T^1 were 13.35 (SD = 5.42), which decreased to 9.49 (SD = 5.58) at T^2, with a decrease in the mean scores of 3.87 points (SD = 7.89; t = 5.021; gl = 104; p <0.001). At T^3, the average score was 8.70 (SD = 5.01) which, despite not presenting a significant decrease with respect to T^2 (M = 0.79; SD = 4.23; t = 1,915; gl = 104; p = 0,058), does indicate a statistically significant tendency. The difference in mean scores between T^1-T^3 was 4.65 points (SD = 7.25; t = 6.58; gl = 104; p <0.001) (Figure 1). Table 2 shows the score items of the RAB.

Mixed linear

The mixed linear analysis for repeated measures showed the effect of the intervention on the RAB (F = 28.5; df = 2; p <0.001). When adjusted for the pre-test variables (socio-demographic and clinical), significant differences were observed between T^3 and T^1 but not between T^3 and T^2 (Table 3). The matrix of variances and the estimation of covariance parameters showed that only 21.9% of the variance in the RAB score is attributable to the difference between subjects while the intervention accounts for 78.1%.

Participation in WhatsApp® groups

Participants were distributed across seven WhatsApp® groups, with an average of 15.1 participants per group (SD = 1.8). Once the experimental situation began, the participants sent a total of 21,893 communications in the form of text messages, non-text symbols (emoticons), videos or audios between T^1 and T^2.

This represents an average of 3,127.6 (SD = 752, 1) communications per group, an average of 391.0 (SD = 121.8)

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Table 2. *Score items of the RAB scale.*

#	Item	Range	Me	MPᵃ(%)	M	SD	rᵇ
1	In the past six months, have you injected drugs?	0-1	1	82.6	.851	.319	-.917
2	In the past six months, have you shared needles or works?	0-3	0	23.6	.623	1.11	.672**
3	With how many different people did you share needles in the past six months?	0-3	0	2.0	.346	.675	.691*
8	In the past six months, how often have you been to a shooting gallery/house or other place where users go to shoot-up?	0-3	0	31.6	1.23	1.42	.532**
9	In the past six months, how often have you been to a Crack House or other place where people go to smoke crack?	0-3	1	01.9	.897	1.66	.593**
12	In the past six months, how often have you shared rinse-water?	0-3	0	8.6	.639	.901	.421*
13	In the past six months, how often have you shared a cooker?	0-3	0	5.1	.498	.873	.396**
14	In the past six months, how often have you shared a cotton?	0-3	0	4.8	.563	.764	.321**
15	In the past six months, how often have you divided or shared drugs with others by using one syringe (yours or someone else's) to squirt or load the drugs into the other syringe(s) (backloading, for example) ?	0-3	0	1.1	.981	.894	.411**
16	How would you describe yourself? (Straight, Gay or Homosexual, Bisexual)	0-3	1	6.4	2.01	.512	-.921
17	With how many men have you had sex in the past six months?	0-3	0	3.0	.609	.743	-.235*
18	With how many women have you had sex in the past six months?	0-3	1	22.8	1.12	.661	.402**
19	In the past six months, how often have you had sex so you could get drugs?	0-3	0	22.6	.574	.802	.097
20	In the past six months, how often have you given drugs to someone so you could have sex with them?	0-3	1	0.6	.971	.888	.472**
21	In the past six months, how often were you paid money to have sex with someone?	0-3	0	11.7	.406	.645	.112
22	In the past six months, how often did you give money to someone so you could have sex with them?	0-3	1	2.4	.914	.886	.504**
24	In the past six months, how often did you use condoms when you had sex?	0-3	1	1.8	.818	.898	.432**

Note. ᵃ Maximum score percentage. ᵇ Correlation with respect to the total. *p ‹.05. **p‹.001.
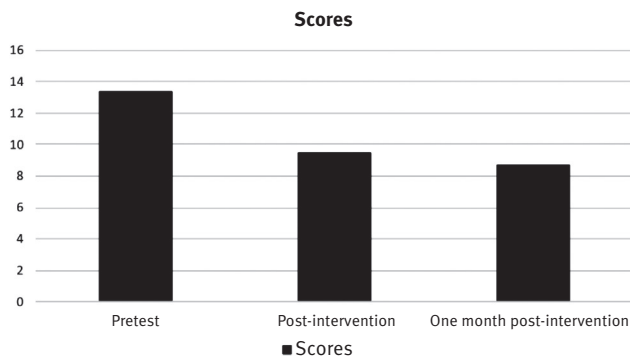

Figure 1. Differences of RAB score means across the three intervention points.

