

Preventive Interventions for Young Adults in Nightlife: Coproduction for a Systematic Literature Assessment Followed by a Stakeholder Dialogue Process

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Keywords

Nightlife · Young people · Prevention · Stakeholder · Co-production · Substance use · Alcohol use

Abstract

Introduction: The nightlife-associated illicit drug and alcohol use presents diverse problems and includes different areas. In the Canton of Zurich, Switzerland, young adults in the nightlife setting were recently set as a priority group for preventive interventions. **Method:** Based on the predefined protocol, we systematically collated evidence on preventive interventions regarding young adults' use of alcohol and illicit drugs in nightlife. EBSCO Medline, Embase, PsycInfo, and PsycIndex were searched for reviews (1990–2016) and primary studies (2012–2016). Additional sources and experts were consulted, and stakeholders involved throughout the research process. Interventions were summarized according to the before-, at- and after-the-party stages. **Results:** Before the party, good-quality studies were found for social media interventions, indicating positive effects on alcohol consumption. For the at-the-party stage, good evidence of low to medium quality was presented for crisis interventions and medical care at festivals and for multi-sector approaches.

The after-the-party setting was mainly covered by gray literature, and evidence remained limited for designated drivers and street safety interventions in the target group. The stakeholder dialogue was a structured exchange and favored the following evidence-informed preventive intervention fields: personalized feedback via social media, sustaining awareness among nightlife managers, focus on public nighttime transportation, and multi-sector approaches. **Conclusion:** The systematic involvement of stakeholders was an inspiring means for identifying evidence relevant for practice and policy in nightlife and fostering implementation. Especially, individual-based interventions, such as personalized feedback via social media and guided reflection on alcohol or drug use, and broader networking, were considered promising.

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Introduction

Since many decades, participating in nightlife has been one of the most favorite leisure and cultural activities of young Europeans [1]. Consistently, there is a strong association between nightlife participation and recreational

alcohol and drug use [2, 3]. According to the Global Drug Survey, the prevalence of recreational drug use among club patrons aged 15–34 years is about 4–25 times higher than in the general population of the same age [4]. Similar findings were reported for drunkenness, binge drinking, and pre-party drinking bearing risks for young adults, especially in nightlife [5–7].

Problems arising from the flourishing nightlife economy and the associated recreational substance use are diverse, context-sensitive, and include different features. They include social nuisance and health issues, such as dehydration or alcohol intoxication and long-term risks, often linked to psychiatric conditions (e.g., addiction and depression). Furthermore, substance-induced violence (including rape) and road safety linked to drunk driving are important concerns [1, 8].

On a national scale, 51% of Swiss bar patrons aged 19–29 years reported use of psychoactive substances (excluding cannabis) on a typical “night out,” with alcohol being most common. At the same time, 90% reported negative consequences of their substance use [9]. Furthermore, substance-induced violence is an important concern with >70% of all assaults and physical injuries in Switzerland being alcohol-related [10]. Furthermore, alcohol-related fatal road crashes were monitored of having the highest incidence among people aged 18–24 years and during weekend nights [11].

For these reasons [9–11], young adults in the nightlife setting were recently set as a target group for future preventive interventions in the Canton of Zurich, Switzerland. Following that, relevant stakeholders asked for a targeted evidence synthesis and consented to bring in their perspective. Therefore, we embedded a systematic literature assessment coproduced with practice-based stakeholders and academia-based researchers in a structured stakeholder dialogue.

Materials and Methods

Based on the a priori protocol (in German), the research question covered preventive interventions regarding alcohol and illicit drug use among young adults in the nightlife setting.

Data Sources and Search Strategy

The following databases were searched for reviews and primary studies on August 29 and 30, 2016, respectively: EBSCO Medline, Embase, PsycInfo, and PsycInfo. Reviews and gray literature sources were included after 1990 and could be available in English, German, French, Spanish, or Italian. To access more recent data not yet included in reviews, primary studies were included from 2012 onwards. The search strategy was checked by an information

specialist (see online suppl. File 1; for all online suppl. material, see www.karger.com/doi/10.1159/000511191). We also checked reference lists of included articles and asked Swiss experts about national and international nightlife interventions and unpublished reports.

Additionally, topic-based Web sites were searched: German Federal Center for Health Education (BzGA), German Center for the Control of Drug Abuse (DHS), Swiss National Center for Documentation of Public Health (CDSP), Addiction Switzerland, Swiss Research Institute for Public Health and Addiction, the European Monitoring Center for Drug and Drug Addiction (EMCDDA), Healthy Nightlife Toolbox, the Nightlife Empowerment & Well-being Implementation Project (NEWIP), and the European Network for safer party labels (Party+). Furthermore, literature was searched in the Network of Libraries and Information Centers in Switzerland, Swissbib (catalog of Swiss university libraries), and the Karlsruhe Virtual Catalog and via Google.

Selection of Reviews and Primary Studies

Following de-duplication, 2 authors (J.B. and M.M.) independently performed the title and abstract screening and selected reviews and primary studies that met the inclusion criteria (outlined below). In case of discrepancies, consent was reached through discussion. References were managed using Mendeley (Elsevier), Covidence (www.covidence.org) for screening, and Microsoft Excel for the data extraction process.

Types of Included Material

We searched for all types of reviews, including systematic reviews and meta-analyses, scoping or rapid reviews, and qualitative or narrative syntheses. Primary studies could be interventional (e.g., randomized controlled trials (RCTs)) or observational studies (e.g., cross-sectional studies) and case reports. The gray literature included reports, working papers, institutional or governmental documents, academic theses, guidelines, conference proceedings, and book chapters.

Type of Participants

Young people aged 18–35 years were included according to the NIH definition of “young adults” [12].

Description of the Setting

The “nightlife setting” was defined with the stakeholders as a social activity and entertainment taking place in public spaces (e.g., bars, clubs, parks, and festivals) after 8 p.m. We excluded interventions regarding private events, sport activities and bodybuilding, and sex worker and gay sex milieu.

