Violence Risk Assessment for females: The HCR-20

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1 Abstract

Violence in females has received little empirical attention, compared to males. However, contemporary society has seen an increase in female violence, as well as offences committed by females, generally. Therefore, gaining further insight female violence is important for understanding, measuring, preventing and rehabilitating females. This thesis includes chapters which apply a meta analytical approach to the existing research for the HCR-20v^3 for females. This is followed by an empirical examination of the predictive validity of HCR-20v^3 for inpatient violence, exploring the effect of gender. An individual exploration of the HCR-20v^3 with a female offender is also presented in this thesis, followed by an investigation of the psychometric properties of a novel female risk assessment, the Female Additional Manual (FAM) to be utilised alongside the HCR-20v^3. This thesis contributes to the literature for violence risk assessment, and the HCR-20's applicability, predictive validity, and need for female samples. Overall findings propose that there is a closing gender gap for male and female inpatient violence. The HCR-20 was generally predictive for females, with no significant differences to males. This research explored the gender sensitive approach to violence risk assessment and found that the current HCR-20 is currently sufficient for risk assessment with females, but requires further and more in depth exploration. Future research would benefit from exploring the qualitative elements of risk assessment, and to consider the pathways and manifestations of risk between genders in a more holistic manner.

2 Preface

This research aims to provide a comprehensive assessment into the violence risk assessment of females, focusing on the recognised violence risk assessment tool, the HCR-20. It aims to address the contemporary issue of female violence, a field which is currently under researched. The following investigations utilised various research methods to gain the range of experience required for an accredited professional doctorate. This thesis encompasses four main chapters which comprise a systematic review and meta-analysis, empirical research study, a single case study, and a critical review of a violence risk assessment tool. The chapters aim to explore the predictive validity, clinical function and applicability of the HCR-20 with female populations. The chapters are structured as sequence; however, each chapter can be considered as an independent piece of work.

Chapter two systematically reviews the literature assessing the predictive validity of the three versions of the HCR-20v^3 when applied to female populations. A meta-analysis assesses the predictive efficacy for females when investigating violence and recidivism, for the H, C, R and total items. Studies reporting outcomes for females were limited and varied in methodology. This meta-analysis contributes to the small field of literature available by establishing a clearer view of what is known about the predictive validity of the HCR-20 for females. This piece of work was also presented at the British Psychological Society's Division of Forensic Psychology Conference (2017) as a poster (Appendix A).

Chapter three reports an empirical prospective study assessing the use of the HCR-20v^3 as a tool for predicting violence in a psychiatric sample. This study explored a matched sample of male and female patients to gain more information on gender differences on inpatient violence and aggression, and to compare the utility of the HCR-20v^3as a predictive risk assessment tool. The results suggested no significant differences between male and female violence. The HCR-20v^3 had good predictive validity for males and females, with no

significant differences between outcomes. Future research will benefit from expanding on this area as these results and others are somewhat varied. Further exploration can build an empirical foundation for understanding the application for gender of the HCR-20v^3 tool. It is recommended that future research follow the Risk Assessment Guidelines for the Evaluation of Efficacy (RAGEE) to reduce heterogeneity among empirical outcomes, and allow for systematic analysis.

Chapter four presents a single case study with a female offender completing a collaborative HCR-20v^3 risk assessment and developing a risk management plan. This process adopts a shared-decision making model to address the risk of the client, whilst empowering autonomy in risk management. A combined risk management plan was designed and implemented, which addressed the imminent risk factors. The effect of this method was assessed via behavioural observation, engagement and recorded incidents of violence and aggression. The case suggested that the HCR-20v^3 was able to contribute to a valuable risk management plan, which resulted in a short-term reduction in violence. The subject of the research also expressed content with the process and opportunity for involvement. However, this revealed the limited understanding of how best practise principles of sharing risk assessment may not be suitable for everyone.

Chapter five is a critical review of the Female Additional Manual (FAM), which recommends additional items to add to the HCR-20 when assessing risk of violence for females. The literature on this tool is limited; however the outcomes reveal predictive validity for violence risk assessment with females. The findings of this review yielded support for further research into this tool, and comparisons of it to the HCR-20 alone. However, this thesis suggests that at present this tool is not considered as necessary for valid female risk assessment, but as useful factors to consider when completing a HCR-20v^3. The final

Chapter details a discussion around the findings and implications of the research, as well as reflections on the thesis as a whole.

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Glossary of terms

APA	American Psychiatric Society
ASSIA	Applied Social Science Index and Abstracts
AT	Addiction Theory
AUC	Area Under the Curve
BPAQ	Buss and Perry Aggression Questionnaire
BPD	Borderline Personality Disorder
CASP	Critical Appraisal Skills Programme
CBT	Cognitive Behavioural Therapy
CCTV	Closed Circuit Television
DoH	Department of Health
DSM	Diagnostic
EMS	Early Maladaptive Schemas
FAM	Female Additional Manual
FAM:RV	Female Additional Manual: Research Version
GAD	Generalised Anxiety Disorder
GAD-7	Generalised Anxiety Disorder – 7 item scales
GCSE	General Certificate of Secondary Education
GBH	Grievous Bodily Harm
GPCSL	General Personality and Cognitive Social Learning model
GST	General Strain Theory
HCR-20/ HCR-20v^3	Historical Clinical Risk/ Historical Clinical Risk Version 3
ICC	Intra Class Correlation
ICD	International Classification of Diseases
IRP	Identifying Risks Programme
MHIRT	Mental Health In Reach Team
MoJ	Ministry of Justice
NICE	National Institute of Clinical Excellence
OAS	Overt Aggression Scale
OASys	Offender Assessment System
PD	Personality Disorder
PHQ-9	Patient Health Questionnaire
PICO	Population, Intervention, Comparison and Outcome
PRU	Pupil Referral Unit
RCI	Reliable Change Index
ROC	Receiver Operating Characteristic
RT	Rational Theory
SIR	Security Intelligence Report
SLT	Social Learning Theory
SOS	Start Outcome Scale
SPJ	Structured Professional Judgement
W&SAS	Work and Social Adjustment Scale
WHO	World Health Organisation

1 Chapter one: Introduction

1.1 Violence

A universally accepted definition for the term violence does not currently exist. The study conducted by Bowers *et al.* (2011) found that published research on inpatient aggression between 1960 and 2009 used a variety of definitions for aggression and violence. These were categorised as threats, verbal threats, physical behaviours towards others and objects, and self-harm. Definitions which focus solely on the 'act' of violence are considered to be exemplar approaches, which do not consider the complex phenomenon beyond the violent act itself (Hamby 2017). These definitions also do not consider the exceptions of societal perceptions of violence and acts which may be considered as 'pro-social', including self-defense, military action or accidental violence. Perspectives of violence are also important to consider across cultures and social structures, and the leading political systems which define violence. What constitutes as violence is influenced by current societal views, which are continuously under review as society evolves (World Health Organisation, WHO, 2002). The office for National statistics (2017) in the United Kingdom (UK) regards violent crime as offences which range from assaults which cause physical harm, to harassment and abuse, which results in no physical harm. Violent crime is also defined as 'victim based crime' or 'crimes against society', where there is no identifiable victim, therefore perceiving violence to be defined by the result of an action. As a result a definition of 'violence' can become indistinct across varying societal, cultural or political views. For example, in some American states it is legal to carry a firearm (with a license), whereas in the United Kingdom (UK) this is an arrestable 'violent' offence to possess a weapon when carrying it in a public place.

In addition to societal and political categorisations of violence, we also need to consider perceptions at a local level. Interacting in a violent manner can be a product of societal ideations, whereby acts of violence are 'acceptable' or perceived as 'legitimate' in a given situation. For example, in socio-economically deprived areas the perceived lack of 'formal control' (e.g. police) can result in 'antisocial informal control', such as violence as a means of resolving conflict (Sargeant, Wickes, Murphy & Mazerolle, 2017). At this level, it may become part of a child's development and socialisation that violence is a legitimate behaviour within their community. Therefore, generating a definition of violence which does not agree with societal, cultural and political ideation, but is better understood and reinforced for one community.

1.2 Defining violence and gender

The distinction of violence can be confused further when understanding violent behaviours and gender. When conducting a preliminary literature search of 'violence' and 'gender' the response rate alludes to 'violence against women' and 'domestic violence towards women', and provides little insight into violence committed by females. Cultural scripts of males and females can contribute to perceptions of risk of violence, particularly for domestic violence. Seelau and Seelau (2005) explored views of domestic violence by providing a variety of cases of domestic violence (e.g. gay male, lesbian, female-against-male, and male-against-female) and found that the participants suggested that (in any situation) a male perpetrator and a female victim was judged as most serious. Seelau and Seelau suggested that this further justifies the difficulties with the gender-stereotypes that males are more capable of inflicting violence, and that females are more likely to be a victim. Statistically this may so, however this study suggested a perception of 'seriousness' which may later impact on differing criminal justice routes and outcomes due to stereotypes of gender.

The social perception that the type of violence committed by females differs from males has been supported in the research, whereby women have been found to be more likely to engage with violence in private, and utilise indirect aggression and passive-aggressive behaviours (Chrisler, Donald & McCreary, 2010; Del Giudice, 2015). The WHO (2018) suggests that violence can be self-directed violence. Self-directed violence refers to "high impact behaviours that contribute to morbidity, mortality, and broader social problems" (Sadeh, Javdani, Finy & Verona", 2011, p.1). Gender differences have been demonstrated, whereby females are more likely to engage in self-directed behaviours than males (Verona, Sachs-Ericsson & Joiner, 2004), and males have been found to engage in more aggressive and assaultive behaviours than females (Swanson, Holzer, Ganju & Jono, 1990). Therefore, the conceptualization of defining violence is further construed by the gender of the perpetrator of violence.

1.3 Definition of violence for this thesis

As a means of developing a more generalizable definition of violence Hamby (2017) suggests considering four elements of violent behaviour and if it is, (a) intentional, (b) unwanted, (c) nonessential, and (d) harmful. Following this format, understanding violence can become less clear when we consider concepts such as terrorism, which may be considered as essential to the perpetrator. Furthermore, behaviours such as online exploitation could be considered as intentional, unwanted, nonessential and harmful, but would not normally fall under the typical definition of violence around verbal or physical threats. And so, a single definition of violence is difficult to generate due to it being such an ambiguous concept. The HCR-20v^3 suggests that violence can be defined as an intention to harm which is an "aggressive act, attempt, or threat must, to some degree, have been deliberate or willful" (Douglas, Hart, Webster & Belfrage, 2013, pp.36). This definition certainly does not cover Hamby's suggestions of whether it is nonessential or unwanted, nor does it consider societal,

cultural or political differences. As this thesis is focused on the measurement of violence utilising the HCR-20v^3 risk assessment it seems appropriate to pragmatically utilise the HCR-20v^3 manual definition of violence and has been applied to identify violent behaviours throughout each chapter.

1.4 Rates of violence and the impact of gender

Historically, it has been assumed that males are more likely to engage in physically violent behaviours than women (Rowe, Vazsonyi, & Flannery, 1995; Strand & Belfrage, 2001; Harer & Langan, 2001). However, UK statistics suggest a significant increase in female perpetrators of all violence from 2006 until 2017 (Office for National Statistics, 2018). In 2015 the gender difference for violent crime revealed markedly more males (n=66,068) who had committed acts of violence against the person than females (n=11,721, MoJ, 2015). However, when assessing the proportional rate for violence of males and females, each revealed the same percentage of the offending population to have committed violence against a person; 22 per cent. Therefore, general rates of violence among the female population are prevalent, equal proportionally to males, and rising.

Nicholls, Ogloff, Douglas and Grant (2004) examined rates of in-patient violence and found that outcomes did not drastically differ between men (68.9%) and women (70.8%). These incidents of violence included acts of physical aggression and engagement in threatening behaviours. In psychiatric settings consequences for in-patient aggression include verbal de-escalation techniques, seclusion, physical interventions, medication and increased supervision. Mental health professionals are continually making important decisions with regards to patients. Such activities are, unescorted leave, as a fundamental part of the rehabilitation process. Therefore, awareness of influence of gender on violence has become more important to understand risk management and assessment of risk, particularly for the female population as this has had less focus, historically (Dolan & Doyle, 2000).

1.5 Theoretical approaches to understanding violence

Understanding the mediators of violence is important in clinical practice so that incidents of violence can be understood and better managed, or even avoided. Theoretical models have been developed to understand the pathways and risk factors which contribute to violence. Considerations have focused on societal and relational influences (Social Learning Theory, SLT, Bandura *et al.*, 1961; The General Strain Theory, GST, Merton, 1957; Relational Theory Miller1986; 1990), psychological factors (Frustration-Aggression hypothesis, Dollard *et al.*, 1939), and biological factors, including hormonal influences (Ferrari *et al*., 2005) and genetic precursors (McGuffin & Gottesman, 1985). However, each of these theories can be critiqued for not considering other domains which contribute to violence, and have been criticised in the feminist literature which claims that these 'male stream' theories are not uniformly applicable to females (Chesney-Lind, 1989, Simpson, 1989). Further, theoretical models and assessments have been further explored and developed for different types of 'violence' (e.g. fire setting, physical violence, sexual violence), therefore an overarching approach may not appropriately examine all types of violence. Following this, the General Aggression Model (Allen & Anderson, 2017) was developed as a more integrative and comprehensive approach to understanding pathways to violence. This model identifies the distal causes, defined as biological, environmental and personality factors, and the proximal causes, which identify factors about the person and situation. Therefore, utilizing a general approach can help to identify relevant proximal and distal factors contributing to various forms of violence for both genders which can guide formulation for clinicians (Allen & Anderson, 2017).

1.6 Risk factors and pathways to violence

When examining violence risk and the impact of gender, research has identified motivations of violent behaviour can differ between genders (de Vogel *et al,* 2015; Bloom, Owen & Convington, 2003; Strand & Belfrage, 2001). Daly (1992) explored life experiences of male and female offenders and suggested a 'pathways' perspective. This approach proposed that some vulnerability existed more for females, which were associated with pathways to violence (e.g. history of abuse, self-harm and substance use). This research was based on a small sample of 40 males and 40 females. However, the study was influential in its time, and has since been explored, and supported, in the gender-responsive offending pathways literature (Salisbury & Van Voorhis, 2009).