Table 3. *Linear regression model adjusted for intra-group differences. Risk Assessment Battery scale result as dependent variable.*

Parameter	Estimation	Error Est.	gl	t	Sig.	CI 95% Min.	CI 95% Max.
Intercep.	8.70	0.52	284.86	16.78	‹0.001	7.68	9.73
Assessment (T)¹	4.57	0.65	208	7.05	‹0.001	3.29	5.85
Assessment (T)²	0.76	0.65	208	1.17	0.241	-0.52	2.04
Assessment (T)³	0*	0					

Note. * This parameter is zero because it is redundant.

communications per group and week and an average of 48.9 (SD = 31.9) daily communications per group. The average number of communications per person during the eight-week program duration was 208.5 (SD = 214.6).

Of the total communications, 54.7% (n = 11,986) were expressions of doubt or questions related to harm reduction. Of these questions, 38.4% (n = 4,597) were about the main risks of overdosing, 16.5% (n = 1,981) about the procedure to get a quick HIV or HCV test, 10.2 % (n = 1,224) on finding injection material, 9.9% (n = 1,181) on drug interaction, 9.5% (n = 1,136) on levels of drug purity, 8.1 % (n = 976) on access to social services (benefits, overnight services or food) and 7.4% (891) on access to treatment or types of addiction treatment.

According to the data on questions or doubts, groups formulated an average of 1,712.3 questions (SD = 471.4), with an average of 214.1 (SD = 264,1) questions per week and group, and 53.5 (SD = 31.9) questions or doubts per day and group.

Of the 9,907 participant communications that were not expressing doubts or questions, 24.4% (n = 2,421) corresponded to answers to the questions asked by other participants, 12.1% (n = 1196) were messages in support of other participants, 9.9% (977) were statements of information provided by the group managers. Finally, 53.6% (n = 5,313) of the communications corresponded to messages without content in themselves and which were part of the interaction of the conversation (messages of affirmation, emphasis in the form of emoticons on many occasions or use of punctuation marks or acronyms typical of virtual textual language). See Figure 2.

The group managers intervened on a total of 2,431 occasions: 4.3% (n = 104) to propose the contents of the topics to work on in the discussions, 56.3% (n = 1,369) to
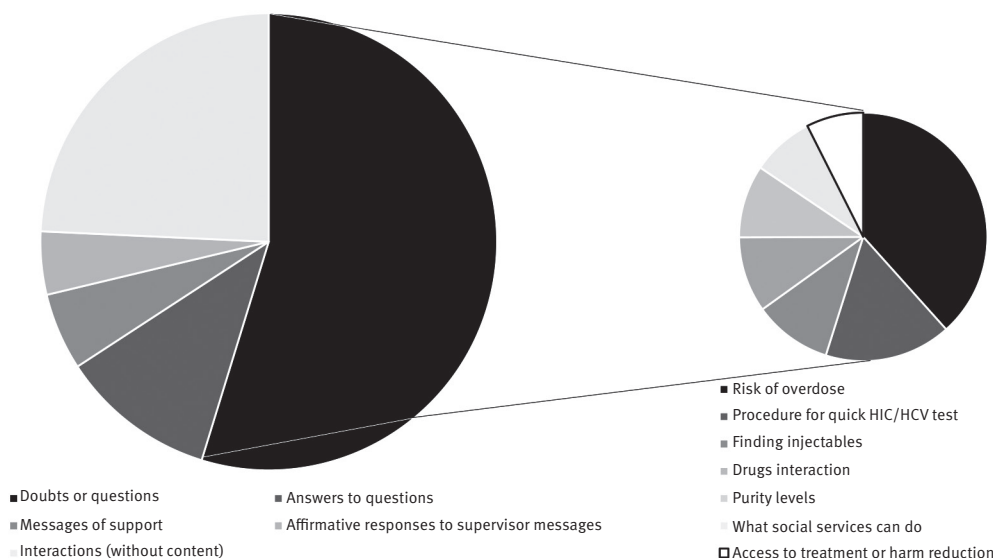
Figure 2. Content of the communications sent in the different WhatsApp® groups.

clear up doubts or answer questions about the proposed content which the users did not answer themselves as part of the discussion process, 24.1% (n = 587) to energize the groups and 15.3% (n = 371) to redirect inappropriate communications (personal questions among participants that had nothing to do with the discussion, jokes, inappropriate audiovisual content such as gags, etc.).