Types of Interventions

Studies focused on preventive interventions targeting recreational drug and/or alcohol use in nightlife. According to the Dahlgren-Whitehead setting model [13], we considered approaches on the microlevel, such as individual- or group-centered approaches. They included brief interventions, personalized feedback, peer interventions, drug checking, and media campaigns. On the meso-level, environmental approaches included club management practices (including house regulations, video monitoring, door policies, and design of the premises), staff trainings, public transport, night-lightings, and safety measurements in high-risk areas or care at festivals. Structural interventions were more on the macrolevel

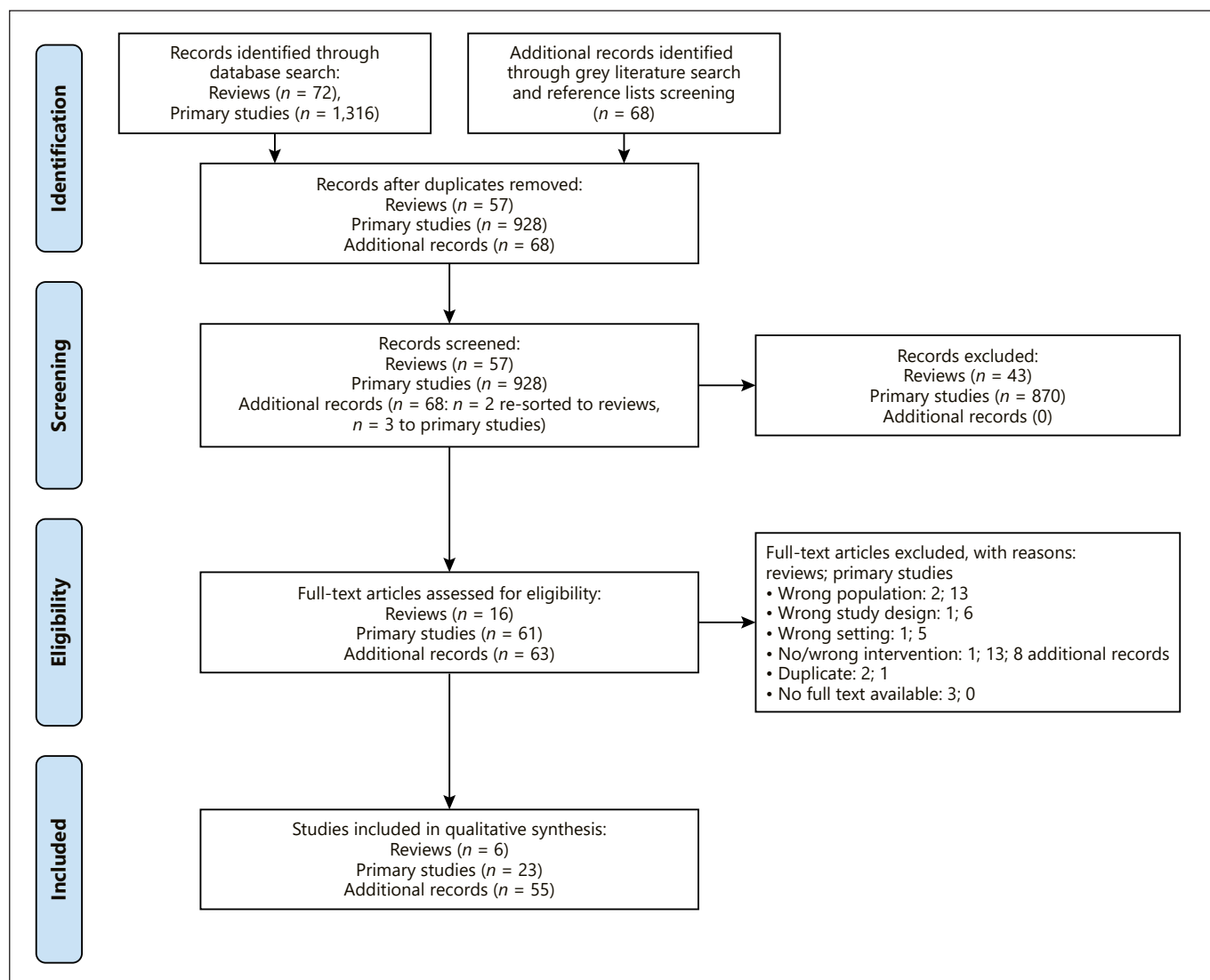


Fig. 1. PRISMA flow diagram of study selection.

and targeted inter-sectoral interventions, (inter-) national networking, knowledge exchange, and multi-sector cooperation involving, for example, police, party organizers, healthcare practitioners, party people, and policymakers. Legislative approaches and regulations regarding prices and package sizes as well as family- or school-based interventions were excluded, as they did not target the main scope of action of the stakeholders.

Types of Outcomes

Primary outcome dimensions of health literacy and harm reduction were assessed with “harm” referring to drunk driving and drug- or alcohol-related road accidents or violence, vandalism, nuisance, crime, injuries, mental crises, and presentations in emergency departments. Health literacy was defined according to the WHO as the ability to obtain, read, understand, and use health information in ways which promote and maintain good health. It is critical to empowerment and, therefore, includes motivation,

behavioral intentions, and self-efficacy [14]. Secondary outcomes included alcohol or illicit drug consumption in nightlife (e.g., maximum or average number of drinks consumed per occasion, frequency of binge drinking, mean days of drug use during the previous weeks, and combinations of drug and alcohol) and cost-effectiveness.