The concept of psychopathology has also been explored. Weizmann-Henelius *et al.* (2015) explored violence and the links to psychopathy in a longitudinal study over 8 years and found expressions of psychopathic traits to differ among males and females. This study also suggested that relations between *criminal versatility* and *poor behaviour controls* to violence have been evident for males and females, but females also have a significant correlation between *impulsivity* and violence. Impulsivity has been a consistent factor which has been suggested as a more prevalent factor for females committing violent offences, compared to males, which would be important to consider for treatment pathways (Warren et al., 2005). When considering in-patient violence, Komarovskaya, Loper, and Warren (2007) suggested that impulsivity was related to female in-patient misconduct. Therefore, in order to understand the development of the factors violence, traits associated with the behaviour are important to consider for males and females.

The contributions of emotional aspects has also been considered and research has suggested that stress-induced negative affect can result in physical aggressive responses in males, but less in females, while frustrations revealed increased physical aggression responses for both genders (Verona & Curtin, 2006). However, this was conducted in a

superficial setting, and was not indicative of genuine 'stress-induced' situation. The understanding of violence between genders has also revealed differences in the relationship context, whereby women are more likely to be violent in romantic relationships, family or friends (Magdol, *et al.*, 1997), whereas men were more likely to be violent against strangers (Kellerman & Mercy, 1992). And so, the emotional and relational context may need to be considered, particularly for in-patient settings as frustrations in a therapeutic relationship may potentially be at risk for females.

The impact of victimization and experiencing traumatic events have been considered as contributors of later violent behaviours in both females (Bloom, Owen & Contington, 2003; Banyard, Williams & Siegel, 2001) and males (Jakupcak & Tull, 2005). Muller and Kempes (2016) explored psychological variables which may contribute to violence in 140 matched male and female violent offenders. They found female offenders were more likely to have suffered depression, engaged in self-injurious behaviours, and more had suffered adverse childhood experiences, such as neglect or abuse. The male offenders also experienced these, but were more likely to have been predisposed to drug and alcohol problems in their past. Meng and D'Arcy (2016) also suggested that strong associations between gender and childhood abuse, and later mental disorders or substance abuse. Predominantly, Meng and D'Arcy's research suggested associations between male and female mental health disorders, and the moderating effect of gender on childhood abuse history and mental disorders in adulthood.

Experiences of trauma are complex, and are in no way described in detail in this review, however a short overview of trauma and its impact on violence and gender is considered. Overtime, research has revealed that males and females are likely to experience different types of trauma. For example, female youths are more likely to report sexual, physical and psychological abuse than males who are more likely to experience accidents,

illness, conflict (e.g. war) and non-sexual assaults (Hennessey *et al*., 2004; Tolin & Foa, 2006). Mears, Ploeger and Warr (1998) suggested that females are "differentially affected by exposure to the same criminogenic conditions" (p.252), which suggests that males and females response and interpretation of traumatic events can play a major role in how an individual processes and copes later on in life. Research has found distinct emotional risk factor differences between genders when assessing violent behaviours. Sadeh, Javdani, Finy and Verona (2011) explored the emotional facets of men and women and found that trait anger (i.e. impulsivity, control of anger) was associated with males and acts of outward violence, whereas females were more associated with trait hostility (i.e. suspiciousness) and acts of self-directed violence.

Experiences of trauma are also suggested to be internalized in a way which can impact emotional self-regulation (Ford, Courtois, Steele, van der Hart, & Nijenhuis, 2005). When assessing in-patient aggression we must consider these experiences of the women and how this has impacted on their view of themselves and the world. As a result this can influence interpersonal functioning, thinking styles, expression and management of emotions and, as a result, their behaviours (American Psychiatric Association, 2013). Therefore adverse effects can become apparent in maladaptive coping techniques such as externalizing behaviour (e.g. aggression) and internalizing disorders/difficulties (e.g. isolation, depression, substance abuse) (Sheeringa & Zeanah, 2001; Johnson, Sheahan & Chard, 2003; Meng & D'Arcy, 2016). Females are considered to be more likely to engage in internalizing maladaptive behaviours, such as self-harm (Muller & Kempes, 2016). Problematic inpatient behaviours by females may also present as relational aggression, which has been theorised as a means self-protection and preservation (Logan & Taylor, 2017; de Vogel, Stam, Bouman, Ter Host, & Lancel, 2016).

Further considerations are societal expectations and gender stereotypes. The historical model of femininity is associated with a "private sphere" focused on domesticity and roles of being primary care givers and compassionate to others (Rosenfield, 2000, p.25; Logan & Taylor, 2017). The cultural norm of masculinity has been more typically coupled with dominance, emotional independence and assertiveness (Hoffman & Borders, 2001). And so, females are stereotypically expected to be able to express themselves to others, whereas males are 'expected' to maintain decorum and internally manage emotions. As a result, females are more likely to seek and be provided with the opportunity to express themselves and receive support when they are subject to trauma. Alternatively, males may have difficulty with emotional expression and so lack the same level of intervention or acknowledgment. This can influence how traumatic events are processed, and as a result impact on coping strategies to manage experiences of trauma. And so, it is worth considering the type and extent of trauma for both genders, and how these experiences have been interpreted, and managed, when assessing and understanding violent behaviours.

1.7 Generations of risk assessment

Originally 'unaided clinical judgment' was used to aid risk assessment, which provided flexibility in decision-making. However, this technique made use of formulation based solely on clinical decision without any specific procedure, and was later found to be less reliable and valid than more structured approaches (Guy, Packer & Warnken 2012). Later developments led to the use of actuarial assessments, which utilises a methodical manner of data collection to inform if individual outcomes deviate from normative scores. Such tools provide the opportunity to compare norms from various populations and follow a structured method and systematic process; however it has been argued that actuarial risk assessment processes cannot account for individual differences and circumstances when predicting risk (Hart, 1998; Mairead & Doyle, 2000). Furthermore, when considering the

application of non-discretional methods of assessment, such as actuarial designs, it is worth considering its narrow focus on a specific topic, for certain populations, and measuring a specific period of time (Hart & Logan, 2011). Consequently, for violence risk prediction this approach is suggested to be 'empirically validated', whereby evidence for that particular tools exists, but is not taking the entirety of the related literature available.

The third generation of risk assessment practice, known as Structured Professional Judgment (SPJ), allows for a combination of flexibility in clinical judgment within the structure of systematic data collection (Webster, Haque & Hucker, 2013). This is a non-actuarial approach which is directed by guidelines to ensure a systematic collection of an individual's dynamic and static risk factors (Hart, Douglas & Guy, 2016). SPJ approaches are based on guidelines which are empirically developed. There is growing research suggesting that the SJP approach is an effective method for risk assessment (Otto & Douglas, 2010). Therefore, SPJ methods are considered to be 'evidence-based' (Hart & Logan, 2011), which comprehends the scientific and professional literature available in the area of assessment. The aim of this method, in violence risk assessment, is to develop a formulation of what exacerbates individual's violent behaviour by considering all areas which are empirically related to risk, and developing quality risk scenarios and management (Hart, Douglas & Guy, 2016).

SPJ is able to assess on a distinctive level, unlike actuarial approaches, which apply group based norms to individuals (Douglas, 2014; Hart, 1998; Douglas, Hart, Webster & Belfrage, 2013). Non-discretionary approaches, such as actuarial assessments, do not allow for modifications of the algorithm used to account for unique factors of individuals (Webster & Guy, 2016). Furthermore, collecting normative data which can covers all demographic characteristics is improbable. Therefore, the conclusions of actuarial assessments can

categories individuals based on norms which may not accommodate for specific individual differences.

SPJ assessments are centralized around collecting relevant information which is distinct to an individual, and allows for removal of factors which are not significant, and inclusions of those which are appropriate. Furthermore, the outcome of an SPJ approach to risk assessment can aid in understanding the factors which influence and contribute to risk of violence in a clinically valuable manner, as opposed to actuarial outcomes which suggest a risk estimate (Webster & Guy, 2016). This review does not doubt the value of a predictive probability of risk based on normative data, but acknowledges the tentative conclusions which can be made compared to the detailed empirically lead overview of SPJ guidelines. When assessing the ability to predict a behaviour, a meta-analysis of SPJ and actuarial measures suggested that they have equally moderate predictive validity (Guy, Douglas & Hart, 2015), and would suggest that for predicative efficacy purposes they are both applicable. However, the SPJ approach can go beyond prediction and provides a guideline for understanding, treating and managing risk. Overall, the actuarial approach is considered to be empirically validated and a useful approach for developing an overall risk estimate. The SPJ approach is considered as evidence-based, to inform more clinically valuable conclusions and management strategies (Webster & Hart, 2016).

1.8 Violence Risk assessment

Violence risk assessment is defined as "the process of evaluating individuals to characterize the likelihood they will commit acts of violence and develop interventions to manage or reduce that likelihood," (Hart 1998, p.356). Historically, risk assessment tools have mostly been researched using male participants. Contemporary research is now extending risk assessment to minority samples, such as females and psychiatric in-patients (De Vogel & De Ruiter, 2005; Nicholls, Ogloff, Douglas, 2004; Sturup, Monohan &

Kristiansson, 2013; Strand & Belfrage, 2001; Morrisey, Beeley & Milton, 2013). It is important that SPJ is continually researched in sub-groups of offenders to conceptualise risk. This requires consideration of the nature, severity, imminence, frequency, duration, and likelihood of future violence, which can then be used to develop risk management strategies aimed at preventing violence for the individual being assessed.

1.9 Predictive validity studies

Predictive validity is the means of evaluating the accuracy of a risk assessment tool. For this thesis, it is understood as the ability of a risk assessment tool to be able to accurately assess the likelihood of future violent behaviour (Singh, 2013). Historically there have been numerous pieces of research which employ a methodology to assess the predictive validity of risk assessment tools. Statistical advances have also contributed to exploring this field in detail. In all forms of science, the ability to predict patterns or correlations is important to develop greater understanding and generate change.

However, the practicalities of actually being able to predict something in the future, which is yet to occur, is questionable and has drawbacks. In clinical practice professionals have an ethical responsibility to acknowledge the drawbacks of any form of risk assessment, and evidence it is based upon. Hart, Michie, and Cooke (2007) discussed two types of error when interpreting risk estimates produced from a risk assessment. Firstly, 'group error' which refers to the margin of error which needs to be considered to understand the uncertainty of whether a certain amount of people will behave in a certain way. Secondly, 'individual error', which focuses on the individuals margin of error, and if individuals are to behave in a certain way. When concerning violence risk, an assessment may predict that 70 per cent of people will be violent if they fall within a certain risk level. At a group level we can tentatively assume that people may be violent, but with little confidence, and knowing that there is a 30 per cent chance that the individual will not be violent. Therefore,

understanding margins of error is crucial in being able to interpret risk assessment tools, and the application of predictive validity outcomes as a sole understanding of risk must be treated cautiously when categorising a person. This is particularly relevant in behavioural sciences and forensic mental health, where being categorised to a certain group (e.g. violent, psychopathic, high/low risk sexual offending) can have critical consequences for an individual's future.

1.10 The HCR-20

The Historical, Clinical, Risk Management-20, Version 3 (HCR-20v^3Douglas, Hart, Webster, & Belfrage, 2013) is a well utilised risk assessment tool which embodies the SPJ approach. This risk assessment was designed for adults and is comprised of static and dynamic risk factors with three subscales; Historical (H), Clinical (C) and Risk Management (R). The scale consists of 20 items (Table 1). The HCR-20 has gained popularity in the forensic field throughout its various versions. Based on information from 2,135 clinicians across 44 countries, Singh (2013) found that the HCR-20 was the most used risk assessment tool.

The original version of the HCR-20 was published in North America by Webster, Eaves, Douglas & Wintrup, (1995). From that point, more systematic literature on violence and use of risk assessment developed, which lead to the development of the HCR-20 version 2. Douglas, Hart, Webster and Belfrage (2013) then established the HCR-20v^3 which was examined across 4 counties and 5 countries with regards to reliability and validity.

The concurrent validity of the HCR-20 has been found to be 'high to very high' between the previous and current version (Douglas & Belfrage, 2014; Strub, Douglas & Nicholls, 2014; Howe, Rosenfield, Foellmi, Stern & Rotter, 2015). The authors of the version 3 have claimed that this assessment will be more useful than the version 2, whist still

maintaining strong evidence-based approach. The HCR-20 v^3 introduced the element of scenario planning, risk management strategies, and an overall risk management formulation. The formulation component is considered as crucial in drawing the evidence together to gain a greater understanding of an individual's potential risk of violence. This is achieved via linking the relevant history, how this associates to current violence, and factors which preceded and perpetuate the violence risk. This informs appropriate plans to manage the current risks of violence. Research exploring the development and application of formulation for risk of violence is in need of development (Logan, 2014). The recently updated assessment requires continued evaluation of its administration, use, and predictive validity of risk of violence (Douglas, Hart, Webster & Belfrage 2013).

1.11 The HCR-20 and gender

HCR-20 items (Table 1) are reliable factors which predict risk of violence (Douglas, Hart, Webster, & Belfrage, 2013). De Vogel and de Ruiter (2005) conducted research on the HCR-20 between a matched sample of 42 male and female personality disordered patients, while good to excellent predictive validity was found for in-patient violence for males (AUC= .75 to .91), greater variance was found for females (AUC= .52 to .86). For the females, only the final risk judgment demonstrated excellent predictive validity for violence. Previous research has found that predictive validity is reduced for studies containing higher rates of patients with personality disorder (O'Shea, Mitchell, Picchioni & Dickens, 2014). De Vogel and Ruiter's (2005) sample was representative of patients with a diagnosis of a personality disorder for this study, which may have impacted on the outcome.

Further research by Schaap, Lammers, and de Vogel (2009) focused on violence risk assessment with females and found low to moderate effect sizes for violent recidivism (AUC = .42 to .68) and general recidivism (AUC= .41 to .58), and was suggestive or poor predictive validity. Better predictive value was found for some individual items, such as substance

abuse and history of violence. Schaap and colleagues research contributes to understanding violence risk prediction with females, however they did not utilise a comparison sample of males to explore differences in predictive efficacy.

Contradictory findings were made by O'Shea and colleagues (2016), who systematically reviewed the moderators of predictive efficacy of the HCR-20 and found that predictability was increased among samples with higher proportions of females, and reduced for those with samples that had high numbers of personality disorders. This impact of personality disorder will need to be considered in future research as this could potentially skew data and is common co-morbidity in mentally disordered offenders. Similar results were found by Nicholls, Ogloff and Douglas (2004) who studied a sample of male (N=162) and female (N=106) inpatients in a psychiatric hospital. No significant differences were found between rates of violence between males (69.8%) and females (70.8%). AUC outcomes revealed moderate to large effect sizes for females (AUC = .57 to .70), but only moderate for males (AUC = .55 to .58). This research was conducted in a civil psychiatric setting, and suggestive that consideration of assessment and management of violence is also prevalent in non-forensic settings.

