Institution: Anglia Ruskin University

Unit of Assessment: 3

Title of case study: Drug-Facilitated Sexual Assault in Nepal: Enhancing Forensic Capacity and Raising Public Awareness

Period when the underpinning research was undertaken: 2014–2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Dr Lata Gautam	Associate Professor	2006-present
Prof Michael Cole	Professor of Forensic Science	2001-present
Dr Sarah Hall	Senior Lecturer	2000-January 2020
Agatha Grela	Research Assistant	March 2017-July 2018

Period when the claimed impact occurred: 2014–2020

Is this case study continued from a case study submitted in 2014? No

1. Summary of the impact (indicative maximum 100 words)

Research carried out at Anglia Ruskin University (ARU) into methods for detecting and investigating drug-facilitated sexual assault (DFSA) has led to wide-ranging impacts on forensic capacity, policy, education and public awareness in Nepal. Both of the country's main forensic science laboratories have acquired the capacity to investigate DFSA using different sample types, including hair, blood and drinks. Additionally, the Government of Nepal introduced a policy to provide specialist nurses for schools to deal with sex education and reproductive health as a result of this research, and sex education was incorporated into the new national school curriculum. Well over 2,000 students and 163 teachers demonstrated raised awareness and understanding of DFSA-related issues following briefings by Dr Lata Gautam, the lead researcher. Gautam's research and training also resulted in changes in legal practice and better understanding of the issues surrounding DFSA among senior policymakers, police officers, legal professionals, and medical and public health practitioners. Gautam's outreach also led to media interest, which resulted in wider public awareness of DFSA in Nepal.

2. Underpinning research (indicative maximum 500 words)

Drug-facilitated sexual assault (DFSA) is a sexual act in which the victim is unable to give or withhold meaningful consent due to intoxication with alcohol and/or drugs, which can be either self-administered (opportunistic DFSA) or covertly administered through spiked drinks by the perpetrator (pro-active DFSA). Sexual assaults have become a serious problem in Nepal, as police records illustrate: between 2009 and 2019, reported annual rape cases rose by 471%, from 391 cases to 2,233. Most cases do not come to light because victims are often ignored or not taken seriously by law enforcement agencies, the judicial system, society and even their own families [3.1]. In particular, awareness on DFSA cases was very low prior to the research, as the media in Nepal have often reported DFSA as generic "rape cases".

In order to address this issue, Dr Lata Gautam, Associate Professor at ARU, began research in 2006 on drug analysis and identification from different sample types [3.1–3.3 and 3.5]. Gautam's research focused on drug analysis from beverages and human hair (both key DFSA samples) as well as other sample types that may play a part in DFSA investigations. Hair provides information for a long time (months or years) whereas other sample types (e.g. blood, urine) retain drugs for just hours or days. Gautam's ARU staff collaborators included Michael Cole (Professor of Forensic Science, at ARU since 2001), Sarah Hall (Senior Lecturer of Forensic Analytical Chemistry, at ARU between 2000 and January 2020), and Research Assistant Agatha Grela (at ARU between March 2017 and July 2018).

The initial research focused on the development and validation of a novel and more effective method [3.1] for the simultaneous detection of piperazines (compounds which mimic the effects of Ecstasy) and congeners (biologically active chemicals often associated with drink spiking) in street samples. Similarly, Gautam and colleagues developed and validated a new method [3.2] for the simultaneous detection of 20 drugs of abuse and pharmaceuticals in drinking water, based on the use of solid-phase extraction followed by liquid chromatography-mass spectrometry. A further project investigated the stability and storage conditions for benzodiazepines (sedatives) found in spiked drinks [3.3]. Drug persistence was found to be longer in drinks, indicating their suitability for forensic analysis. Therefore, beverages suspected of being involved in DFSA cases should be routinely collected and analysed. The research also identified issues around the stability of flunitrazepam and temazepam (which are most often associated with DFSA cases), highlighting the importance of analysis immediately after sample collection.

Another research project [3.4] critically evaluated DFSA drug trends from cohort studies, reporting on the differences in drugs detected in opportunistic and pro-active DFSA cases. The paper included pharmacological data for each of the drug groups and showed why these compounds are used by perpetrators of DFSA. Furthermore, the pharmacology and mechanisms of action were analysed to explain how the drugs cause their effects, providing research insights which are useful for medical professionals and forensic practitioners.