Data Extraction and Analysis

Full-text articles were retrieved and assessed for inclusion independently by J.B. and M.M., with discrepancies resolved through discussion. Data were extracted using predefined standardized extraction forms. Of reviews and primary studies, we extracted country, year(s) of intervention, number and type of original studies, target group(s) of intervention, number of participants, target substance(s), setting, primary and secondary outcome results, and characteristics of the intervention. Outcomes included beneficial and harmful effects of the intervention(s). From the gray literature,

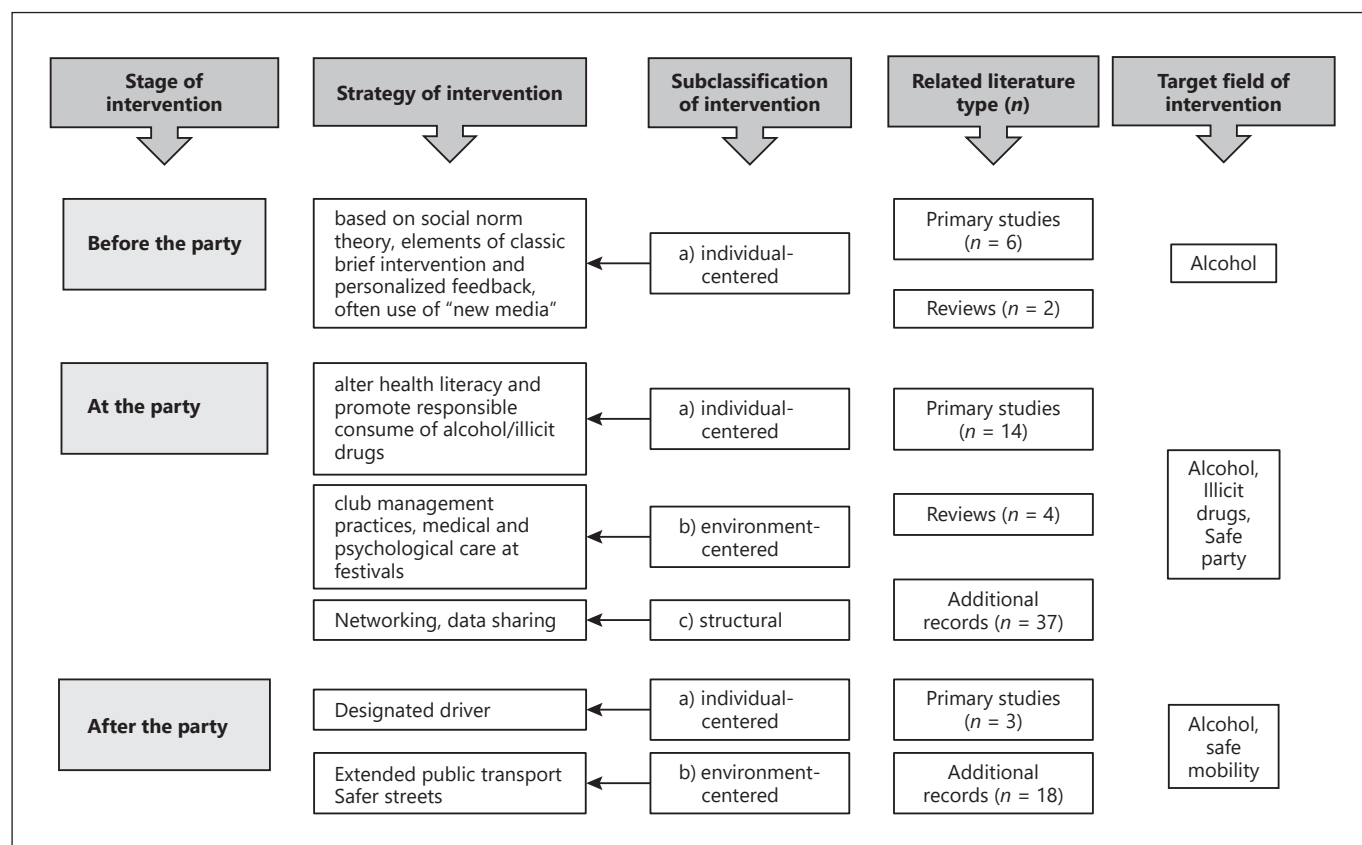


Fig. 2. Framework of the targeted nightlife setting.

we further extracted sponsorship, coordination body, and cost- and project evaluation-related data. Data extraction was performed by J.B. and spot-checked by M.M. on a random basis.

Assessment of the Methodological and Reporting Quality of Included Studies

The methodological quality of reviews was assessed using the Assessment of the Methodological Quality of Systematic Reviews (AMSTAR) tool, the reporting quality of the observational studies was assessed with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist. Furthermore, a 4-star rating system, established for systematic reviews and meta-analysis, was used [15]. Four stars were assigned to RCTs, 3 stars to uncontrolled experiments and controlled cohort studies, 2 stars to uncontrolled cohort studies, and 1 star to case reports. Due to missing instruments, the quality of the gray literature could not be assessed. All quality assessments were completed by J.B. and randomly spot-checked by M.M. Disagreements were resolved through discussion.

Data Synthesis

Data are presented as a narrative synthesis due to the heterogeneity of the study types. All evidence was grouped according to the starting point of the intervention as before the party, at the party, and after the party, and therein, references were assigned as individual-centered, environmental, or structural intervention.

Knowledge Exchange with Stakeholder Involvement

Knowledge exchange was defined as “a collaborative problem-solving between researchers and decision-makers through linkage and exchange involving mutual learning through the process of planning, producing, disseminating, and applying existing or new research in decision-making” [16]. As science and practice benefit from structured interaction, this case study in the nightlife field is of distinct relevance for an integrated knowledge exchange in the field of addiction. Methodologically, this process included the systematic literature assessment and its structured presentation as a deliberate dialogue [17, 18].