Strub, Douglas, and Nicholls (2016) explored predictive validity for male (n=52) and female (n=48) short-term psychiatric patients. Males exhibited higher scores for the H, C, ad R subscales, and also had higher total scores. AUC outcomes showed moderate to large effect sizes for males (AUC = .56 to .83), and females (AUC= .64 to 75). Further analyses were conducted to compare gender correlations, and found no significant differences between male and female AUC's. Strub and colleagues (2016), found that although there were slight differences between genders, it was not a moderator of predication of violence. This study explored the various types of violence; 'any violence', 'physical violence' and 'verbal violence'. AUC outcomes were marginally higher for males, apart from when using C items

for predicting any or verbal aggression or violence. Further exploration of the HCR-20's ability to predict various types of violence would contribute to its clinical utility. This study acknowledged the low power caused by the small sample size as a possible impact on the outcome. Other studies have found, the HCR-20 displays only a slight increase in predictive validity of violence for females, compared to their male counterparts (Garcia-Mansilla, Rosenfield, & Cruise, 2011). This has suggested that the HCR-20 should be utilised with caution when assessing risk with females due to limited understanding, however it is still considered to be valid.

Individual items on the HCR-20 have further created debate amongst the predictive efficacy for male and females. O'Shea, Picchioni, Mason, Sugarman, and Dickens (2014) examined the HCR-20 v2 items as a function of gender, diagnosis, age and ethnicity. The study assessed forensic psychiatric patients (*n*=505) and found that the risk management item, R5 contributed to the predictive power of violence in females, whereas male violence was best predicted by clinical factor, C5. O'Shea and colleagues (2014) also concluded that AUC values were generally higher for females than they were for the male patients, thus suggesting great accuracy for this group. The final risk judgement, which is an overall judgement of risk of violence is coded as low, moderate and high, has been found to be significantly more predictive of risk of future violence with females than males (McKeown, 2010; de Vogel & de Ruiter, 2005). Therefore, itemised considerations are important when formulating individuals risk of violence when considering pathways to violence.

1.12 The HCR-20 v^3

Research on the HCR-20v^3 is in the early stages. Strub, Douglas, and Nicholls (2014) tested a sample of civil psychiatric patients and offenders in prison (n=106) prospectively as a predictor for violence. They concluded that ratings had moderate to large effect sizes, while relevance to violence ratings were lower, but still averaging at a moderate effect size. These

results were supportive of the predictive ability of the HCR-20v^3. These results did not take into account the effect of gender and reported the scores with males and females combined, which may have skewed the results, given past research on gender differences.

Green, Shcnieder, Griswold, Belfi, Herrera, and DeBlasi (2016) also evaluated the HCR-20 v^3 and observed the effect of gender for 'Not Guilty due Reason of Insanity' (BGRI) examinees. Green *et al's* (2016) study found that in patient violence was marginally higher for females (54.2%) than it was for males (42%). The results also revealed larger effect sizes for predicting violence for males however there was no significant effect for gender of the HCR-20v^3's prediction of future violence. The sample size of females (N =24) was considerably fewer than that of the male (N = 100) participants, so may have bias results.

1.13 The Female Additional Manual (FAM)

The FAM (de Vogel, de Vries Robbe, Kalmthout, & Place, 2014) was developed in response to the perceived need for a gender-sensitive violence risk assessment tool. This risk assessment is based on the HCR-20 and was designed for mental health professionals to assess risk with women. The FAM was first formulated in 2007 based on empirical literature and interviews with experienced clinicians (de Vogel, *de Vries Robbe, van Kalmthout, & Place,* 2013). It has since been implemented and modified for the HCR-20v^3. The FAM includes empirically based adaptations to two historical items (Table 15) and eight additional factors for the C and R sections (Table 16). Research on the FAM is currently limited; however findings have revealed moderate to large effect sizes when predicting violence with females (De Vogel & De Vries Robbe, 2010; Grieg, 2014).

1.14 Aims of this thesis

Research exploring the predictive efficacy of the HCR-20 for gender is limited, and contradictory. A limited evidence base exists for the utility of the HCR-20 v^3 for psychiatric

in-patients (O'Shea & Dickens, 2015; Strub, Douglas & Nicholls, 2014; de Vogel, Van Den Broek & de Vries Robbe, 2014); with little assessing the impact of gender. This thesis aimed to systematically review the current research available for females, followed by an exploration of the predictive validity and application of the HCR-20 v^3 both comparatively for male and female gender. Lastly, this thesis explored the validity and reliability of a specifically engineered gender sensitive risk assessment tool, the FAM

2 Chapter Two: Systematic Review and Meta-Analysis

The HCR-20 in Predicting Violence in Adult Females: A Meta-Analysis

2.1 Abstract

This meta-analysis aimed to examine the effectiveness of the Historical Clinical Risk-20 violence management tool for predicting violence in adult female populations. Violence risk assessment is utilised in psychiatric and forensic settings to predict and manage violent behaviour. The HCR-20 is a well-known tool which has been predominantly developed and validated on males. A systematic review exploring the effectiveness of this tool exclusively in female populations has not yet been conducted. Nine electronic databases and reference lists of relevant analyses were searched. All papers were reviewed with pre-defined inclusion criteria, and quality assessment. Relevant papers were then subject to data extraction and synthesis. The electronic search revealed 1025 papers. After the exclusion process and quality assessment 10 studies were included in the review. A meta-analysis was conducted using a total of 37 effect sizes assessing the predictive validity of the H, C, R and Total items for violence and recidivism. Results suggested a large effect for the H items when assessing

recidivism. Low to Medium effect sizes were also found for H, C, R and Total when measuring risk of violence. Risk management items were considered the least predictive for females, when assessing recidivism. This review concludes that the HCR-20 assessment can be considered as a useful tool for assessing violence risk with females, particularly for recidivism. Future research should focus on the effectiveness of the HCR-20 version three as the updated tool.

2.2 Introduction

Violence is a prevalent phenomenon in forensic clinical settings (Daffern & Howells, 2002). Incidents of violence have been found to be typically committed by males (Mica, Oesterle, Werner, & Simmen, 2015; De Vogel & De Vries Robbé, 2013). However, the gender gap for occurrences of violence has been proposed to be narrowing in institutional settings (Strand & Belfrage, 2001; Greig, 2014). Therefore, it is becoming increasingly important to understand risk and causes of violence committed by females (Dolan & Doyle, 2000). Risk assessment tools measuring likelihood of violence are important for prediction of future risk, and development of risk management plans. Such tools were initially designed for evaluating risk for males and have since been applied to females in practice (McKeown, 2010). The Historical Clinical Risk-20 management tool (HCR-20, Webster, Eaves, Douglas, & Wintrup, 1995, Webster, Douglas, Eaves, & Hart, 1997; HCR-20v^3, Douglas, Hart, Webster, & Belfrage, 2013) is a recommended assessment in the field for assessing risk of violence (Singh, 2013). To be able to validly make predictions in order to formulate and manage future risk of violence in females it is important to consider the application of the HCR-20 when applied to this population. A systematic review exclusively examining the use of this tool with female populations does not currently exist. This review sought to synthesize how effective the HCR-20 tool is, when being utilised to predict future violence in female populations.

2.2.1.1 Defining Violence and Recidivism

Violence is a commonly used term, but does not have a universally accepted definition. Being able to develop a clear widespread definition of violence seems improbable, following the earlier discussion (see section 1. 1). As a means of developing a more generalizable definition of violence Hamby (2017) suggests considering four elements of violent behaviour and if it is, (a) intentional, (b) unwanted, (c) nonessential, and (d) harmful. The HCR-20v^3 suggests that violence can be defined as an intention to harm which is an "aggressive act, attempt, or threat must, to some degree, have been deliberate or willful" (Douglas, Hart, Webster & Belfrage, 2013, pp.36). This definition considers Hamby's suggestion of 'intentional' and 'harmful', but doesn't specify that the violence is unwanted or nonessential. As this review is considering measurement of violence employing the HCR-20 the definition defined in the most up to date HCR-20 v^3 professional manual will be applied, for pragmatic purposes.

Recidivism is a broad term and encapsulates re-conviction, re-arrest and imprisonment (Fazel & Wolf, 2015). Re-conviction rate for females in the UK was 46 per cent within one year (Prison Reform Trust, 2016) and is therefore a prevalent area to understand and explore. Recidivism is often considered when assessing predictive validity of the HCR-20 for community samples as a means of recording violence.

2.2.1.2 Rates of violence and recidivism

Historically, female violence has been considered as so minor that is it not worth researching (Buss, 1961). Risk of violence and aggression has stereotypically been viewed that males express more violent behaviour compared to their female counterparts (Rowe, Vazsonyi, & Flannery, 1995; Hare & Langan, 2001; MoJ, 2013; Mica, Oesterle, Werner & Simmen, 2015). However, contemporary studies suggest a narrowing gender gap for incidents of violence in the community (Holmes, 2010) and institutional settings (de Vogel & de Ruiter 2005; Nicholls, Ogloff, Douglas, & Grant, 2004). Females have also been

suggested to be more likely to engage in inpatient violence (Nicolls, Brink, Greaves, Lussier, & Verdun-Jones, 2009; de Vogel, Stam, Bouman, Ter Host, & Lancel, 2016). Little is known about why this is more prevalent when females are in secure settings, however some explanations have been considered. Logan and Taylor (2017) discuss the idea that the 'cultural ideal' of women and if females are not able to fulfil this 'feminine role' it can create tensions. It is suggested that females are more likely to engage in internalizing maladaptive behaviours, such as self-harm (Muller & Kempes, 2016). Therefore, Logan and Taylor suggest that when females do express aggression it can be directed to towards themselves or those closest to them (which in forensic settings may be peers or staff), which in itself can be considered as an indirect form of self-harm due to the "self-defeating nature" of sabotaging relationships (p. 246). Another explanation may be the nature of record keeping in forensic settings which may be amplifying the expressions of aggression in females which may not be recorded or considered in the community due to the 'cultural ideal'.

A study by Knaap *et al.* (2014) explored criminogenic needs for male and female offenders to understand recidivism. The results suggested that accommodation, education, work, and relationships were more strongly correlated with male offenders, whereas emotional well-being was more highly linked with female offenders. Furthermore, females are assumed to have shorter criminal careers than males (Gelsthorpe, 2004). Explanations as to why female recidivism has less research may be related to the lower rates of re-offending, after detention in prison, for females than males (MoJ, 2014). It may also be understood by the limited sample access, with <5% of the criminal justice population being females. When specifying violence, the sample is further reduced in female populations. Therefore, understanding violent behaviours and recidivism among female samples can be difficult due to the restricted access to samples.

2.2.1.3 Understanding female violence

Historically, theories of violence have been criticised for their development and application to male populations, and not providing sufficient explanation for female criminality (Piquero & Sealock, 2006; Chesney-Lind, 2007; Miller, 1990). The scarcity of theoretical knowledge for female offenders may be explained by the historical minimal number of female criminals compared to males, and their different types of offences.

Earlier explanations of violence concentrated on male populations and societal influences as contributing factors to violence, (e.g. Social Learning Theory, SLT, Bandura *et al.,* 1961; Bandura, 1977; Frustration-Aggression hypothesis, Dollard *et al.*, 1939; Miller, 1941; and The General Strain Theory, GST, Merton, 1957). Theoretical exploration has since attempted to address the domain of female violence, such as Relational Theory (RT, Miller (1986; 1990), Trauma Theory (Herman, 1992) and Addiction Theory (AT, Covington, 1999; 2007). A more cohesive approach to understanding violence has been the General Aggression Model (GAM, Anderson & Bushman, 2002; Anderson & Carnagey, 2004; Anderson & Huesmann, 2003; DeWall, Anderson, & Bushman, 2011; 2012). This model encompasses bio-social-cognitive and developmental aspects to understand aggression and is applicable to understand individual pathways to violence.

Research understanding risk factors of violence has identified life experiences which can influence later violent behaviours. For example, females have been found to report more sexual, physical and psychological abuse than males who are more likely to experience accidents, illness, war and non-sexual assaults (Hennessey *et al*., 2004; Tolin & Foa, 2006). Experiences of trauma are also suggested to be internalized in a way which can impact emotional self-regulation, and their views of themselves (Ford, Courtois, Steele, van der Hart, & Nijenhuis, 2005; Logan & Taylor, 2017). When assessing in-patient aggression for females it would be important to consider the individual experiences of the women and how this has

impacted on their view of themselves, others and the world. Traumatic experiences can impact on interpersonal functioning, thinking styles, expression and management of emotions, and behaviours (American Psychiatric Association, 2013). Behaviorally, adverse effects can become apparent in maladaptive coping techniques via externalizing behaviour (e.g. aggression) and internalizing disorders/difficulties (e.g. isolation, depression, substance abuse) (Sheeringa & Zeanah, 2001; Johnson, Sheahan, & Chard, 2003; Meng & D'Arcy, 2016). Problematic inpatient behaviours by females may also represent itself as relational aggression, which has been theorised as a means self-protection and preservation (Logan & Taylor, 2017; de Vogel, Stam, Bouman, Ter Host, & Lancel, 2016). Therefore, understanding violence in females can aid in understanding their view of the world, self and others, as well as formulation and management of future risk.

2.2.1.4 Risk Assessment

Assessments developed to measure risk of violence "attempt to predict the likelihood of future offending to identify individuals in need of intervention" (Brown & Singh, 2014, pp. 49). Application of risk assessment methods for violent individuals enables informed risk management plans and enhances public safety. A contemporary method to risk assessment is the Structured Professional Judgement (SPJ) approach, which employs a combination of clinical experience, theoretical knowledge and statistical application to manage risk.

2.2.1.5 Risk Assessment and gender

Risk assessment tools adopting the SPJ approach have been predominantly developed, researched and validated among the males (McKeown, 2010). Therefore, the efficacy of utilising such tools with females is queried. Singh *et al.* (2011) conducted a meta-analysis for nine risk assessment tools and found there was no significant difference between predictive validity for males and females. However, Geraghty and Woodhams (2015) systematic review of risk assessment tools validity found the HCR-20 (Webster, Eaves, Douglas & Wintrup,

1995; Douglas, Hart, Webster and Belfrage 201) had larger AUC values for acts of violence of females (AUC = .54 to .70 and AUC=.55 to .73).