A further project [3.5] focused on hair analysis, which is capable of determining both an individual's long-term drug history and a single exposure to a drug. The latter can be particularly important for corroborating incidents of drug-facilitated crimes. Gautam and colleagues undertook a hypothesis review on drug hair analysis and results interpretation, categorising variables such as an individual's pharmacokinetic and metabolic responses, hair growth rates, drug incorporation routes and others. The outcome was a three-stage analytical approach to assist forensic toxicologists, hair analysis experts, the judiciary, etc. in the interpretation of hair analysis results.

Key findings of this body of work are, in summary: (i) drugs can be detected from spiked drinks; (ii) drinks should be analysed immediately after seizure to avoid stability issues; (iii) novel methods reported here can be used to detect drugs from different sample types; and (iv) when hair sample is analysed, variables categorised in this work should be considered for arriving at fair and just conclusions in forensic investigations of DFSA cases.

3. References to the research (indicative maximum of six references)

The body of research represented below meet the two-star threshold for underpinning research since they have been published in peer reviewed journals and received 42 citations.

[3.1] Kuleya, C., Hall, S., **Gautam, L.,** Cole, M.D. (2014) An optimised gas chromatographic-mass spectrometric method for the chemical characterisation of benzylpiperazine and 1-arylpiperazine based drugs. *Analytical Methods* 6 (1): 156-163. Submitted in REF2. https://doi.org/10.1039/C3AY41020J

[3.2] Peng, Y., **Gautam, L.,** Hall, S. (2019) The detection of drugs of abuse and pharmaceuticals in drinking water using solid-phase extraction and liquid chromatography-mass spectrometry. *Chemosphere*, 223: 438-447. Submitted in REF2 https://doi.org/10.1016/j.chemosphere.2019.02.040

[3.3] **Gautam, L.,** Sharratt, S.D., Cole, M.D. (2014) Drug Facilitated Sexual Assault: Detection and stability of benzodiazepines in spiked drinks. *PLoS ONE 9 (2): e89031.* Submitted in REF2. https://doi.org/10.1371/journal.pone.0089031

[3.4] Grela, A., **Gautam, L.,** Cole, M.D. (2018) A multifactorial critical appraisal of substances found in drug facilitated sexual assault cases. *Forensic Science International* 292: 50-60.

https://doi.org/10.1016/j.forsciint.2018.08.034

[3.5] Davies, C., **Gautam, L.,** Grela, A., Morrissey, J. (2020) Variability associated with interpreting drugs within forensic hair analysis: A three stage interpretation. *Journal of Applied Toxicology* 40 (7): 868-888. https://doi.org/10.1002/jat.3959

4. Details of the impact (indicative maximum 750 words)

Summary

Gautam's purposeful engagement on DFSA with stakeholders at all levels of Nepali society has led to wide-reaching impacts. Key beneficiaries of the research include Nepal's two main forensic science laboratories, who have acquired the capacity to investigate DFSA more effectively (demonstrating impacts on practitioners and delivery of professional services); students and teachers at schools, where the national curriculum has been reformed and specialist nurses have been provided to advise on sex education and reproductive health; government ministers and other senior policymakers; community leaders; police officers; legal professionals; medical and public health practitioners; and the general public.

Influencing professional standards and training: Enhanced forensic services in Nepal

In 2018, Gautam delivered training based on her research at Nepal's two main state-owned forensic science laboratories, the Central Police Forensic Laboratory and the National Forensic Science Laboratory, both located in Bagmati Province [5.1–5.2]. Through this training, 48% (N=25) of chemistry and toxicology scientists at both labs acquired the ability, for the first time, to analyse beverages suspected of involvement in DFSA cases and quantify drugs from beverages and hair samples. As feedback received from the Nepal Police Forensic Lab states: *"This training has certainly enhanced the competency of our staff in the area of qualitative and quantitative analysis of drugs and toxicological samples, which has been a big challenge for us since long* [sic]*"* [5.2]. One trainee commented: *"Now I can better analyse the sample and generate results, both qualitatively and quantitatively. I can help in result accountability of my organisation"* [5.3a]. During the training, laboratory protocols were developed building on Gautam's underpinning research [3.1 and 3.3], which enabled the forensic science laboratories to detect and quantify drugs more effectively from different sample matrices (blood, drinks, hair and street drugs) [5.1]. Those trained also acquired the ability to *"train new staff, adopt standard operating procedures and contribute in upgrading the lab facilities"* [5.3b] in six other provinces (sub-national level) [5.4]. In particular, the capacity-building training resulted in changes in the storage and processing of samples received and updating of standard operating procedures and training manuals [5.4].