All invited stakeholders were mainly community-based experts in the field of addiction prevention, partly with an international focus. Most of them had a leadership role and long-standing practice in supervising the implementation of preventive interventions. In the systematic literature assessment, they were involved in scoping the research question and defining the interventions and outcomes to be targeted. The stakeholder dialogue was then designed to discuss the resulting evidence and its quality and to consider implementation options. It was structured by pre-formulated questions and according to the 3-party stages allowing participants to organize the presented input through building on their existing knowledge base and to interact, discuss, and further develop it according to the cognitive (learning) theory of Ausubel referred to by [19]. The starting point was to resolve questions, followed by the selection of especially relevant finding(s), the identification of similar interventions

in Switzerland, the potential transferability to a Swiss context, and reasons for that. Here, we report the results of the discussion regarding especially relevant finding(s). The responses of the dialogue participants were recorded as a written protocol, which was submitted to the participants for additional feedback. The stakeholder dialogue was evaluated with a questionnaire adapted from Moat [20].

Results

Of the literature searched, 23 primary studies, 6 reviews, and 55 reports from gray literature and reference lists screening met the inclusion criteria. The primary studies included were not part of the reviews. The PRISMA flow diagram of the search process is depicted in Figure 1.

Interventions with Respect to the Party Stage: before, at, and after the Party

Most references targeted interventions at the party, including reviews ($n = 4$), primary studies ($n = 14$), and gray literature ($n = 37$). Literature published in this category was older (mostly before 2012) than for interventions before or after the party, respectively. Hence, interventions before the party were represented in more recent primary studies ($n = 6$) and reviews ($n = 2$), interventions focusing on the after-the-party stage were mostly represented by gray literature ($n = 18$) and some primary studies ($n = 3$), but reviews were missing. Most studies of good quality RCTs and reviews including RCT(s) were found for interventions at the before-the-party stage.

With respect to substance use, illicit drugs were less often targeted by primary studies and reviews ($n = 1$ review) than alcohol ($n = 3$ primary studies). However, they were often at least co-targeted by peer interventions at parties, which often focused on “party safety” in general as shown in Figure 2.

All interventions starting before the party were individual-centered and referred to alcohol as target substance. Conceptually, they based on the social norm theory and included elements of brief intervention and personalized feedback. With 10 overlapping studies, there was considerable overlapping between the 2 reviews targeting brief interventions [21, 22]. They showed small positive short-term effects toward lower alcohol intake with a reduction of 1.5 drinks per week in heavy episodic drinkers and minus 0.8 drinking days per month among high school/university students, respectively [21, 22]. All European primary studies reported the use of social media apps, social networks, or serious games. They mostly showed positive effects on short-term drinking behavior

[23–27]. However, adverse effects were also reported, especially when including estimates of the blood alcohol concentration [28]. Thus, estimates of the blood alcohol concentration calculation lead to a significant increase in drinking frequency compared to controls in a Swedish study among university students with established levels of risky drinking [28]. Tables 1 and 2 depict the main characteristics of the included studies and the online suppl. Files 2–4 provide all data extracted.

Interventions focusing on the at-the-party stage were heterogeneous and included individual-centered approaches as well as environmental and structural perspectives, targeting alcohol as well as illicit drugs. Individual-centered approaches mostly included peer interventions, which aimed to foster health literacy and promote responsible consumption of alcohol or illicit drug use. According to an Australian primary study, these interventions were considered to lead to a better factual and theoretical knowledge on health hazards associated with the consumption of illicit drugs and on harm minimization strategies. There was also evidence of a decrease in illicit drug use 3 months following exposure to peer educators’ information [29]. Moreover, computer-assisted interviews among young multidrug users decreased their drug use and substance dependence symptoms, especially after the first assessment, and were considered to support self-reflection [30]. On the other hand, better health knowledge did not necessarily lead to a consistent health behavior [31]. Of importance, primary studies reported the adverse impact of responsible drinking messages on drinking behavior under experimental conditions [32] or of blood alcohol level (BAC) tests in nightlife recreational settings [33, 34]. Contrary to the intended effect, an even increased consumption of alcohol was favored. The gray literature mainly included professionals’ attendance in nightlife to enhance health literacy and for harm reduction (including chill-out areas, provision of water, ear-plugs, and condoms) [9, 35–41]. Environmental approaches at the party included crisis interventions and medical care at festivals, which showed positive short- and long-term effects on the mental and physical health of users and lead to a decrease of emergency department admissions [42, 43].

On the other hand, contradictory data existed regarding the abundance and geographical distribution of alcohol-serving establishments and their association with drinking patterns [44, 45]. In Australia, voluntary licensing conditions on licensed venues did not reduce emergency department injury presentations during high-alcohol risk times compared to regulatory alcohol licensing

Table 1. Characteristics of included reviews: preventive interventions in nightlife

Reference	Type of participants	Interventions	Studies included (country), <i>n</i>	Outcomes	AMSTAR rating
<i>Before the party: individual-centered intervention</i>					
Fachini et al. [21]	College students engaged in heavy episodic alcohol drinking	Brief alcohol interventions, using techniques of motivational interviewing and personalized feedback, face-to-face intervention with follow-up of 1–48 months	18 RCTs USA: 17, Brazil: 1	At approximately 12 months, reduction in alcohol consumption (difference between means -1.50 drinks per week, 95% CI: -3.24 ; -0.29) and alcohol-related problems (difference between means -0.87 , 95% CI: -1.58 ; -0.20) Perceived alcohol peer norms mediated the effects of intervention for all drinking outcomes	8/11
Tanner-Smith et al. [22]	High school/University students, 19–30-yr-olds	Brief alcohol interventions, using techniques of motivational interviewing and personalized feedback, face-to-face intervention with follow-up periods between 1 and 24 months	161 (RCTs: 145) (USA: 81%)	Lower levels of alcohol consumption (mean effect size $g = 0.17$, 95% CI: 0.13 ; 0.20 , equivalent to a 0.8 reduction in drinking days/month, from 6.2 to 5.4 d in the past month); beneficial effect on alcohol-related problems ($g = 0.11$, 95% CI: 0.08 ; 0.14 , with e.g., motivational interviewing and goal-setting exercises being associated with larger effects)	8/11
<i>At the party: environmental interventions</i>					
Hughes et al. [47]	Staff and patrons in drinking venues	Association of environmental factors (venues, social, and staff factors) with alcohol use and service practices	34 (mainly observational) USA: 12; Australia: 8; UK: 5; Canada: 3; France: 2; Bulgaria, Netherlands, Spain, Sweden: 1 (each)	Physical factors (e.g., poor ventilation, poor cleanliness, crowding, noise, low lighting, high temperature, shabby decor, low maintenance) and social factors (e.g., permissive environment, drinks promotions, focus on music and dancing) have been associated with increased aggression, higher levels of alcohol use, or intoxication; in Europe, loud music volume has been linked to faster drinking speed and alcohol consumption; no European studies were identified that linked staffing factors to levels and patterns of alcohol use	3/10
Akbar et al. [50]	Alcohol server setting, addressing alcohol- and/or drug-related harm	Server training; responsible beverage service; law enforcement; patron education	14 USA: 4; Australia: 4; UK: 2; Sweden: 3; Finland: 1	Heterogeneous efficacy measures were reported, making study comparisons difficult	3/10