Finally, open responses regarding the experience in the WhatsApp groups were coded and classified to allow analysis. Regarding the content covered in the groups, 102 participants reported that it was suitable and that it answered the questions or extended the information they had previously on the topics discussed, 81 participants highlighted the possibilities offered by immediate access to information and responses from both peers and the group's managers, and 51 stressed that the virtual space could be a complement to the usual benefits of the treatment and harm reduction services which they were receiving: 32 said so because it could overcome access barriers such as fixed schedules since the virtual group could access whenever they wanted, and 19 because the professional of the WhatsApp group responded quickly to the demands of the group. All participants who finished the process would be willing to participate in virtual groups periodically or continuously as part of their therapeutic process.

Discussion

The objective of this study was to test the viability of using an instant messaging service in a clinical context of reducing the risk of HIV infection associated with injected drug use. For this purpose, a longitudinal multicentre study was designed with three assessment points: pretest, post-intervention and one month after the intervention. In the absence of specific damage reduction scales in Spanish, the RAB, a self-administered scale measuring participation in activities which increase the probability of contracting HIV, was chosen. Among the different scales available in English, the RAB was suitable in that it assesses a type of patient who is difficult to retain in treatment, meets the normal clinical history requirements of the public drug addiction services where the study was carried out, and maintains confidentiality regarding practices of exchanging injection material and sexual activity associated with contagion risks among people who inject drugs (National Institute on Drug Abuse, 2018).

Two main lessons can be drawn from this research. The first is the feasibility of using OSNs for this type of intervention. The decrease in RAB scale scores between T^1 and T^3 suggests a reduced potential risk of HIV infection (National Institute on Drug Abuse, 2018). The second has to do with the capacity to retain participants. Outpatient care in drug addiction is affected by a high dropout rate (Martínez-González, Albein-Urios, Lozano-Rojas & Verdejo-García, 2014); in fact, beyond the retention produced by being on opioid substitutes, no behavioural and educational, counselling or supportive treatments have been found to facilitate retention (Timko, Schultz, Cucciare, Vittorio & Garrison-Diehn, 2016). The intervention groups in this study presented a high adherence capacity, superior to other addiction treatment interventions (Calvo et al., 2018), thereby reducing the inherent limitations of face-to-face services, such as schedules, waiting lists, travel expenses, personal organization, etc., something the participants themselves suggested in their evaluation of the intervention (Soto-Pérez & Franco-Martín, 2014)

EHealth has proven useful in harm reduction programs associated with alcohol and tobacco use in controlled clini-

cal trials (Chiauzzi, Green, Lord, Thum & Goldstein, 2005; Kypri et al., 2004; Kypri & McAnally, 2005; Neighbors, Larimer & Lewis, 2004; Neighbors, Larimer, Lostutter & Woods, 2006; Walters, Vader & Harris, 2007). Common benefits have to do with the anonymity of the user and with the possibility of accessing the services at the precise moment they are needed (Marlatt & Witkiewitz, 2010). EHealth improves contact with services and increases the adherence of those in situations of extreme social exclusion (Burda, Haack, Duarte & Alemi, 2012) and has proven its effectiveness in improving overdose assessment and prevention (Baldacchino et al., 2016). Likewise, WhatsApp® presents good results as a means of rapid communication and at very low cost, potentially improving clinical communications and patient learning about their process while preserving their privacy (Kamel-Boulos, Giustini & Wheeler, 2016; Nardo et al., 2016; Schreiner & Hess, 2015).