Impact on health and wellbeing through policy change and outreach in schools

Gautam's research and resulting engagement with the Head of the National Examinations Board in Kathmandu, resulted in the introduction of the ***"one school one nurse" policy*** in Bagmati Province in 2018 [5.5]. By the end of December 2020, this new policy had been successfully implemented at 19 state-run schools, with plans for it to be rolled out to a total of 119 schools in the province. The nurses provide counselling on sex education and reproductive health to female students.

In 2018/19, Gautam carried out school and college-level outreach activities on DFSA, with support from Nepal's National Examination Board [5.5], civil society organisations and professional bodies. By June 2020, these had reached 13 schools (990 students) and 11 college/university-level institutions (1,102 students) as well as more than 163 teachers/academics. These activities influenced ***attitudes, awareness and understanding of DFSA among schoolteachers and students***, as student feedback demonstrates: *"The teachers themselves feel awkward while talking about the subject matter. In my personal experience as well, I was not able to understand much about sex education during my school days"* [5.6a]. Another participant said: *"There is not enough coverage, people should not have guilt, and shame to say if they have been sexually assaulted"* [5.6b]. Feedback from a workshop with students and teachers in 2018 highlighted the need for effective implementation of "sex and

relationship education" as well as drug-related issues in schools and colleges, with ideas such as offering extra-curricular education on sex and relationships and on drugs receiving a positive response from teachers. Consequently, in 2020, the ***revised curriculum*** included topics on sex education and drugs [5.5]. Some schools have addressed this issue by hiring female staff and though performing drama, essay competitions and invited speakers [5.7].

Gautam's initiatives also led to *"hospital staffs considering these new dimensions and issues in the assessment of the cases handled*", according to the Ministry of Health [5.8]. Following one of Gautam's events, one student victim came forward and reported that she had been sexually assaulted; as a result, she received the necessary support and was referred to a specialist NGO.

Influencing public policy on DFSA: Raising awareness among policymakers and professionals and changing legal practice

Gautam's research and subsequent engagement with the then Joint Secretary of the Office of the Prime Minister of Nepal in 2018 led to three national-level workshops with active participation from a variety of relevant stakeholders. 39 non-governmental and 25 governmental organisations (1,471 people including teachers) took part, including representatives from different government departments, school education and curriculum officials, students, police officers, forensic scientists, lawyers, medical professionals, public health experts, human rights activists and media. The Joint Secretary described the sessions as *"particularly valuable"* [5.9]. As the workshops were also attended by top-level officials (e.g. Nepal's Minister of Education in 2019), they provided opportunities for advocacy efforts on incorporating DFSA issues in education policies and the school curriculum [5.5 and 5.9].

The workshops highlighted how much of a social taboo still surrounds DFSA in Nepal. Feedback received after the first workshop from a district court judge stated that "...*the cases that come to court are only symbolic; there are still many cases that are unreported or made compromise by police*" [5.6c]. To address this, in the third workshop (2019) Gautam introduced the use of alternative tools (such as drama, poems and mind-mapping) to communicate and facilitate learning on this sensitive topic. These ideas have already been applied in schools [5.7].

Feedback also indicates that the workshops led to ***changes in legal practice***: a district judge from Pokhara reported enhanced understanding of sample types and the memory loss associated with DFSA, which often leads to victims reporting the crime late. The judge commented: *"I and my legal cohort have considered these new dimensions and issues in the assessment of the cases handled since then… the information disseminated from the DFSA workshop were helpful in making decision which comprised 40% out of 800 criminal cases settled in my bench."* [5.6e]

As a direct response to Gautam's work, Nepal's Minister of Education, Science and Technology (who was the chief guest in one workshop) stated that there was a need to put correct policy measures and effective teaching methods in place [5.10a]. The Minister also highlighted the need for proper scientific investigation of sexual assaults and the rising number of DFSA cases. To that end, he invited Gautam for a follow-up meeting in the Ministry in which she shared her research findings and assessment of media coverage on DFSA cases with the minister, providing a list of recommendations based on her research and feedback from the workshop.