Table 1 (continued)

Reference	Type of participants	Interventions	Studies included (country), <i>n</i>	Outcomes	AMSTAR rating
Ker et al. [48]	Alcohol server setting	Server training	20 (RCT: 1; nonrandomized controlled studies: 19) USA: 10; Australia: 5; Canada: 2; Sweden: 2; UK: 1	No reliable evidence that interventions in the alcohol server setting are effective in preventing injuries; effectiveness of the interventions on patron alcohol consumption is inconclusive; some indication for improved server behavior but difficult to predict what effect this might have on injury risk; compliance with interventions was a problem	9/10
Droste et al. [57]	ED clinicians	ED data sharing with nightlife-related authorities to reduce alcohol-related violence	8 (cross-sectional; 6; controlled crossover study: 1; experimental: 1) UK: 7; Australia: 1	Ease of implementation into modern ED triage system; all but 1 study reported substantial reductions of assaults and ED attendance post-intervention, cross-referencing with alternate data sources compared favorably in terms of violence detection rate and the rank order of risk-allocated venues	4/11

RCT, randomized controlled trial; ED, emergency department.

conditions [46]. Evidence regarding management practices in drinking venues (e.g., bar crowding, display of house and safety rules, door policy, and music volume) had been reviewed previously but remained inconclusive [47–49]. Two reviews were found to overlap with 2 studies [48, 50]. Interventions described in the gray literature intended to improve the risk management at large events, such as providing “amnesty boxes” to deposit illicit drugs without prosecution and establishing safer clubbing networks [41, 51–55].

Structural approaches tended to optimize cooperation between educational strategies and enforcement, for example, regarding youth violence and appeared promising [56]. In a review of lower quality, emergency department data sharing to reduce alcohol-related violence via “hot spot” police interventions seemed to be effective in the UK [57]. One primary study described an online database to provide access to data of >650 novel psychoactive substances, a SMS information service, and multimedia information tools [58]. Interventions to provide trainings and guidelines [59, 60], as well as to support networking and media campaigning were addressed in the gray literature [61, 62]. For more details, see online suppl. File 3.

Interventions paying attention to the after-the-party setting included individual-centered and environmental approaches to prevent drunk-driving and alcohol-related accidents and promote public transport [63–65]. In a 3-year intervention period in Seattle, involving Spokane and Portland as comparisons, no overall effect of a multifaceted social marketing campaign was found among 21–34 year olds, but the use of designated drivers increased by 48% and the use of taxis by 63% among the heaviest drinkers. The crash data trends showed a decreasing trend in the last 18 months, whereas in the comparison cities and other age-groups no changes or increases were observed [63]. Especially, young people with a higher attitude to alcohol were more willing to use new transport options in Lugano, Switzerland, such as shared taxis. A combined strategy, including rising awareness of public transport alternatives and appropriate legislation, was found to increase this willingness [64]. The agent-based simulation model of Scott et al. [65] revealed a 25% reduced prevalence of experiencing verbal aggression and an increase of alcohol consumption-related harms among heavy drinkers in Melbourne, Australia, with combined 24-h public transport operation and alcohol venue lock-outs at 1 or 3 a.m. Furthermore, gray literature from the UK included safe travel advice by street patrols on weekend nights to increase street safety [66, 67] as summarized in online suppl. File 4.

Table 2. Characteristics of included primary studies: preventive interventions in nightlife