Research has suggested differing criminal profiles between males and females (De Vogel & De Vries Robbé, 2013). Sturup, Monohan and Kristiansson (2013) prospectively observed a large cohort of males and females in a psychiatric setting, and found that female violence was significantly predicted by victimization in childhood and displays of anger in the previous year. Research on violence risk factors provides valuable contribution to understanding the distinct risk factors associated with future risk of violence for females, and has since been supported (Muller & Kempes, 2016). It must be noted that the risk factors identified are known to increase risk of violence and are not a cause of violence (Farrington, 2000).

2.2.1.6 Evaluation of Predictive validity

Measuring the predictive accuracy of risk assessment tools aids in being able to utilise and apply them in clinical settings. Singh, Khiroya and Maden (2009) estimated that 80 per cent of forensic psychiatric patients are routinely assessed for their risk of violence, using the HCR-20. This demonstrates the extent to which this tool is relied upon, and in turn the requirement for validating the assessments.

The Area Under the Curve (AUC) statistic has been suggested as the preferred statistical tool for measuring predictiveness, which uses a Receiver Operating Characteristics (ROC) curve to plot the true positive rates against the false positive rates of a risk assessment (Singh *et al.*, 2011). This can therefore enable researchers to use the result, between 0 and 1, to be able to predict the accuracy of risk measurement tools. AUC values ≥.714 are generally considered as having a 'large' effect size, .639 as 'moderate' and ≤.556 as 'small' (Rice & Harris, 2005).

2.2.1.7 Historical Clinical Risk Management tool 20

The original version of the HCR-20 was published by Webster, Eaves, Douglas & Wintrup, (1995) in North America. Subsequent research on its effectiveness was initially carried out in North America, generally with males (e.g. Douglas, & Webster, 1999; Strand, Belfrage, Fransson & Levander, 1999) The HCR-20 risk management scheme (Webster *et al.,* 1995) was developed from empirical evidence on violence (Douglas, Guy, Reeves & Fraser, 2008; Dolan & Doyle, 2000). The HCR-20 assessment was proposed to be a framework for clinicians to assess risk of violence scientifically, accommodate professional judgement and in a way which can be tested (Douglas *et al*, 2008).

Exploration into the HCR-20 and development in literature resulted in a revised version of the tool (See Table 1, HCR-20, Webster *et al.,* 1997). Further revisions of the updated literature led to the development of a modified version three, referred to as the $\mathrm{HCR}-20^{\mathrm{V3}}$ (Webster & Belfrage 2013). This update maintained a similar core to previous versions, such as using past, present and future risk. However, the version 3 had major revisions to risk items, and an additional concentration on formulation and risk management. A brief overview of the alterations of items from version 2 to version 3 has been summarised in Table 1. A more detailed description of the changes can found in the HCR-20v^3 manual (Douglas, Hart, Webster & Belfrage, 2013).

2.2.1.8 HCR-20 and Females

The HCR-20 is widely used; Singh (2013) found that 2,135 clinicians across 44 countries agreed that the HCR-20 was the most used risk assessment tool. Garcia *et al*. (2009) provided a detailed review of risk assessments including the HCR-20, and suggested that research exploring the use of the HCR-20 with females provided more conflicting evidence than consistent. This outcome is significant for shaping future research, as it has been found that tools designed for specific populations have greater predictive validity than those designed for a breadth of populations (Singh, Grann & Fazel, 2011). Therefore, it is

important to ensure that application of such tools is validated for specific populations, such as females (de Vogel, dr Vries Robbe, van Kalmthout, & Place, 2014).

Some conclusions around the HCR-20 suggested poor predictive efficacy for institutional violence (Schaap, Lammers & de Vogel, 2007; de Vogel & Ruiter, 2005). Green *et al.* (2016) found that the HCR-20 was more accurate for males; however, this outcome was not significant. The statistical exploration in this study was detailed, though the comparison sample size of females (N =24) was considerably fewer than that of the male (N = 100) participants, which may have impacted the result.

Further research has explored the difference between the subscales of the HCR-20. Predictive efficacy for violence in females has been found for Historical items (Strub *et al*., 2016), and the final risk judgement (Grimbos *et al.*, 2016; de Vogel & Ruiter, 2005). Nicholls, Ogloff and Douglas (2004) studied a sample of male (N=162) and female (N=106) inpatients in a psychiatric hospital and found moderate effect sizes for female in-patient violence for the H Scale (AUC =.69, $p< 0.01$) and C scale (AUC = .70, $p< 0.01$). This outcome has been supported in other literature utilising data from forensic psychiatric populations (O'Shea, *et al.*, 2014).

The conflicting results and limited research presented for the HCR-20's accuracy in female populations has led to contrasting views. However, it does contribute to the understanding and application of the HCR-20 risk assessment tool. There is a requirement for further assessment to gather a clearer understanding of whether the HCR-20v^3 measure can accurately predict violence perpetrated by females, where can be applied validly in clinical practice.

2.2.1.9 Aims and Objectives

To date there have been no published systematic reviews to explore the predictive validity of the HCR-20 for predicting violence in females exclusively. Therefore, this systematic review aims to:

- Assess the validity of the HCR-20 for predicting future violence and recidivism committed by females.

Table 1.
The differences between the HCR-20 risk assessment tool between versions 2 and 3 historical, clinical and Risk items.

HCR-20 items Version 2	HCR-20 items Version 3
Historical (H)	
H1 Previous Violence	H1 Violence
H2 Young Age at First Violent Incident	H2 Other Antisocial Behaviour
H3 Relationship Instability	H3 Relationships
H4 Employment Problems	H4 Employment
H5 Substance Use Problems	H5 Substance Use
H6 Major Mental Illness	H6 Major Mental Disorder
H7 Psychopathy	H7 Personality Disorder
H8 Early Maladjustment	H8 Traumatic Experiences
H9 Personality Disorder	H9 Violent Attitudes
H10 Prior Supervision Failure	H10 Treatment or Supervision Response
Clinical (C)	
C1 Lack of Insight	C1 Insight

C2 Negative Attitudes	C2 Violent Ideation or Intent
C3 Active Symptoms of Major Mental Illness	C3 Symptoms or Major Mental Disorder
C4 Impulsivity	C4 Instability
C5 Unresponsive to Treatment	C5 Treatment and Supervision
Risk (R)	
R1 Plans Lack Feasibility	R1 Professional Service Plans
R2 Exposure to Destabilisers	R2 Living Situation
R3 Lack of Personal Support	R3 Personal Support
R4 Noncompliance with Remediation attempts	R4 Treatment and Supervision
R5 Stress	R5 Stress or Coping

2.2.1.10 Scoping search

An initial scoping search was completed in June 2016 Cochrane Library, Campbell Collaboration, Psych Info, Doctoral theses and further general searches. Overall, three systematic reviews were found exploring violent risk assessment with females each of these are summarised below.

Geraghty and Woodhams (2015) examined the predictive validity of risk assessment tools for violent female offenders for 12 standardized violence risk assessment tools, with four studies assessing the HCR-20. The outcome of this suggested that the HCR-20 (Webster, Eaves, Douglas & Wintrup, 1995; Douglas, Hart, Webster and Belfrage 201) could predict violent recidivism for female offenders more accurately than other assessments. Geraghty and Woodhams (2015) concluded that the variability of AUC scores may be attributed to current risk assessment tools, not acknowledging specific risk factors associated with female offenders.

Singh *et al.,* (2011) reviewed violence risk assessment tools and examined characteristics which may impact on the predictive validity of the measures, including

gender. For the HCR-20, 8 samples were used (n=1320 participants). This review found the HCR-20 to have a good median AUC statistic (0.70; Interquartile Range [IQR] = 0.64-0.76), however a significant effect for gender was not found; suggesting that in this sample the HCR-20 is no more predictive for males than females.

Lastly, O'Shea, Mitchell, Picchioni and Dickens (2012) completed a review on the moderators of predictive efficacy for the HCR-20 for psychiatric inpatient violence. A meta-analysis was conducted on 20 studies and it was found that certain items on the HCR-20 (C5 - unresponsive to treatment and R5 - Stress) had larger effect sizes than others (H10 – Prior supervision failure) for predicting inpatient aggression, with the total risk summary outcome having the largest mean effect size. This review concluded that the HCR-20 had good predictive efficacy for females, showing some of the better predictive efficacy outcomes.

2.3 Method

For this systematic review, the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA, Moher *et al.,* 2009) guidelines were used. This is a 27-item checklist designed to facilitate transparency when reporting results. A protocol was devised prior to the review, including the search strategy, inclusion/exclusion criteria and quality assessment. This was reviewed by the second author of this review.

2.3.1 Eligibility Criteria

Characteristics of studies to be included were pre-defined and are summarised in Table 2.

Table 2.
The PICO characteristics applied

Characteristic	Description
Population	• Adult (18 years and over) female (if male and female are included in study must be able to extract female data).
Exposure	• To have had a HCR-20 risk assessment tool completed (any version)
Outcome	• Violence (including re-conviction, recidivism, recorded and self-reported)

Study Design	• Case control and Cohort (Retrospective or Prospective)
Language	• No restriction.
Exclusion criteria	• Reviews, opinion papers etc.

2.3.1.1 Population

The population was limited to adult females (over the age of 18 years) as the HCR-20 was designed to be used with adults aged 18 who pose a risk of future violence (Douglas, Hart, & Webster & Belfrage 2013). The offending profile of a juvenile offender differs to that of an adult offender (Richards, 2011), hence why criminal justice systems began to categorise them separately. Some of the items included in the HCR-20 are not be applicable to juveniles, such as problems with employment.

For studies evaluating gender, the female data were extracted, where possible. Studies were excluded where female data was not able to be extracted. With research on female risk assessment being limited, this review was not limited by population type (psychiatric, offenders, intellectually disabled etc.) or setting (hospital, prison, community).

2.3.1.2 Exposure

Studies utilising any version of the HCR-20 (version 1, 2 or 3) and examining the predictive validity of its use within a female population were included. Appropriate statistical assessments include AUC, Cohens *d* (Cohen, 1969; 1988), and Pearson's product moment correlation coefficient, also known as *r* (Pearson, 1954).

2.3.1.3 Outcome

For this review, violence was defined from the HCR-20v^3 authors as, "actual, attempted, or threatened infliction of bodily harm of another person" with "the act, attempt,

or threat must, to some degree, have been deliberate or willful" (Douglas *et al*., 2013, pp. 36). Violence is likely to be defined differently across papers, therefore, re-conviction, recidivism, recorded and self-reported violence was also considered.

2.3.1.4 Language

Due to the broad application of the HCR-20 across various countries, this review was not limited for language and included of all available publications in order to avoid bias.

2.3.1.5 Exclusion

Reviews and opinion papers were excluded as they do not provide a data set to evaluate.

2.3.2 Sources of literature

For this review, the search process was inclusive of published and unpublished (e.g. unpublished dissertations or theses) research. Further, the time frame for articles was limited to the initial publishing date of the HCR-20 (Webster *et al.*, 1995) until present (August 2016).

2.3.3 Electronic bibliographic databases

A total of 8 electronic databases were searched, inclusive of studies from 1st January 1995 to present (August 2016). The data bases included OVID Medline, OVID EMBASE, OVID PsychINFO, Cochrane Library, PsychArticles, Applied Social Science Index and Abstracts (ASSIA), National Criminal Justice, and Web of Science (See Figure 1). Databases were selected due to their relevance to the topic, and following previous similar reviews. Two professionals in the field of violence risk assessment were contacted for further direction to studies, however neither responded within the time limit. Two abstracts were identified and the author sought to find them via various libraries and contacting the authors directly, however authors did not respond.

2.3.4 Search terms

The search terms which were across the databases are summarised below (please refer to Appendix B for breakdown of search syntax for each database):

Violence OR Offences OR Reconviction OR Re-offense OR Aggression OR Recidivism

AND

HCR OR Historical Clinical Risk

AND

Predictive Validity OR Accuracy OR Area Under the Curve (AUC)

The search of Females/Women/Gender was not included so as to not limit the search and ensure breadth of results. This was decided based on an initial scoping exercise which indicated that inclusion of females in the search would narrow the results, and place risk of overlooking relevant research.

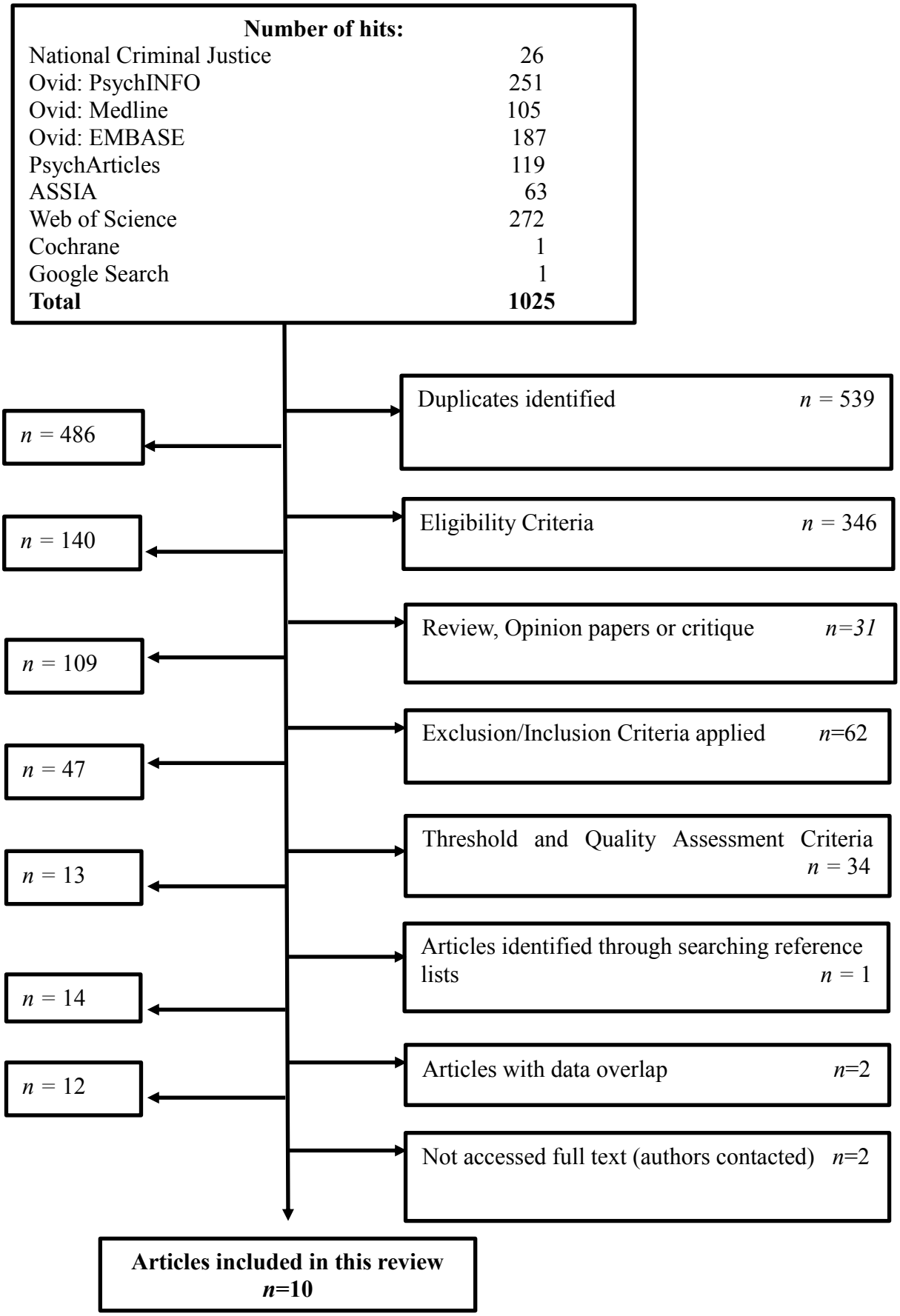


Figure 1 Systematic Review Search strategy

The Google Search also directed one to University of Edinburgh's Research Archive. For the relevant selected studies, the reference lists were hand searched to sustain comprehensiveness of the search.