Increasing public awareness of DFSA and changing attitudes

The workshops also led to wider media coverage [5.10a-i] of DFSA. In 2018/19, Gautam actively promoted her message through invited TV interviews and panel discussions in the local language [5.10e, h, i], an interview with BBC Nepali Radio [5.10g], and an article co-authored with a local medical doctor and published in a medical professionals' outlet in Nepal [5.10k]. Previously, in 2014, she had written an article on DFSA in a Nepalese newspaper [5.10j]. Several of the interviews and articles were viewed, shared and liked on YouTube and Facebook, totalling 19,838 engagements. Collectively, these media engagements reached an online audience (followers) of more than 5 million people, equalling 19% of Nepal's total population. Audience feedback demonstrated active discussion of the subject, as this sample response on a

TV programme highlights: "… *It was a wonderful discussion, informative, scientific and valuable in our society. Congratulations for disseminating this knowledge in Nepalese scientists and public*" [5.10l].

Gautam also shared her research findings at community level, e.g. at an event in 2019 organised by a community development police–public partnership project in Baneshwore, Kathmandu.100 participants (including a number of mother groups and local parents) attended this event, representing six different grassroots organisations. Similarly, Gautam was invited to take up the role of advisor in a 3-day programme organised by BSN, a youth group in Nepal on the "Impact of Science in the Federal Democratic Republic of Nepal", 23–25 April 2019, with forensic science and Drug Facilitated Sexual Assault topics introduced for the first time. Gautam contributed to this event attended by more than 1,000 participants through an exhibition (posters, pamphlets, one-to-one conversation) and an oral presentation on DFSA. In June 2020, during the Covid-19 lockdown, Gautam was invited to a Zoom webinar organised by Janata Multiple Campus and Ladies Jaycees, Itahari (Province 1). The event was attended by 77 participants and broadcast live on Facebook, resulting in 3,300 views and 14 shares. Participants found the presentation *"really relevant, situational, informative and dynamic"* [5.6d]. These events have allowed Gautam to reach a wider public, addressing the need to make more people aware of DFSA.

Most recently, Gautam has begun to transfer the insights from her work in Nepal to other countries. In **Botswana** she is co-supervising an MSc research student as an impact of her webinar. Public events have been offered in the **UK**, e.g. at the Cambridge Science Festival 2020. Gautam delivered an invited webinar on DFSA to an audience in **India** (hosted by Amity University, India).

5. Sources to corroborate the impact (indicative maximum of 10 references)

[5.1] Letter from Acting Executive Director of National Forensic Sciences Laboratory, Nepal.
[5.2] Letter from Superintendent of Police, Central Police Forensic Science Laboratory, Government of Nepal.
[5.3 a and b] Feedback from training participants.
[5.4] Response to list of questions sent from National Forensic Science lab about impact of our training.
[5.5] Letter of support from Director, Province Examination Management Office, National Examinations Board, Bagmati Province, Government of Nepal, May 2020.
[5.6] Workshop feedback: (a and b) – students; (c) judge; (d) webchat – evidence from Janta Multiple Campus webinar on DFSA (province 1); (e) letter of support from Judge, Kaski District Court, Pokhara, Nepal.
[5.7] Response from a teacher to measure impact of workshop offered, Gurukul School, Chitwan.
[5.8] Email from Director, Naradevi Ayurveda Hospital, Ministry of Health and Population.
[5.9] Letter of support from Joint Secretary, formerly Office of Prime Minister, now at Ministry of Agriculture and Livestock Development.
[5.10] Collated examples of media coverage, engagement and feedback including: (a) Science, Technology and Education Minister's speech as a chief guest of the DFSA workshop. Janata Samachar TV; (b) Nepal Live article; (c) News 24 Nepal coverage; (d) Imagekhabar article; (e) Imagekhabar TV channel; (f) Kantipur Saptahik interview; (g) BBC Nepali FM (transmitted live and on Facebook); (h) ABC TV: Our health; (i) Sambhash – TV panel discussion (Imagekhabar); (j) Republica news article, 2014; (k) an article written with a medical doctor from Nepal in local language; (l) feedback on TV discussion shared on Facebook, ex-Vice Chancellor, Agriculture and Forestry University, Nepal.