Reference	Method	Participants, <i>n</i>	Intervention	Outcomes	Quality rating STROBE (star rating) (14)
<i>Before the party: individual-centered interventions</i>					
Boyle et al. [23]	Two-arm RCT	Undergraduate students 18–24 yr (237)	Gamified alcohol norm discovery and readjustment (Gamified vs. standard personalized normative feedback (PNF))	Alcohol consumption was reduced from baseline to follow-up; reduction in drinking was more substantial in the CampusGANDR condition versus standard (average no. drinks on single occasion (mean [SD]): 3.88 (1.72)–2.23 (0.87) versus 3.64 (1.33)–2.79 (1.12)) -> gamified elements may increase the efficacy of Web-based PNF interventions	No STROBE rating* (****)
Carrà et al. [25]	Quasi-experimental pre-/post-test study	Young people (590)	E-health app (digital alcohol risk alertness)	At follow-up, 14 days after self-administration of D-ARIANNA, young people reported a reduction in binge drinking (37% at baseline vs. 18% at follow-up)	21/22 (***)
Flaudias et al. [24]	Quasi-experimental pre-/post-test study	Young people (866)	SNS alcohol prevention program	↓ of The link between alcohol and partying (only influenced by number of days since registration in the program); declared number of glasses of alcohol consumed at festive moments did not diminish consistently over recruitment periods	20/22 (***)
Gajecki et al. [28]	RCT	University students (1,932)	Smartphone intervention with BAC calculation	Overall, study participation did not affect drinking in any of the 3 study groups; Promillekoll participants showed an increase in drinking occasion frequency Conclusion: eBAC calculation in the app form is not effective for reducing alcohol consumption	No STROBE rating* (****)
Johnson et al. [26]	Experimental pre- / post-test study	Mainly young people crossing border between San Diego and the high-risk drinking environment in Tijuana (2,218)	Social norm information according to the 9 conditions presented	Social norms feedback significantly affected participants' perceived norms; providing participants with highly detailed information (to increase salience and specificity) appeared to reduce the effect; efficacy of social norms feedback was undermined by individual experience; the relationship between changes in perceived norms and exit BrACs was weak	20/22 (***)
Suffoletto et al. [27]	RCT	18- to 24-yr-old hazardous drinkers, recruited following an emergency department visit (765)	SMS-delivered information-based alcohol intervention plus feedback (SA + F)	SA + F group: ↓ in Binge drinking days from baseline to 3 months; ↓ in number of drinks per drinking day from baseline to 3 months (increases in the SA group and the control group, <i>p</i> > 0.05); greater reductions in the proportion of participants with any binge drinking in the last 30 d from baseline to 3 months (–14.5%) compared to the SA group (–3.1) and the control group (–2.0)	No STROBE rating* (****)
<i>At the party: individual-centered interventions</i>					
Bowering et al. [32]	Cross-sectional study	Participants (16–29 yr) from a 1-day music festival in Melbourne	Awareness and understanding of the 2009 Australian alcohol guideline	A total of 32% of participants reported being aware of the 2009 guidelines; 74% had an accurate understanding of a safe number of drinks to avoid long-term harm from alcohol but: despite high awareness of alcohol-related harms many young people report risky alcohol consumption	22/22 (**)

Table 2 (continued)

Reference	Method	Participants, <i>n</i>	Intervention	Outcomes	Quality rating STROBE (star rating) (14)
Buchholz et al. [34]	Cross-sectional study	Undergraduate women (37)	Dietary restraint and accuracy in estimating level of alcohol intoxication	Women in dietary restraint overestimated their intoxication levels; restrained women overestimated intoxication if they intended to eat more before drinking; no difference in accuracy of intoxication if they intended to eat less before drinking	18/22 (**)
Calafat et al. [33]	Cross-sectional study	Residents of the included Spanish cities <30 yr olds (6.5% <18 Jahre) (537)	BAC tests in nightlife recreational settings as an effective preventive tool? Participants were informed about BAC result and were asked 3 a posteriori questionnaire items	After communication of BAC test result: 15% said they would stop drinking during the rest of the night, 6.6% would drink less than initially intended, 21.5% would drink more than foreseen, 56.7% remained unaffected	17/22 (**)
Kurtz et al. [30]	18-month natural history study	Young adult multidrug users in the club scene	Computer-assisted personal interviews to reduce substance use	↓ in drug use frequencies and substance dependence symptoms. most relevant after first assessment => study assessment interviews served as self-awareness and self-monitoring tool	22/22 (**)
Moss et al. [31]	Experimental study in simulated environment	Undergraduate students with non-problem drinking (AUDIT score), aged 18–25 yr	Effect of responsible drinking messages in a simulated bar or lab context, participants believed that beverages were alcoholic (de facto all were nonalcoholic)	Drinking volume in a simulated bar was higher than in a lab. Display of posters with RDM led to increased consumption. Brief responsible drinking advice reduced the negative impact of the posters. Low level of visual engagement with RDM	18/22 (****)
Silins et al. [29]	Quasi-experimental design	Festival/nightclub/dance event patrons 18–29 yr olds, having used ecstasy at least once during past 12 months	Brief intervention in nighttime establishments	Specific ecstasy-related message was recalled immediately post-intervention (64%) and after 3 months (46%); 55% of participants who collected pamphlets referred to the information later and shared it with others (68%)	21/22 (***)
<i>At the party: environmental interventions</i>					
Astudillo et al. [44]	Cross-sectional study	Swiss young men from 3-military recruitment centers, age 19.5±1.3 yr (5,519)	Alcohol consumption and on-premise outlet density	Drinking level and heavy episodic drinking were positively associated with on-premise outlet density (bars, clubs, and restaurants). No associations between drinking consequences and outlet density	22/22 (**)
Byrnes et al. [49]	Cross-sectional survey	Young patrons (mean age 27, SD 7.8) at electronic music dance events (738)	Club management practices and patrons' alcohol/drug use	Over-serving was related to exit levels of alcohol and drug use. Clubs with greater number of posted safety signs had lower levels of cocaine use. Other club management practices (i.e., security practices, bar crowding) were only related to drug and alcohol use at the bivariate level	19/22 (**)
Carvalho et al. [42]	Cross-sectional study	Attendants of Boom festival (most attendants aged 19–39 yr)	Kosmicare intervention model to reduce risk for mental disorders related to psychedelic drug use	Mental state exam symptoms were reduced after intervention; 76% of crisis episodes obtained resolution; 80% of visitors were satisfied when leaving intervention site, all visitors followed-up reported long-lasting intervention effects	16/22 (**)

Table 2 (continued)