In the specific use with addictions, group discussion through WhatsApp® groups is effective in reducing relapses thanks to direct and rapid communication and social support (Cheung et al., 2015), and social and health professionals perceive it as potentially beneficial in clinical practice (Ganasegeran, Renganathan, Rashid & Al-Dubai, 2017). Added to this are the general benefits of using mobile phones in health, such as the possibility of transmitting information efficiently and economically, access to social support networks, all featuring the aspect of immediacy (Gravenhorst et al., 2015). Immediacy is a common beneficial factor of mHealth in addiction, regardless of program specificities (Marlatt & Witkiewitz, 2010). As we can see, this benefit is enhanced in instant messaging services because participants can access the support of the group at any time and can obtain a response faster than in specialised treatment centres, thereby positioning itself as a resource with great potential for retaining patients in significantly unstructured socio-economic situations and in social exclusion (La Sala & Mignone, 2014; McInnes, Li & Hogan, 2013). The high number of IDUs among the homeless population in the context of the intervention (Calvo-García, Giralt-Vázquez, Calvet-Roura & Carbonell-Sánchez, 2016), the relationship between chronic injected drug use and risk of homelessness as a situation of extreme social exclusion (Des Jarlais, Kerr, Carrieri, Feelemyer & Arasteh, 2016), and homelessness as a new risk factor for HIV infection among IDUs (Folch et al., 2016) are situations in which mHealth can be efficacious/ play a positive role.

In itself, the use of mobile phones has proven effective in increasing retention and treatment adherence in addictions (Ganasegeran et al., 2017; Wolfe, Carrieri & Shepard, 2010). OSN and instant messaging services can be incorporated in virtual interventions in harm reduction because they respect HR principles (retention, support and respect for the time the IDUs need in their addiction process) thanks to their universal character and by being a "virtual presence". In ad-

dition, the patient has the possibility of using these virtual features when needed and in a cost-effective way hardly comparable to other types of interventions.

The results obtained in this study have some limitations that should be taken into account. First, the small sample size resulting from the need to design and manage group sessions in an appropriate manner, given the recommendations for the maximum number of participants in this type of group. It would be important, therefore, to replicate the study in other contexts and centres to increase the sample analysed. Second, the RAB has not yet been validated in the Spanish population. It is recommended that the study be extended to validate our adaptation as it constitutes an instrument which allows the assessment of the HIV-infection risk behaviours associated with injection and sexual risk behaviours. In addition, the number of observations taken from the RAB has been limited and the internal consistency analyses, while acceptable, have been lower than those of the scale in its original version. Even so, to reduce the risk of systematic error, participants were randomized and the results have demonstrated the equivalence between the groups at baseline. Nevertheless, even with acceptable internal validity, it is necessary to expand the sample to limit the possibility of random error. Thirdly, it would have been interesting to see, in an observation six months after the intervention, whether the results obtained remained stable, diminished or were nullified, but the complications of accessing the sample after this period made it difficult. Fourth, in the absence of similar research on the use of WhatsApp® as a communication channel for the development of group harm reduction treatments, the results could not be compared to other studies. Finally, access to a mobile phone and services such as OSNs are still an important limitation for a part of the population with higher social exclusion criteria. In our study, not having a smartphone has been a reason for exclusion, and the results are therefore limited to those who did have a mobile phone and routinely used OSNs. In future studies, this fact should be reversed to avoid participation biases due to this circumstance, both in terms of telephone ownership and the ability to use and manage it.

In conclusion, the use of OSNs in the field of harm reduction interventions is at an early stage and we believe that this study supports the use of instant messaging services in virtual treatment. OSNs have great potential to contribute to reducing exposure to HIV infection risks, improving retention and increasing the participation of injected drug users.

Conflict of interests

The authors declare the absence of any type of conflict of interest.

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Appendix 1. Risk Assessment Battery scale - RAB

☐ Check If Asked By Interviewer

ID#: _____

DATE ____ / ____ / ____

Administered by: _____

Checked by: _____

Risk Assessment Battery

R A B

Please read each of the following questions very carefully. As you will see, many of these questions are personal. We understand this and will make every effort to protect the privacy of your answers.

It is very important that you answer every question honestly. In fact, it's better not to answer a question at all than to tell us something that is not accurate or true. Some questions may not seem to have an answer that is true for you. When this happens, you should simply choose the answer that is most right. Don't spend too much time on any one question. Remember, always ask for help if you're unsure about what to do.

Thank you for your time and cooperation.