2.3.5 Study selection/Screening

The included studies were subject to a screening process. The titles of the papers were reviewed and obviously irrelevant papers were excluded. The abstracts were then revised of the remaining literature papers, and irrelevant topics were excluded. Reviews, opinion papers and critiques were also identified and excluded. The following steps are outlined below.

2.3.6 Exclusion

Following the above process, the remaining papers (N=109), were subjected to a pre-defined exclusion process (Appendix C) which resulted in 62 papers being removed, justification for removal is detailed in Appendix D. All the papers were reviewed independently by the first author of this review, followed by *n*=10 being independently assessed by a trainee clinical practitioner, which resulted in 100 per cent agreement for study exclusion.

2.3.7 Quality assessment

The remaining 47 papers were subjected to a quality assessment. The process was carried out on the selected studies in two stages. The first stage included the articles being assessed on a threshold criterion, outlined below:

- Clear description of outcome measurement (Violence/Recidivism/Aggression etc.)
- Use of the HCR-20 risk assessment tool (any version)
- Appropriate statistical analysis of predictive validity of the HCR-20 measure
- Clear indication of inclusion and reporting of female participant's data

In total, 34 studies failed to meet the threshold criterion and were therefore excluded from the review at this stage. Papers which did not report female data separately were also excluded at this stage. Studies omitted based on the exclusion criteria are detailed in Appendix D.

The second stage made use of a quality assessment checklist. There is no universal checklist applicable for all methodologies, therefore two quality assessment checklists were adapted using the Critical Appraisal Skills Programme (CASP, 2013) for Cohort (Appendix E) and Case Control designs (Appendix F). These contained 33 questions relating to objectives, selection bias, measurement bias, attrition, and data/results. The primary author quality assessed the 10 included studies. To ensure consistency of the reviewing process a second reviewer, a trainee clinical practitioner with experience in risk assessment tools, independently assessed 50 (*n*=5) of the records. An Intra-class correlation coefficient (ICC) of 0.896 (single measure) was found between the two assessors. Following Fleiss's (1986) ICC guidelines, an outcome of 0.75 and above is considered as 'excellent' correlation. Both assessors agreed that all the 10 studies would still be included at this point.

2.3.8 Data Extraction

A pre-defined data extraction form was created (Appendix G), adapting the data extraction template from the Cochrane handbook (Higgins & Green, 2011). The data extraction form was piloted on 4 of the studies, which led to an additional item regarding statistical analysis beyond predictive validity, such as regression analysis or survival analysis unique to the particular study.

2.3.9 Risk of bias

A bias in studies is considered as a "systematic error or deviation from the truth, in results or inferences" (Higgans & Green, 2011, p. 8.2). Outcomes of the quality assessment were used to address risk of bias. For each question, an outcome of 'Yes', 'No' and

'Unclear', were available, as per the Cochrane Handbook guidelines. The overall quality score of the studies (Table 3) was considered when interpreting the results of the studies.

2.3.10 Description of studies

The systematic search produced 1025 publications, after the review process 10 studies were included (Table 3).

2.3.11 Characteristics of participants in included studies

Study characteristics are presented in Table 3. From the included studies, 1216 female participants were included, with all studies reviewed separately. The mean ages of the participants ranged between 28.3 years and 42 years: one study did not report this information separately for females. The ethnicity of participants was reportedly differently across papers, most of the included participants were of a white/Caucasian background, which is reflective of the geographical locations of the papers. Eight of the studies reported diagnosis, inclusive of personality disorders (Clusters B and C), mental health diagnosis (Psychotic disorders, Mood disorders, Schizophrenia, Bipolar, Depression, and Anxiety), developmental disorders, dementia, and substance misuse.

Table 3. ***Summary of study characteristics of papers included in review***

Author, Date and Country	HCR-20 Version	Sample	Mean age in years	Setting	Inter-rater Reliability	Methodology	Follow-up	Outcomes	AUC's				Quality Score
									H	C	R	Total	
O'Shea *et al* (2014) ***England***	2	156	39.8*	Forensic Psychiatric	K=0.91	Pseudo-prospective cohort	3 months	Overt Aggression Scale (OAS, Yudofsky *et al*., 1986)	.58	.76	.76	.78	46
Nicholls, Ogloff & Douglas (2004) ***Canada***	2	75	42	Civil Psychiatric	ICC= 0.80	Retrospective cohort	Inpatient (length of stay) and Community (up to 2 years)	Inpatient and community violence	.69	.70			43
Schaap, Lammers & de Vogel (2009) ***The Netherlands***	2 (Dutch)	45	28.3	Forensic Psychiatric	ICC = 0.98	Quasi-prospective cohort	Unclear	Violence and recidivism	.68	.42	.47	.54	39
Coid, Yang, Ullrich & Zhang (2009) ***England and Wales***	2	304	28.2	Prison	ICC= 0.98	Prospective Cohort	4 years and 4 months	Recidivism	.73	.69	.59	.59	38

Viljeon *et al* (2016) ***Canada***	2	40	46.7	Civil Psychiatric	ICC = 0.82	Prospective	6 Months and 12 Months	Violence START Outcome Scale (SOS, Nicholls *et al.*, 2007)				.47	38
Garcia-Mansilla, Rosenfield & Cruise (2011) ***USA***	2	350	29.8	Civil Psychiatric	Not analysed	Retrospective Cohort	20 weeks	Any violence	.60	.52			33
Green *et al* (2016) ***USA***	3	24	40.9	Insanity Acquittees	ICC= 0.90	Retrospective cohort	M = 13.8 months	Violence START Outcome Scale (SOS, Nicholls *et al.*, 2007)	.65	.67	.50	.65	35
Strub, Douglas & Nicholls (2016) ***Canada***	2	48	35	Civil Psychiatric	ICC= 0.62	Prospective Cohort	6 Months (data collected every 4 weeks)	Any, verbal and physical violence	.62	.60	.60	.75	35
Warren *et al* (2005) ***USA***	2	132	< 32 60.33 % >32 39.67 %	Prison (Correctional)	ICC = 0.94	Retrospective Cohort	Not reported	Violence and recidivism				.55	35

de Vogel & de Ruiter (2005) ***The Netherlands***	2 (Dutch)	42	33.2	Forensic Psychiatric	ICC=0.75	Retrospective Cohort and prospective cohort combined	Retrospective (M= 74.6 months) Prospective (M = 10.2 months)	Violent recidivism and inpatient violence	.63	.61	.52	.59	32

**the mean age of male and female participants included in the overall study, female mean age was not reported separately in this study.*

2.3.12 Characteristics of included studies

Geographically, three of the papers were conducted in the USA, three in Canada, two in England, and two in the Netherlands. Setting types were four civil psychiatric settings, four forensic psychiatric, and two correctional/prison settings. The HCR-20 version 2 (Webster *et al*, 1997) was utilised in nine of the papers, and one utilised the HCR-20v^3 (Douglas, Hart, Webster, & Belfrage, 2013).

Outcome measures varied, for two of the ten studies used the Violence START Outcome Scale (SOS, Nicholls *et al*., 2007) and one paper used the Aggression and Violence Overt Aggression Scale (OAS, Yudofsky *et al*., 1986). The remaining papers recorded general recidivism, violent recidivism and/or inpatient/community violence. The interpretation and definition of violence varied across these studies but were generally characterised by physical or verbal violence. For two of the studies, the follow-up period was unclear or not reported. Of the remaining eight, the follow-up period ranged between three months and four years, and four months.

The study design of the 10 included papers were all cohort designs, four of which were retrospective, five were prospective and one which used mixed methods of retrospective and prospective data combined. Most of the included studies reported AUC as a measure of predictive validity, apart from one which reported point-biserial correlations.

2.3.13 Risk of Bias

Risk of bias was monitored via the quality assessment process and is displayed in Figure 2. This process revealed the limitations of the included studies, each of which are discussed in this section.

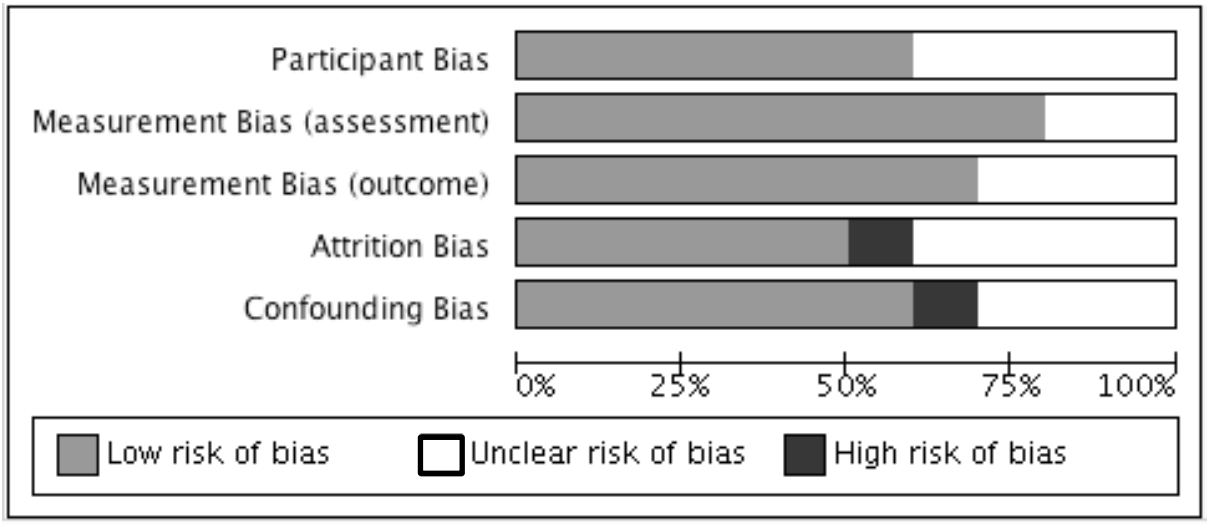


Figure 2 Risk of bias graph for 10 included studies

2.3.13.1 Participant selection bias

Risk of participant selection bias was classified as low risk for *N* = 6 (60%) of the studies. The four remaining articles were considered as unclear due to insufficient information on sampling.

2.3.13.2 Measurement Bias (Assessment)

The measurement bias of the HCR-20 assessment was found to be low in 80 per cent of the studies (*N*= 8). This was due to studies reporting a clear method of assessment and stated the qualifications of the assessors. Assessor qualifications and suitability was not always clear.

2.3.13.3 Measurement Bias (Outcome)

Most studies (*N*= 7) were classified as low risk of bias for the outcome measure. Those deemed as unclear had often reported a definition of violence but had not specified where this information had come from (e.g. self-report, members of staff, database and so on).

2.3.13.4 Attrition bias

Attrition rate is important to consider as an attrition rate of ≥20% has been considered as a threat to validity of the study's results (Fewtrell *et al*, 2008). Therefore, attrition rate of 20 per cent or less was considered as acceptable for this review. Those which were considered as low risk of bias (N = 2, 20%) reported attrition rates >20%. Those considered to be unclear acknowledged attrition but did not specify the amount.

2.3.13.5 Confounding

Controlling for the impact of confounding variables is considered important to reduce the risk of bias on the effect size estimates. Confounding variables, when assessing the utility of the HCR-20, have been found in previous studies and include population characteristics such as age, gender, length of stay and forensic status (Swanson *et al*, 1990). Confounding variables can be controlled for using matching samples, stratification of samples, and use of regression analysis. However, it is noted that no method is perfect for being able to identify, and control for, confounding variables. Of the studies, 70 per cent were found to be low risk due to additional statistical analysis. The study considered to be high risk of bias did not acknowledge or appear to control for confounding variables.

2.3.13.6 Test of homogeneity and publication bias

To determine homogeneity among the population of all 10 included studies a Q-statistic and I^2 utilising MedCalc Software (Figure 3). In addition, potential publication bias was assessed from a funnel plot (Figure 4) of standard error and effect size for each study (Egger, Smith, Schneider, & Minder, 1997).