Reference	Method	Participants, <i>n</i>	Intervention	Outcomes	Quality rating STROBE (star rating) (14)
Miller et al. [46]	Observational study	Nighttime injury-related hospital emergency department visits (about 77 obs. per month)	Regulatory versus voluntary alcohol licensing conditions to reducing harms (data collected: emergency department visits)	Only mandatory interventions based on trading hours restrictions were associated with reduced emergency department injury presentations during high-alcohol hours	19/20 (***)
Stagelund et al. [43]	Prospective observational study	Attendants of Roskilde festival including guests, performers, and volunteers (10,630)	24-h medical assistance and 12 first-aid stations and treatment areas throughout festival area (music and camping area)	A total of 6,919 patients was handled by first-aid volunteers; 3,473 patients required further health care (prescriptions, medications, cutaneous suture); 260 patients referred to a local hospital, general practitioner, or dentist; common minor illnesses/injuries: wounds, bandages, and sprains; illnesses/injuries: infections, pain, and deeper wounds	20/21 (**)
Toomey et al. [45]	Cross-sectional design	83 Minneapolis (USA) neighborhoods, ranging in population size from 128 to 15,247	Alcohol establishment density and nonviolent crime	Positive associations between density of total alcohol establishments and each of the 5 crime outcomes; approx. 3.3–10.9% increase across crime categories resulting from a 20% increase in the alcohol establishment density in neighborhoods	18/18 (**)
<i>At the party: structural interventions</i>					
Corazza et al. [58]	Qualitative assessment and monitoring	Young people (secondary schools/college/universities) health professionals	Accurate information on novel psychoactive substances, pilot mobile technologies to disseminate this information and inform future research in e-health, selective prevention, and harm reduction	Overall were >650 substances identified Development of a secured ReDNet online database, a SMS-email information service, and multimedia tools Production of 183 technical reports (access restricted); 11 technical reports; and 30 factsheets for public access	13/13 (*)
Ramstedt et al. [56]	Quasi-experimental design	High-school students, their parents, restaurant owners, doormen, event companies	Cooperation regarding alcohol use (restaurants, police, event companies, schools); information/education (students, parents) and increased enforcement. Data from 5 major hospitals in Stockholm from 2005 to 2010	Violence-related hospital visits were markedly decreased in the experiment group during intervention period (23%)	15/19 (***)
<i>After the party: individual-centered intervention</i>					
Scagnolari et al. [64]	Cross-sectional stated preferences survey	University students aged 14–25 yr (mean 20.1, SD 3.07) (316)	Mobility preferences during night hours	Young drivers are willing to choose public alternatives (i.e., shared taxis); countermeasures (i.e., police controls, license suspension) can increase willingness. People with higher attitude to alcohol are more willing to switch to new public transport alternatives. Conclusion: need of combined strategy (rise in public awareness, appropriate legislation, and appropriate public transport)	18/22 (**)

Table 2 (continued)

Reference	Method	Participants, <i>n</i>	Intervention	Outcomes	Quality rating STROBE (star rating) (14)
<i>After the party: environmental interventions</i>					
Scott et al. [63]	Agent-based simulation model	Simulation based on 18- to 25-yr-old heavy drinkers, outer-urban and inner-city residents who move between private and public-commercial (e.g., nightclubs) venues	Extended public transport (PT) operating hours and alcohol venue lockout policies	24-h PT: 21% decrease in prevalence of experiencing verbal aggression 1 a.m. lockouts: Reduced prevalence of experiencing verbal aggression, ↑ prevalence of consumption-related harms, ↓ transport-related harms by more than a third (35%) 24-h PT AND 1 a.m. lockouts: ↓ prevalence of experiencing verbal aggression by 25%; ↑ consumption-related harms; when implemented in conjunction with any extension of PT; 3 a.m. lockouts equally effective as 1 a.m. lockouts	22/22 (**)
Rivara et al. [63]	Quasi-experimental design	21- to 34-yr-old bar patrons	New taxi stands, point of sale information (coasters, posters, etc.), public education campaign (commercials on TV, radio, transit advertisement, street teams, presence in social media, pop-up ads, and Web page)	No overall effect on self-reported driving after drinking, serving as a designated driver, or use of taxis after drinking in bars Among those at greatest risk of road accidents, significant increase in the use of designated drivers (+48%) and of taxis (+63%). Nighttime road accidents in the target age-group decreased	22/22 (***)

RCT, randomized clinical trial; BrAC, breath alcohol concentration; PNF, personalized normative feedback; Obs, observations; BAC, blood alcohol concentration; SNS, social networking site; RDM, responsible drinking messages; PD, public transport; SD, standard deviation; TV, television; STROBE, Strengthening the Reporting of Observational Studies in Epidemiology; AUDIT, alcohol use disorders identification test. * The STROBE checklist was developed for observational studies and not for RCTs.

Stakeholder Dialogue

Following the evidence synthesis, a half-day stakeholder dialogue structured by the presentation of the findings and pre-formulated questions was implemented in July 2017. Prior to it, all 7 participants received a 2-page summary.

The following main aspects evolved during the discussion:

- self-reflection,
- health literacy,
- health behavior.

It was considered remarkable that interviews themselves influenced people's health behavior as described by Kurtz et al. [30]. This effect was mediated via interview questionnaires at baseline which made people reflect their own alcohol or drug consumption pattern and its negative consequences [30]. According to the stakeholders, this effect could also be seen in practice, for example, through interactions during drug checking. They were convinced that this could empower people to reconsider and improve their health knowledge and behavior.

On the other side, it was also shown that health literacy and health behavior were not always concordant. Thus, in an Australian study, many young festival patrons reported risky alcohol consumption, even though they had an accurate understanding of the safe number of drinks protecting them from long-term harm and injury [32]. Contrary to this, most of the Swiss young people were unaware of the nationally recommended drinking limits. Still, their alcohol consumption was considered less problematic than in most other countries, which was also reported in the Global Drug Survey and might be a cultural difference [68]. Hence, dialogue participants preferred health behavior-based outcomes (measured e.g., via alcohol or drug use) and drug-related harm measures (such as vandalism or emergency department admissions) for pragmatic reasons and because of its higher policy relevance.

Participants claimed that it was sometimes difficult to plan and evaluate preventive interventions targeting illicit drugs because of their illegal status that impaired open interactions. Thus, open discussions about drug problems and policies in nightlife establishments were difficult and stakeholder interests sometimes contradictory (e.g., regarding police and club management). However, participants recommended that optimally tailored interventions should always consider the whole nightlife context (private and public). This should envisage to prevent shifts of alcohol or drug-related harms from public to private sectors or to identify adverse events of preventive interventions [65].