PAST MONTH DRUG AND ALCOHOL USE

A. In the past month, how often have you injected cocaine and heroin together (Speedball)?
  0. ☐ Not at all
  1. ☐ A few times
  2. ☐ A few times each week
  3. ☐ Everyday

B. In the past month, how often have you injected heroin (not mixed)?
  0. ☐ Not at all
  1. ☐ A few times
  2. ☐ A few times each week
  3. ☐ Everyday

C. In the past month, how often have you snorted heroin (not mixed)?
  0. ☐ Not at all
  1. ☐ A few times
  2. ☐ A few times each week
  3. ☐ Everyday

D. In the past month, how often have you smoked heroin?
  0. ☐ Not at all
  1. ☐ A few times
  2. ☐ A few times each week
  3. ☐ Everyday

E. In the past month, how often have you injected cocaine (not mixed)?
  0. ☐ Not at all
  1. ☐ A few times
  2. ☐ A few times each week
  3. ☐ Everyday

F. In the past month, how often have you snorted cocaine (not mixed)?
  0. ☐ Not at all
  1. ☐ A few times
  2. ☐ A few times each week
  3. ☐ Everyday

G. In the past month, how often have you smoked crack, rock, or freebase cocaine?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

H. In the past month, how often have you injected amphetamines, meth, speed, crank or crystal?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

I. In the past month, how often have you snorted amphetamines, meth, speed, crank or crystal?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

J. In the past month, how often have you smoked amphetamines, meth, speed, crank or crystal?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

K. In the past month, how often have you used benzodiazepines (benzos, benzies) such as Xanax, Valium, Klonipin or Ativan?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

L. In the past month, how often have you taken painkillers - pills such as Percodan, Percocet, Vicodin, Demerol, Dilaudid, Darvon, Darvocet or syrup (Codeine)?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday
   a. Which types of painkillers did you use? _____
   _____

M. In the past month, how often did you inject Dilaudid?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

N. In the past month, how often have you used acid, LSD, or other hallucinogens?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

O. In the past month, how often have you used marijuana?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

P. In the past month, how often have you used beer, wine or liquor?
   0. ☐ Not at all
   1. ☐ A few times
   2. ☐ A few times each week
   3. ☐ Everyday

PART I: NEEDLE USE

1. In the past six months, have you injected drugs?
    0. ☐ No
    1. ☐ Yes

2. In the past six months, have you shared needles or works?
    0. ☐ No or I have not shot up in the past six months
    3. ☐ Yes

3. With how many different people did you share needles in the past six months?
    0. ☐ 0 or I have not shot up in the past six months
    1. ☐ 1 other person
    2. ☐ 2 or 3 different people
    3. ☐ 4 or more different people

4. In the past six months, how often have you used a needle after someone (with or without cleaning) ?
    0. ☐ Never or I have not shot up or shared in the past six months
    1. ☐ A few times or less
    2. ☐ A few times each month
    3. ☐ Once or more each week

5. In the past six months, how often have others used after you (with or without cleaning) ?
    0. ☐ Never or I have not shot up or shared in the past six months
    1. ☐ A few times or less
    2. ☐ A few times each month
    3. ☐ Once or more each week

6. In the past six months, how often have you shared needles with someone you knew (or later found out) had AIDS or was positive for HIV, the AIDS virus?
    0. ☐ Never or I have not shot up or shared in the past six months
    1. ☐ A few times or less
    2. ☐ A few times each month
    3. ☐ Once or more each week

7. Where did you get your needles during the past six months? (Check all that apply)
    0. ☐ I have not shot up in the past six months
    1. ☐ From a diabetic
    2. ☐ On the street
    3. ☐ Drugstore
    4. ☐ Shooting gallery or other place where users go to shoot up
    5. ☐ Needle Exchange Program
    6. ☐ Other:_____

8. In the past six months, how often have you been to a shooting gallery/house or other place where users go to shoot-up?
    0. ☐ Never
    1. ☐ A few times or less
    2. ☐ A few times each month
    3. ☐ Once or more each week

9. In the past six months, how often have you been to a Crack House or other place where people go to smoke crack?
    0. ☐ Never
    1. ☐ A few times or less
    2. ☐ A few times each month
    3. ☐ Once or more each week

10. Which statement best describes the way you cleaned your needles during the past six months? (Please choose one)
    0. ☐ I have not shot up in the past six months
    1. ☐ I always use new needles
    2. ☐ I always clean my needle just before I shoot up
    3. ☐ After I shoot up, I always clean my needle
    4. ☐ Sometimes I clean my needle, sometimes I don't
    5. ☐ I never clean my needle