2.4 Results

2.4.1 Meta-analysis

Results from the 10 included studies reported both violence and recidivism, so effect sizes were computed for both violence and recidivism for the Historical items, Clinical items,

Risk Management items and the Total score. Overall, 37effect sizes were computed to answer the research question. Meta-analysis has two main model assumptions; a fixed effects model suggests that studies in the analysis are functionally identical with a common true effect size across studies (Borenstein *et al*, 2009). By contrast, a random effects model assumes that variation is present across studies, and that they sufficiently differ. A random effects meta-analysis assesses the mean of a distribution of effects (Borenstein *et al*, 2009). The model adopted for analysis here was based on heterogeneity assessments. The statistical software MedCalc for Windows (Version 15.0) was utilised which transforms the correlations using a Fishers Z transformation to standardise the outcome using the Hedges-Olkin (1985) method. MedCalc also follows DerSimonian and Laird's (1986) approach to calculate the summary correlation coefficient using the random effects model. This meta-analysis accepted Rice and Harris's (2005) interpretation of *r* as small (.1), medium (.3) or large (.5) effect sizes. Outcomes for each meta-analysis from MedCalc are presented in Appendices A and B, inclusive of the included studies and their outcomes.

2.4.2 Homogeneity and publication bias

Meta-analysis for the entire included studies revealed statistically significant Q statistic, Q=22.77, df =9, p<<0.0067. Observed total variation also suggested heterogeneity between studies (I^2= 60.49%, CI = 20.99 – 80.24). As such, a random effects model was adopted and suggested a small summary effect size across studies (k=10, N=1217, *r*=0.247, *p*<.001). The funnel plot in Figure 4 does not suggest publication bias, however with the small number of studies in this analysis, and the limitations of this method publication bias cannot be excluded.

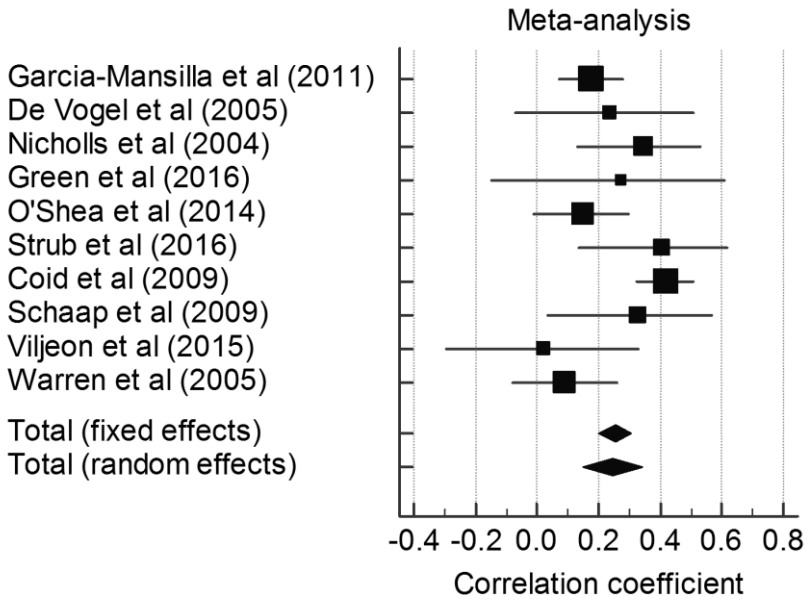


Figure 3. Forrest plot of standardised mean difference effect size and 95% confidence intervals for the 10 studies included in the meta-analysis.

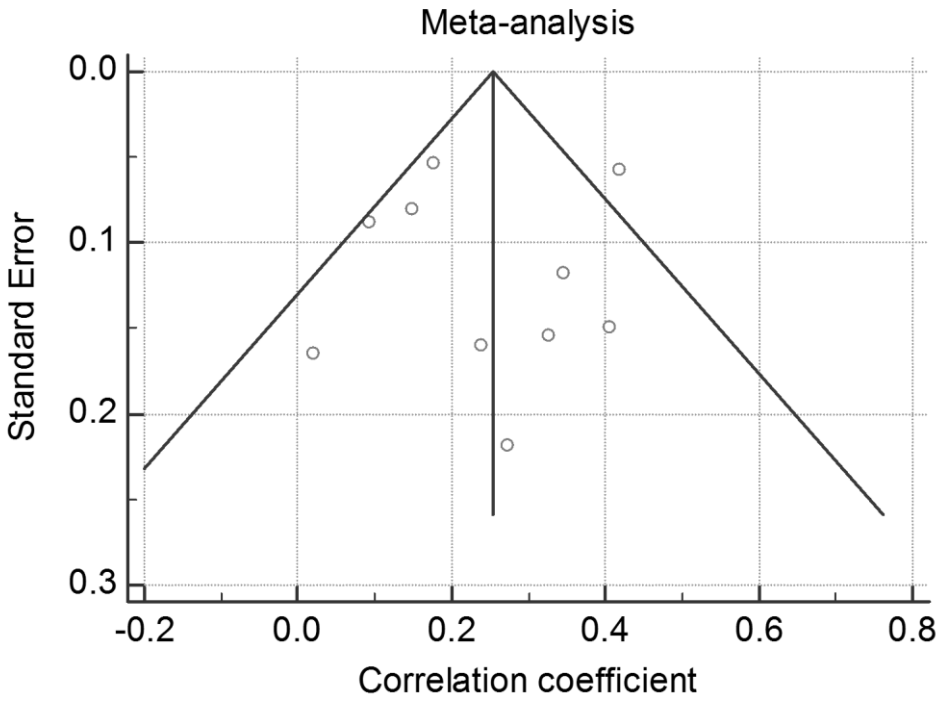


Figure 4. Funnel plot of the effect size against the standard error for the 10 studies included in the meta-analysis. The vertical line represents the summary effect size, with the horizontal lines indicating the 95% confidence limits.

2.4.3 Violence

2.4.3.1 Historical Items

Meta-analysis of the Historical (H) factors as a predictor of violence used six of the studies (Appendix H) and revealed the heterogeneity of variance was non-significant suggesting that the effect sizes were homogenous: Cochran's Q= 4.8959 (df=5), p=0.4287. Observed total variation across studies was also assessed with I^2 statistic which was suggestive of no heterogeneity: I^2 =.0%, CI = 0 to 74.83. Given these results, a fixed model effect was adopted which suggested that the H scale revealed a significant and near medium effect for predicting violence in females (k=6, N =695, r=0.211, p<.001). Pooled correlation coefficients and significance levels are reported in Table 4 and forest plots are displayed in Figure 3.

2.4.3.2 Clinical Items

Meta-analysis of the Clinical (C) factors as a predictor of violence used six studies (Appendix H), and revealed heterogeneity among the weighted sum of squares, Q= 28.5487, df=5, p<0.0001. Observed total variation suggested the heterogeneity to be substantial (I^2 = 82.49%, CI= 62.94 to 91.72). Given these results, a Random effects model was adopted which suggested significant and a near medium effect for predicting violence in females (k=6, N= 695, r= 0.277, p<.01). This result must be interpreted with caution due to the

heterogeneity of studies and the study most weighted (Garcia *et al*., 2011) revealed a considerably low effect size.

2.4.3.3 Risk Management Items

Four studies were included for the meta-analysis for Risk (R) items as a predictor for violence (Appendix H), and revealed considerable heterogeneity among studies (Q=11.4909, df=3, p< .01, I^2= 73.89%, CI= 26.94-90.67). A Random effects model for the Pooled total was suggestive of a near medium effect size for predicting future violence for females, however this was not significant (k=4, N= 270, r=.237, p=.086).

2.4.3.4 Total items

To assess the validity of total HCR-20 items as a predictor of violence, the five studies with this information were included, which revealed substantial heterogeneity: Q=*13.1752,* df=4, p<.05, I^2=69.64%, CI=22.34 to 88.12. A Random effects model was adopted for the pooled total which suggested of a significant and medium effect (Figure 3) for predicting violence for females (k=5, N=310, r=.279, p<.05).

Table 4.
Meta-analysis pooled outcomes for H, C, R and total items when predicting risk of violence and recidivism.

Measure	Total Sample size	Pooled Correlation coefficient	95% CI	z	*p*
Violence					
Historical	695	0.211	0.138 to 0.282	5.581	< 0.001*
Clinical	695	0.277	0.0735 to 0.458	2.646	< 0.05
Risk	270	0.237	-0.0339 to 0.475	1.718	0.086
Total	310	0.279	0.0546 to 0.476	2.422	0.015
Recidivism					
Historical	467	0.447	0.243 to 0.614	4.040	< 0.001
Clinical	467	0.218	0.0587 to 0.366	2.669	0.008
Risk	467	0.171	0.0146 to 0.319	2.142	0.032
Total	294	0.253	-0.0899 to 0.542	1.453	0.146

Note. Pooled correlation coefficient is pooled studies included in each meta-analysis – for further information on included studies see Appendices A and B. CI = Confidence intervals. z

*= Fishers Z transformation, p = significance value, significant results considered as p<.05. * for outcomes using fixed effects model.*

2.4.4 Recidivism

2.4.4.1 Historical Items

Meta-analysis of the H factors as a predictor of recidivism used four of the studies, and revealed substantial heterogeneity between studies (Q=12.8097, df=3, p<.05, I^2=76.58%, CI = 35.89 to 91.44). Following this result, a Random effects model was used on the pooled total of outcomes suggested a significant and near large effect (k=4, N= 467, r=.447, p<.001, Figure 4) for predicting recidivism.

2.4.4.2 Clinical Items

Meta-analysis of the C factors as a predictor of recidivism used four studies and found a non-significant Q statistic (Q=6.3078, df= 3, p<.0976), which is suggestive of homogeneity among the studies. However, the I^2 statistic suggested that the studies revealed moderate heterogeneity (I^2=54.22%, CI = 0 to 84.28). Due to this result, a Random effects model was adopted and revealed a significant and small effect size for the C items to predict recidivism for females (k=4, N= 467, r=.218, p<.05).

2.4.4.3 Risk Management Items

Meta-analysis of the R factors included four studies, and revealed homogeneity (Q=5.9697, df=3, p=.1131). The I^2 outcome was suggestive of a possible moderate level of heterogeneity (I^2=49.75%, CI = 0 to 83.37). Given these results, a Random effects model was adopted and suggestive of a small effect size, which was not significant (k= 4, N= 467, r=.171, p=.032).

2.4.4.4 Total

Heterogeneity was evident for the total items (Q=24.0284, df=3, p<.001) and suggestive that is was considerable among the four studies (I^2=87.51%, CI=70.25 to 94.76).

A random effects model of the pooled effect suggested that a near medium effect size was found for the predictive validity of the total items for recidivism, however this was not significant (k= 4, N= 294, *r*=.253, *p*=.146).

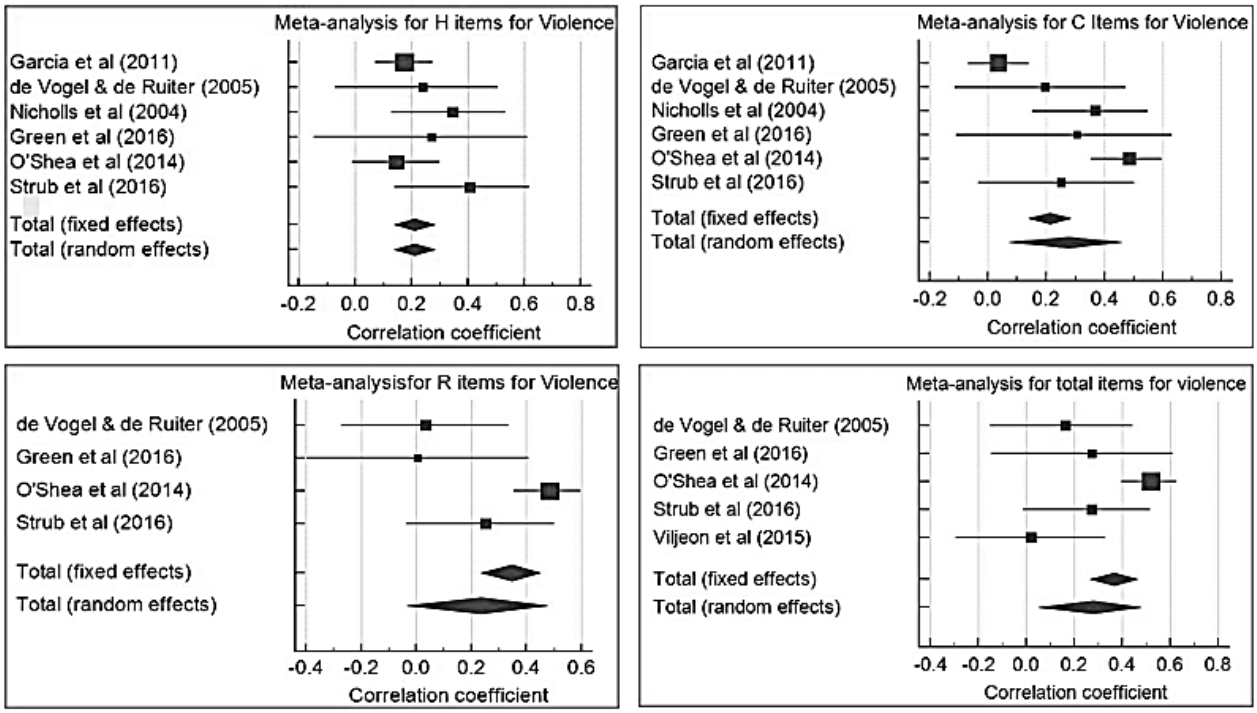


Figure 5. Forest plots for H, C, R and Total items when predicting violence for females

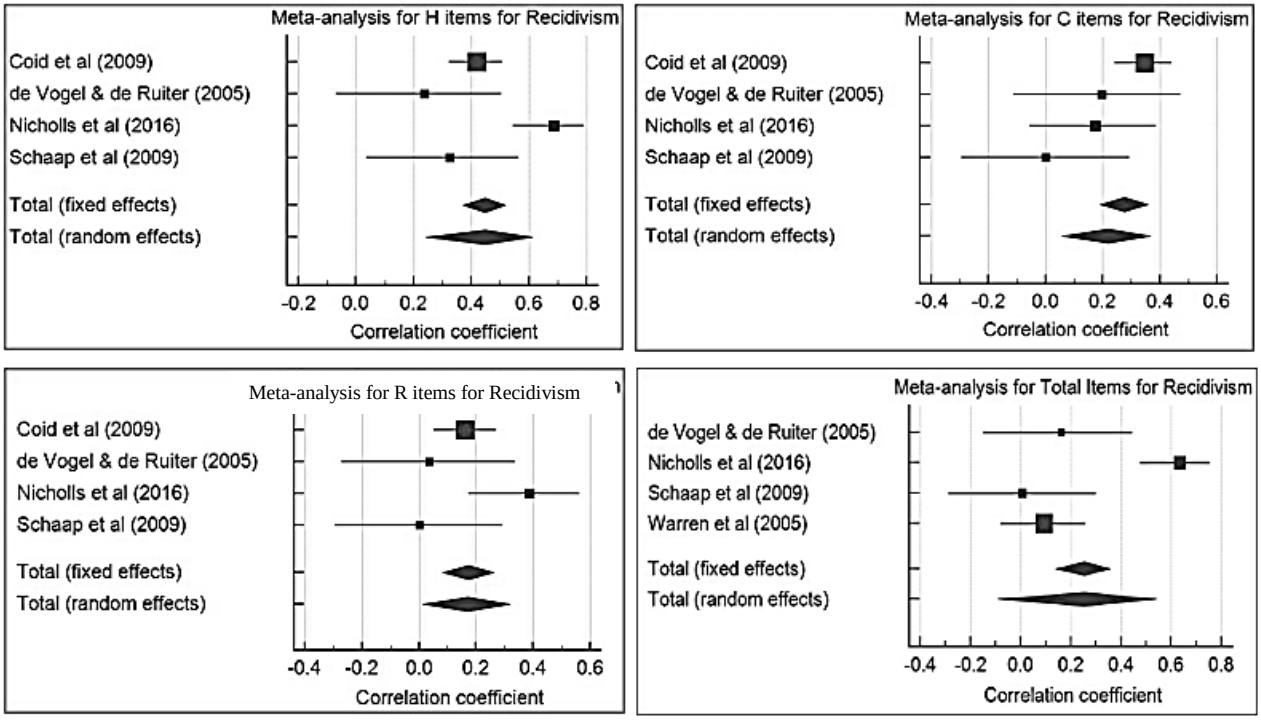


Figure 6. Forest plots for H, C, R and Total items when predicting recidivism for females.