Personalized Feedback via Social Media

The fact that BAC tests or their estimates could alter alcohol consumption and trigger an exploration of personal limits was consistent with the practical experience of the stakeholders. Additionally, the BAC was considered as a parameter of limited informational value. This was concordant with scientific evidence where mostly the level permitted to drive was used to inform people about the meaning of their BAC. Still, most people did not limit their consumption because of objective data but rather according to their personal feeling. In this context, "getting drunk" was rarely considered something adverse but often something to go for [33]. This was also the reason why stakeholders agreed that potential mobile apps should be customizable and focus on enjoyable consumption with minimized side effects, rather than on objective harm reduction. They should contain motivational, self-efficacy promoting contents, and support the critical reflection of the drinking behavior after the party, including individual cost-benefit analysis.

Networking and Multi-Sector Approaches

All participants agreed that knowledge exchange and networking facilitated a broader view and fostered mutual understanding. In future, especially a multi-sector approach [56] would merit further dissemination and was also supported by the European Monitoring Center for Drugs and Drug Addiction [69].

Participants agreed that emergency department data could present interesting outcome data for the planning of preventive interventions in a multi-sector approach. However, there were also constraints with respect to the setting and the patients being in a vulnerable situation (e.g., intoxicated and/or injured). Before local implementation, accordance with national data protection regulations and collaboration with hospitals and emergency department clinicians needed to be ensured. As an alternative, data of public nighttime transportation could be collected. Participants reported massive problems in this field (e.g., because of soiling and vandalism) and criticized that this area was underrepresented in multi-sector approaches. They further discussed to broaden the perspective and even integrate sporting events or holidays which were often confronted with similar challenges (e.g., binge drinking in holiday resorts or at sporting events).

Evaluation of the Stakeholder Dialogue

All participants provided written feedback. They agreed that it was helpful to consider scientific evidence

when participating in decision-making processes. Still, for most of the participants, the use of evidence was not self-explanatory and they found it useful to discuss potential knowledge gaps, facilitators, and barriers regarding the implementation of evidence-informed practice and policy. Due to time constraints, more concrete strategies on how to proceed in future could only be developed at a subsequent meeting.

Discussion

We provided an overview of preventive interventions considering the nightlife spectrum, from the before- and at-the-party to the after-the-party stage. Therefore, the evidence synthesis and the stakeholder dialogue informed key stakeholders and researchers in an integrative way on exploring potential facilitators and barriers for evidence uptake and implementation in practice and policy. This was a major strength of our approach. The structured presentation of the findings, designed as an equal interaction between researchers and practitioners allowed us to build relationships. We are convinced that not only the structured knowledge translation but also the relevant findings which emerged at the stakeholder dialogue might be of relevance for a European audience.

From a researcher's perspective, the heterogeneity of the included records was challenging when assessing their quality. The best available evidence, RCTs, mainly targeted individual-centered interventions in 3 articles [23, 27, 28] and 2 higher quality reviews, which included mostly RCTs [21, 22]. All of them addressed the before-the-party stage. Another review included controlled studies and targeted with the alcohol server setting an environmental intervention at at-the-party stage. However, one should keep in mind that randomized controlled designs would not always be feasible, for example, for medical or psychological interventions at festivals.

No reviews of structural interventions of the after-the-party stage were found. This was also reflected by the high counts of grey literature in these fields which made it difficult to summarize evidence and impossible to perform critical appraisal of these interventions. Furthermore, dissemination into practice might be hindered by missing or unavailable evaluation measures.

At the stakeholder dialogue, participants mainly focused on individual-based and structural interventions. Regarding the former, personalized feedback via social media or apps and self-reflection measures, for example,

performed as computer-assisted personal interviews, was considered as potential interventions for young adults in nightlife. Promisingly and described, for example, by a survey conducted in Berlin, Germany, partygoers themselves requested to combine the highly accepted drug checking with an educational offer about harms and risks of illicit drug use [70, 71].

They were preferred to responsible drinking messages (based on BAC limits or tests) and also to interventions striving health literacy-related outcomes, which were considered difficult to assess. However, and as a limitation of this study, the description of the term "health literacy" was not consistently used. Hence, self-reflection and personalized feedback enhancing self-efficacy would be part of health literacy if not a restricted definition is used based on provision of health information only.

The 2 reviews targeting brief alcohol interventions were mainly conducted in the US college or high school settings and their contextualization in a European setting might be questioned. Of note, there are brief alcohol intervention programs in Europe, targeting adolescents and young adults following alcohol-related emergency admissions. The respective review did not meet our inclusion criteria [72]. It described inconsistent evidence for effectiveness and feasibility and identified needs for further research [72], which might include the assessment of cultural factors.

Furthermore, stakeholders addressed networking and multi-sector approaches as structural interventions – although there is no high-quality scientific evidence available. They could include the before-the-party stage in addressing public and private nightlife as well as safety issues and public nighttime transportation after the party. Even an approach to target people's leisure time in general was envisaged including sport events with similar problematic alcohol or drug use, which could support the sharing of experiences. This would merit further research and a more integrated framework for the evaluation and contextualization could be provided by health promotion [73, 74] or the super-setting frameworks [75].

Acknowledgements

Our thanks go to Ms. Martina Gosteli and Mr. Diego Morosoli for performing the comprehensive literature searches. We thank all stakeholders for their engagement, their valuable and inspiring contributions, and discussions.

Statement of Ethics

All authors confirm that this study complies with the guidelines for human studies. The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

The authors did not receive any funding.

Author Contributions

All authors designed the study and contributed to the protocol, and J.B. and M.M. performed the screening steps. Data extraction was done by J.B. with spot-checking by M.M., and all authors contributed and consented to the publication of the article.

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