11. If you cleaned your needles and works in the past six months, how did you clean them? (Check all that apply)
    0. ☐ I have not shot up in the past six months
    1. ☐ Soap and water or water only
    2. ☐ Alcohol
    3. ☐ Bleach
    4. ☐ Boiling water
    5. ☐ Other:_____
    6. ☐ I did not clean my needles in the past six months
    7. ☐ I ALWAYS used new needles in the past six months

12. In the past six months, how often have you shared rinse-water?
    0. ☐ Never or I have not shot up in the past 6 months
    1. ☐ A few times or less
    2. ☐ A few times each month
    3. ☐ Once or more each week

13. In the past six months, how often have you shared a cooker?
    0. ☐ Never or I have not shot up in the past 6 months
    1. ☐ A few times or less
    2. ☐ A few times each month
    3. ☐ Once or more each week

14. In the past six months, how often have you shared a cotton?
  0. ☐ Never or I have not shot up in the past 6 months
  1. ☐ A few times or less
  2. ☐ A few times each month
  3. ☐ Once or more each week

15. In the past six months, how often have you divided or shared drugs with others by using one syringe (yours or someone else's) to squirt or load the drugs into the other syringe(s) (backloading, for example) ?
  0. ☐ Never or I have not shot up in the past 6 months
  1. ☐ A few times or less
  2. ☐ A few times each month
  3. ☐ Once or more each week

PART II: SEXUAL PRACTICES

16. How would you describe yourself?
  1. ☐ Straight
  2. ☐ Gay or Homosexual
  3. ☐ Bisexual

Please note: For the following questions, sex means any vaginal intercourse, anal intercourse (in the butt) or oral sex (blowjobs, for example)

17. With how many men have you had sex in the past six months?
  0. ☐ 0 men
  1. ☐ 1 man
  2. ☐ 2 or 3 men
  3. ☐ 4 or more men

18. With how many women have you had sex in the past six months?
  0. ☐ 0 women
  1. ☐ 1 woman
  2. ☐ 2 or 3 women
  3. ☐ 4 or more women

19. In the past six months, how often have you had sex so you could get drugs?
  0. ☐ Never
  1. ☐ A few times or less
  2. ☐ A few times each month
  3. ☐ Once or more each week

20. In the past six months, how often have you given drugs to someone so you could have sex with them?
  0. ☐ Never
  1. ☐ A few times or less
  2. ☐ A few times each month
  3. ☐ Once or more each week

21. In the past six months, how often were you paid money to have sex with someone?
  0. ☐ Never
  1. ☐ A few times or less
  2. ☐ A few times each month
  3. ☐ Once or more each week

22. In the past six months, how often did you give money to someone so you could have sex with them?
  0. ☐ Never
  1. ☐ A few times or less
  2. ☐ A few times each month
  3. ☐ Once or more each week

23. In the past six months, how often have you had sex with someone you knew (or later found out) had AIDS or was positive for HIV, the AIDS virus?
  0. ☐ Never
  1. ☐ A few times or less
  2. ☐ A few times each month
  3. ☐ Once or more each week

24. In the past six months, how often did you use condoms when you had sex?
  0. ☐ I have not had sex in the past 6 months
  1. ☐ All the time
  2. ☐ Most of the time
  3. ☐ Some of the time
  4. ☐ None of the time

PART III: CONCERNS ABOUT HIV AND TESTING

If you know that you are HIV positive, skip to question # 28.

25. How worried are you about getting HIV or AIDS?
    - 0. ☐ Not at all
    - 1. ☐ Slightly
    - 2. ☐ Moderately
    - 3. ☐ Considerably
    - 4. ☐ Extremely

26. How worried are you that you may have already been exposed to the HIV or AIDS virus?
    - 0. ☐ Not at all
    - 1. ☐ Slightly
    - 2. ☐ Moderately
    - 3. ☐ Considerably
    - 4. ☐ Extremely

27. How many times have you had a blood test for the AIDS virus (HIV)? (circle):

    0 1 2 3 4 5 6 7 8 9 10 or more times

28. When were you last tested for HIV? On the lines below, please write the month and year of your most recent test.

    _____/_____
    MONTH   YEAR

29. Were you ever told that you had the HIV, the AIDS virus?
    - 0. ☐ No
    - 1. ☐ Yes
    - 2. ☐ I never got the results

Thank You.
Please let the staff person know that you have finished.