2.4.5 Sensitivity Analysis

Following the risk of bias outcomes a sensitivity analysis was conducted to assess the effect with removal of the studies 'high risk' of bias. Two studies were removed from the analysis for H, C, R , and Total items when measuring for violence (Figure 7).

2.4.5.1 H for violence

Similarly to the initial analysis, the outcomes suggested homogeneity of variance (Q = 3.9160, df = 3, p=0.2707). Observed total variation across studies suggested small chance of heterogeneity (I^2 =.23.39%). A slight larger effect size was found following the removal of the two studies for both a fixed model (k=4, N = 321, r=0.246, p<.001) and random effect model (k=4, N = 321, r=0.260, p<.001).

2.4.5.2 C for violence

For the C items, homogeneity among the weighted sum of squares was found, Q=4.9045, df = 3, p=0.1789, with a lower I^2 statistic (I^2 = 38.83%, CI= 0 to 79.13). Previous analysis

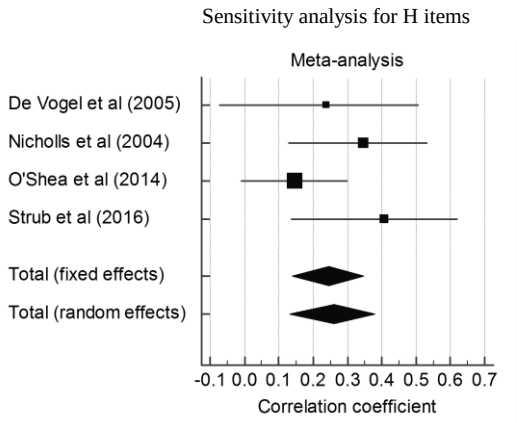
inclusive of the two extra studies with possible bias revealed heterogeneity among the samples. Similarly to the H items, both fixed effect model (k=4, N= 321, *r*= 0.391, *p*<.001) and random effect model (k=4, N= 321, *r*= 0.365, *p*<.001) revealed improved effect size.

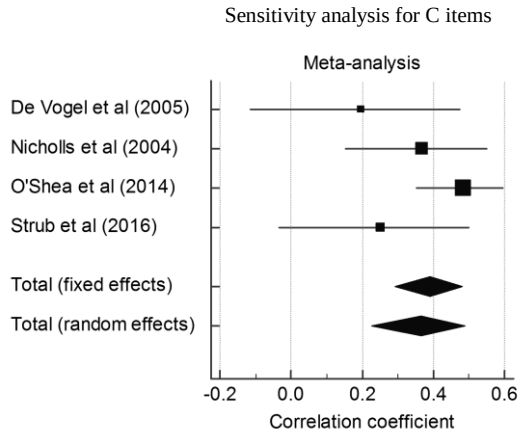
2.4.5.3 R for violence

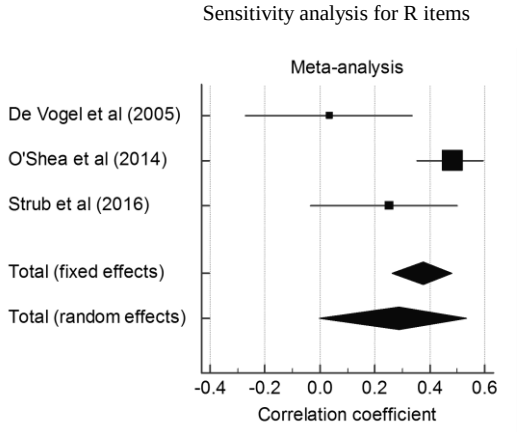
The sensitivity analysis for the R items revealed similar results to the initial analysis, suggesting heterogeneity among the studies (*Q*=8.5656, df=2, *p*< .00138, I^2= 76.65%, CI= 23.67 to 92.86). A random effects model suggested a non-significant near medium effect size for predicting future violence for females (k=3, N= 246, *r*=.289, *p*=.052)

2.4.5.4 Total for violence

For the total score, the four studies included in the sensitivity analysis suggested substantial heterogeneity (Q=12.8915, df=4, *p*<.00, I^2=76.73%, CI=36.39 to 91.49), similarly to the initial analysis. A random effects model suggested a near medium effect (k=4, N=386, *r*=.276, *p*<.05), which was also suggested in the initial analysis.







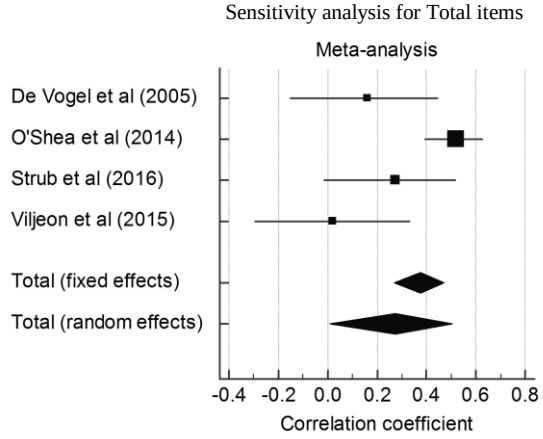


Figure 7. Forest plots for sensitivity analysis to explore H, C, R and total items for predicting violence

2.5 Discussion

2.5.1 Conclusions

The main aim of this paper was to review the current research examining the validity of the HCR-20 for predicting future violence committed by females. Due to the differences in outcome measures, predictive validity was examined for H, C, R and Total items for violence and recidivism.

2.5.2 Heterogeneity and publication bias

Heterogeneity was significant when assessing all of the 10 included studies. For the subgroup analysis the results in 7 of the 8 meta-analysis also suggested heterogeneity. Such results may be explained by the limited number of included studies, and clinical diversity among studies. A variation in measurement of outcomes (violence or recidivism), differences in sample size (24 to 350), distinctive samples (civil psychiatric, forensic mental health and prisoners), versions of the HCR-20, and a combination of retrospective and prospective deigns may have contributed to the lack of homogeneity. Conducting meta-analysis in behavioural sciences has to accept such limitations in analysis of subjective outcomes, such as violence. Therefore, it is recommended that future research focuses on means of developing common definitions and measurements of violence as means greater chances of homogeneity and more comprehensive analysis of predictive efficacy of risk assessment tools.

With regards to publication bias, this analysis suggests that publication bias was not a concern. However, it does not remove the risk of publication of positive results. Both journals and researchers may be concerned to suggest that a comprehensive tool, which has been

implemented across services for twenty-three years, is actually not predictive of violence for a certain subgroup. The current small number of published studies which has assessed predictive validity of the HCR-20 in females (over twenty-three years) suggests a possible lack of interest or exploration into the area, or potentially risk of publication bias. Therefore, further research is required in order to conduct a more comprehensive meta-analysis of data for females.

2.5.3 Violence

The meta-analysis suggested that the H, C, R and Total AUC outcomes for measuring risk of violence all produced a near medium effect size. A larger effect size was found for the Total items when measuring violence. The Historical factors were suggestive of having the lowest effect size for assessing violence, yet this outcome did yield significance. The C items revealed a significant and a near medium effect size for predicting violence for females. The C items on the HCR-20 explore more current problems with insight, violent ideation, mental disorder, instability and response to treatment. Therefore, this outcome has face validity in assuming that any problems with these factors currently may be suggestive of an increased risk, if they are not managed.

A variation in settings may have also influenced the outcomes, considering the research suggesting a narrowing gender gap of violence for inpatient settings (de Vogel & de Ruiter, Nicholls, Ogloff, Douglas & Grant, 2004). The impact of sample must also be noted, as weighting of each study was calculated based on this.

2.5.4 Recidivism

The meta-analysis revealed significant and a near large effect sizes for the H items, suggesting good predictive efficacy when assessing recidivism for females. Near medium effect sizes were found for the C and Total item, neither of these outcomes was significant. The R items revealed the lowest effect size, of all the outcomes, when measuring recidivism

or violence for females. Such an outcome may be expected, considering the purpose of these items which is to primarily outline future risk management problems, rather than predicting violence. This supports the research suggesting criminogenic needs vary between males and females (Knaap *et al*., 2012), which suggests certain factors correlate more strongly with males and recidivism which are identified in the R items (e.g. accommodation, work and relationships). For females, emotional well-being has been considered as a correlating with recidivism risk, which is not outlined in the R items.

The heterogeneity of the studies across the meta-analysis must be noted here. For the studies measuring violence, a variety of methods were utilised to collect violence information (Table 3), including researcher coding based on pre-defined outcomes, and specific tools to measure violence. Such variation in measurement may have influenced the results for each study.

The meta-analysis for the H and C items, when measuring recidivism for females, utilised a larger number of studies. This suggests that papers assessing the predictive validity of the HCR-20 may have a heavier focus on recidivism, than incidents of violence. Similar to incidents of violence, differences in measurement of recidivism was also noted. Some of the papers measured recidivism in general, whereas others divided the measurement between violent recidivism, and other recidivism.

2.5.5 Sensitivity analysis

A sensitivity analysis was conducted following the high risk of bias posed by two of the studies. Both studies were excluded and the meta-analysis was run again for measuring violence with the H, C, R and Total outcomes. This supplementary analysis suggested no or small change in heterogeneity and effect size for H, R and Total items. However, the sensitivity analysis for the C items removed one study and revealed homogeneity among the studies and improved effect sizes. The study which was removed had a limited sample size

(n=24) and had suspected attrition bias. As the C item only consists of 5 items, having a small sample size may have impacted on statistical validity. Such outcomes reveal the importance for high quality studies and recognition of bias for researchers. It is recognised that the limited sample of studies being assessed in the meta-analysis could also impact the validity of results, which further supports the need for future research in this area.

2.5.6 Drawbacks and Recommendations

A systematic approach was used for this review to ensure that studies were identified in a comprehensive manner. However, limitations are also recognised. Regardless of the comprehensive methods used to include studies, there is a risk that unpublished papers were not identified. This review assessed published AUC outcomes, so may be more susceptible to publication bias and AUC outcomes supportive of the HCR-20. Further, attempts were made to contact the author of two articles, and various libraries were utilised to source the articles, however, nevertheless two of the papers were not accessible in the time frame.

As acknowledged earlier, previous meta-analysis and reviews have examined the HCR-20 in general, and violent risk assessment tools in females. However, this is the first systematic and Meta analytical review, examining the application of the HCR-20 for females. The results have revealed important implications for further research for this population.

The small number of included studies here is evident that further research is required in this area to be able to make further conclusions for the utility of the HCR-20 assessment for females. Additionally, aspects of the methodology of the studies were noted to be unclear, which suggests further research to be conducted, more systematically and reported in a more detailed manner. Recognition of female violence has become more prevalent in recent years, with the rise in female offenders and research suggesting a closing gender gap for violence (de Vogel & de Ruiter 2005; Nicholls, Ogloff, Douglas & Grant, 2004). Therefore, validation of clinical assessments to be able to measure and effectively manage the risks is becoming

more significant for risk management purposes. The HCR-20's ability to predict time scales for risk of violence may be useful for both inpatient and outpatient settings for risk management purposes. Future studies are encouraged to utilise statistical analysis to explore time related predications (E.g. Survival analysis, regression analysis). The implication for clinical practice is that the use of the HCR-20 is appropriate for females, though it should be utilised and interpreted with caution, and be reviewed in consideration of other sources. Assessors utilising the tool in clinical practice need to remain aware of the lack of research into specific female sub groups, those with particular clinical diagnosis, intellectual ability, and levels of security.

3 Chapter Three: Primary Empirical Study

Predictive Validity of the HCR-20 Version 3 for inpatient violence in psychiatric setting: The Effect of Gender

3.1.1 Abstract

Objectives: *The HCR-20v^3 is a recently updated violence risk assessment tool, encompassing a structured professional judgement approach. Limited research has explored the effect of gender on this instrument. The aim of this prospective naturalistic study was to test the predicative validity of the HCR-20v^3 as a screen for predicating risk of future in-patient violence between male and female civil psychiatric patients.*

Method: *Patients were matched based on age, ethnicity, length of stay in hospital, and Mental Health Act (MHA) section. The patients were screened using the HCR-20v^3 prospectively via patient files. Incidents of inpatient violence were recorded during a four month follow up period. A total of 24 males and 24 females (n= 48) were included in the follow up sample.*

Results: *Analysis revealed that males committed significantly more sexual aggression than females, no significant differences were found for other types of violence. Receiver Operating Characteristics (ROC) Area Under the Curve (AUC) analysis suggested that the AUC outcomes for the H, C, R, Total, and Final Risk Judgements (FRJ) were good predictors of verbal and any violence, for males and females, in this sample. Pairwise comparisons of AUC outcomes suggested no significant differences between male and female outcomes.*

Conclusions: *Previous research has shown varied outcomes when assessing the predictive validity of the HCR-20 by gender. This study found that the HCR-20* v^3 *subscales were generally better predictors of verbal and any violence for females. Future research is recommended to develop a more empirical foundation for the use of the recently updated HCR-20*v^3 *across gender. Future research would benefit from following Risk Assessment Guidelines for the Evaluation of Efficacy (RAGEE) to reduce heterogeneity among empirical outcomes, and allow for systematic analysis.*

3.2 Introduction

Inpatient violence is prevalent in the forensic field and a significant clinical issue due to the acts causing harm to staff and fellow patients (Barlow, Greyner & Ilkiw-Lavalle, 2000; Daffern & Howells, 2002; Bower, Stewart, Papadopoulos, Dack, Ross, Khanom, & Jeffery, 2011). Violence risk assessment has advanced in methodology, and actuarial and SPJ assessments are at the forefront of valid and reliable measures of this behaviour (Guy, Packer & Warnken, 2012). The Historical, Clinical and Risk Management-20 assessment, (HCR-20, Webster *et al.,* 1995, 1997; HCR-20 v^3 , Douglas, Hart, Webster & Belfrage, 2013) encompasses the actuarial and SPJ approach, and has been widely researched. The HCR-20 has recently been updated to the version 3 (HCR-20v^3, Douglas *et al.,* 2013). Most of the HCR-20 validation samples have comprised males, rather than females (McKeown, 2010). The lack of gender exploration in this area may be attributed to females being only a small sub-group of offenders, representing just 4.5 per cent of the offending population in the

United Kingdom (Ministry of Justice [MoJ], 2014). However, it has been suggested that *a priori* gender-neutral policies for risk reduction in psychiatric patients is not effective as they do not reflect the different trajectories of male and female offenders may have (Afifi, 2007; World Health Organisation [WHO], 2006). This highlights the potential importance of assessing gender specific issues in psychiatric services when assessing risk.

3.2.1 Defining Violence

Violence does not have a universally accepted definition. Bowers *et al.* (2011) explored published research on inpatient aggression from 1960-2009 and categorized violence as threats, verbal threats, and physical behaviours towards others and objects, and lastly self-harm. Being able to develop a clear universal definition of violence seems improbable, following the earlier discussion (see section 1. 1). As a means of developing a more generalisable definition of violence Hamby (2017) suggests considering four elements of violent behaviour and if it is, (a) intentional, (b) unwanted, (c) nonessential, and (d) harmful. The HCR-20v^3 suggests that violence can be defined as an intention to harm which is an "aggressive act, attempt, or threat must, to some degree, have been deliberate or willful" (Douglas, Hart, Webster & Belfrage, 2013, pp.36). This definition considers Hamby's suggestion of 'intentional' and 'harmful', but doesn't specify that the violence is unwanted or nonessential. As this research is considering measurement of violence employing the HCR-20v^3, the definition defined in the most recent HCR-20 v^3 professional manual will be applied, for pragmatic purposes.

3.2.2 Gender and institutional violence

Historically, research has led us to believe that males are more likely to engage in violent behaviours than women (Rowe, Vazsonyi, & Flannery, 1995; Strand & Belfrage, 2001). However, for in-patient violence, such a gender gap is suggested to be less defined (Nicholls, Ogloff, Douglas & Grant, 2004). For example, Sturup, Monohan, and Kristiansson

(2013) observed no significant difference exists between male and female violence in a civil psychiatric setting. A study conducted by Green *et al.* (2016) also found no significant differences between gender for any violence, physical aggression, verbal aggression, aggression against property, and sexual aggression. Other research suggests that violent in-patient incidents are more prevalent for females than males (Strand & Belfrage, 2001; Verstegen, de Vogel, de Vries Robbe & Helmerhorst, 2017). Strand and Belfrage (2001) found that females had a higher base rate of violence than their male counterparts. Strand and Belfrage suggested that the difference existed for the type of violence used, as female violence was more often directed towards staff and themselves, whereas the males exerted violence towards other patients. They concluded that mentally disordered female offenders may have had higher base rates of violence, but the risk factors were similar to males for their in-patient setting. Either way, the current understanding of inpatient violence rates between genders is inconsistent, and requires further exploration.

In inpatient settings incidents of violence are often responded to with de-escalation techniques, physical interventions, isolation, or increased supervision. All of these can interfere with treatment progress, medication and general routine, as well as increase strain on staffing and services. Therefore, developing awareness and understanding of risk factors, severity and imminence of violence is crucial for effective risk management and implications to treatment progress.

3.2.3 Types of violence

Following the complexities with defining violence, it is important to consider the ways in which violence may be expressed. For example, individuals can express violence via internalised behaviours (e.g. self-harm, neglect of self, indirect violence), or externalised behaviours (e.g. anti-social behaviours and physical violence). Internalising behaviours are

considered to be more common among females, with externalising behaviours being more prevalent for males (Rosenfield, 2012; Verona, Sachs-Ericsson, & Joiner, 2004; Swanson, Holzer, Ganju, & Jono, 1990).

When assessing for different types of violence, exploration thus far has found that for inpatient aggression base rates of physical or verbal violence does not differ significantly between males and females (Nicholls, Ogloff, & Douglas 2004). When assessing community violence Nicholls and colleagues found that 'threatening behaviour' had similar rates, however men were more likely to engage with physical violence or to commit a further criminal offence, which has been supported in other research (Garcia-Mansilla, Rosenfield & Cruise, 2011). Yet, few studies appear to acknowledge or assess for the internalising behaviours, which are suggested to be more common among females, such as self-harm, self-neglect, or covert manipulation. Therefore, when recording 'violent behaviours', clinicians and researchers may be inadvertently excluding behaviours which would qualify under comprehensive definitions of violence (e.g. Hamby, 2017), but which are not typically inclusive in a typical definition of violence (e.g. verbal and physical aggression). Therefore, to develop comprehensive violence risk assessment, further exploration into understanding what it is we are predicting or measuring is required.

3.2.4 Historical, Clinical and Risk Management-20, Version3 (HCR-20 v^3)

The HCR-20 v^3 (Douglas *et al.,* 2013) is a well utilised risk assessment tool which embodies the SPJ approach (Singh, 2013). Version two of the HCR-20 (HCR-20 V2) has been well established across various settings, and has consistent evidence to suggest that it can be utilized across varied populations, including psychiatric offenders (Morrisey, Beeley & Milton, 2014; Kotter, Von Franque, Bolzmacher, Eucker, Holzinger & Muller-Isberner, 2014; Guy & Wilson, 2007; Singh, Grann, & Fazel, 2011).

Violence Risk Assessment for females: The HCR-20

Since the establishment of the HCR-20 V2 (Webster *et al*, 1997), the literature on violence and use of risk assessment has grown, and this was one of the main drivers behind the development of the HCR-20 v^3 (Douglas, 2014). The HCR-20 v^3 continues to have the same historical, clinical and risk management item structure (Table 5) and comprises 20 items, with additional areas for formulation and risk management scenarios. The HCR-20v^3 items have a procedure which informs the assessor and readers of the presence of an item, and it's relevance to risk of violence. These outcomes can be used to inform the risk categorisation for the Final Risk Judgement (FRJ), which informs if an individual, is considered to be of low, medium or high risk of violence in the future. The individual items and subscales (e.g. H, C and R totals) are not designed to categorise levels of risk independently, but to inform the structured professional judgement made for a FRJ (Webster *et al*., 1997). For example, an individual with a large quantity of present and relevant risk factors from the historical items, but a low number of present and relevant ratings for the clinical and risk management items may be considered overall as a low risk of future violence. However, assessing the historical items alone may lead one to consider the individual as high risk, which may be inappropriate. Therefore, considerations overall risk is recommended to consider all subscales, and not one in isolation. To maintain the strong evidence-based approach of this tool, the recently updated assessment requires continued evaluation of its administration, use, and the predictive validity it's able to predict risk of violence (Douglas *et al*., 2013).

Table 5
The 20 items and three subscales of the HCR-20$\boldsymbol{v^3}$ risk assessment tool (Douglas, Hart, Webster, & Belfrage, 2013)

Historical (H)	Clinical (C)	Risk (R)
H1 – Violence	C1 -Insight	R1 – Professional Service Plans
H2 – Other Antisocial Behaviour	C2 – Violent Ideation or Intent	R2 – Living Situation

Violence Risk Assessment for females: The HCR-20

H3 – Relationships	C3 – Symptoms or Major Mental Disorder	R3 – Personal Support
H4 – Employment	C4 - Instability	R4 – Treatment and Supervision
H5 – Substance Use	C5- Treatment and Supervision	R5 - Stress or Coping
H6 – Major Mental Disorder		
H7 – Personality Disorder		
H8 – Traumatic Experiences		
H9 – Violent Attitudes		
H10 – Treatment or Supervision Response		

3.2.5 Risk factors and manifestations of violence

The HCR-20 has suggested that the 20 items from the assessment are reliable constructs for predicting risk of violence (Douglas *et al.*, 2013). When examining violence risk, research typically finds that violence is moderated by gender (de Vogel, Stam, Bouman, Horst & Lancel, 2015; Bloom, Owen, & Convington, 2003; Strand & Belfrage, 2001, Muller & Kempes, 2016). These gender differences can have implications for clinical practice and the approach to violent risk assessment. For example, the impact of victimization and experience of traumatic events as moderators of violence have been found to contribute to later violent behaviours in females (Bloom, Owen & Contington, 2003; Banyard, Williams, & Siegel, 2001; de Vogel *et al*., 2015). While risk factors for violence may be similar for males and females, the different pathways to violent behaviours and measuring risk of violence should not be overlooked.

Previous research has found a significant difference between scores on the H, C, and R subscales, and total scores where males have been found to have significantly higher scores

for H, C, and total HCR-20 scores (Nicholls, Ogloff, & Douglas, 2004). However, other research has found no difference between male and female scores on the H, C, R and total items (Strand & Belfrage, 2001). The aforementioned studies have focused on forensic psychiatric samples. Studies of a civil psychiatric sample of males had significantly higher for H, C, R and Total item scores (Strub, Douglas, & Nicholls, 2016).

3.2.6 Predictive Validity of the HCR-20 for females

Garcia-Mansilla, Rosenfield and Nicholls (2009) provided a detailed review of risk assessments including the HCR-20, and suggested that research exploring the use of the HCR-20 with females is more inconsistent than that for males. Other research suggests that the HCR-20 assessment is poor for predicting recidivism for females in a psychiatric setting (Schaap, Lammers & de Vogel, 2009). De Vogel and Ruiter (2005) compared Area Under the Curve (AUC) outcomes for males and females in a psychiatric setting and found moderate to good outcomes for inpatient violence (AUC =.52 to .86). De Vogel and de Ruiter's (2005) study assessed patients considered to have a personality disorder, which has been found to reduce the predictive efficacy for the HCR-20 (O'Shea, Mitchell, Picchioni & Dickens, 2013). Similar studies for female in-patient violence has also revealed moderate effect sizes (Nicholls, Ogloff & Douglas, 2004), and outcomes more predictive for males than females (Green *et al.*, 2016).

A systematic review conducted by O'Shea, Mitchell, Picchioni, and Dickens (2013) evaluated moderators of predictive efficacy for the HCR-20 and found that predictability was increased among samples with higher proportions of females. Some research into the predictive validity has found Final Risk Judgements (FRJ) significantly more predicative of risk of future violence for females than males (de Vogel & de Ruiter, 2005). For the individual item scores on the HCR-20, females have presented higher scores for relationship

instability (de Vogel & de Ruiter, 2005), presence of personality disorders, and problems with stress and coping (Strand & Belfrage, 2001). O'Shea, Picchioni, Mason, Sugarman and Dickens (2014) examined the HCR-20 (Webster *et al.,* 1997) as a predictive tool for violent risk as a function of gender, diagnosis, age and ethnicity. The study assessed forensic mental health patients (*n*=505) and found that items R5 and C5 (response to treatment, supervision) contributed to the predictive power of violence in females. O'Shea *et al.* (2014) also concluded that the AUC values were higher for females H, R and FRJ's (.588, .760, and .650, respectively) than they were for the male patients (.526, .645, and .503), and that these were more predictive for any aggression, rather than just physical aggression.

Strub, Douglas and Nicholls (2016) explored persons under short-term inpatient psychiatric care and found the H, R, Total and FRJ were able to predict risk of future violence (verbal, physical and any) with moderate to large effect sizes for males (AUC= .62 to .83) and female (AUC= .60 - .72) patients. The H subscale predicted any type of violence, producing significant AUC's for both males and females (AUC=.71, p<.05 AUC=.72, p<.05, respectively). More significant outcomes were found for males than for their female counterparts. These findings have implications for future research, as conclusions have been contradictory across different settings, populations and outcomes. Garcia-Mansilla, Rosenfield and Cruise (2011) explored the predictive accuracy for females compared to males and concluded that the HCR-20 does not need to be adapted for females, but when used it should be completed and applied with caution.

3.2.7 HCR-20 v^3

For the HCR-20v^3, research is in the early stages. Strub, Douglas and Nicholls (2014) investigated the recent scale for psychiatric patients and concluded that the presence ratings had moderate to large effect sizes (AUCs = .63 to .90), with relevance ratings for the similar

range (AUCs = .56 to .91), averaging at a moderate effect size. These results are supportive of the predictive ability of the HCR-20v^3. The results did not take into account the effect of gender, which may have skewed the results, given past research on gender differences. Green *et al.* (2016) also evaluated the HCR-20 v^3 and found inpatient violence marginally higher for females (54.2%) than for males (42%). The relationship between recorded violent incidents and assessment scoring was higher in males. They did not find any significant effect of gender on the HCR-20's predication of future violence.

3.2.8 Predictive accuracy studies

Assessment of behaviour, specifically violence, contributes to safety of the public and management of individuals who pose a risk. Therefore, consistent and quality assessment is required to apply the implications of research into practice. Studies assessing for predictive efficacy aim to assess a tools accuracy of predicting the likelihood of a specified outcome (Singh, 2013). Predictive validity studies have progressed in the behavioural sciences, particularly for assessing risk of violence. Statistical approaches to correlational explorations have also developed for more precision and accuracy in outcomes (E.g. ROC and AUC analyses). Understanding the predictive validity of an assessment enables clinicians to make tentative conclusions on an individual's level of violence risk compared to a wider population. It is noted that these conclusions are tentative due to the possibility of error in risk estimates, and the lack of consideration of individual differences when assessing the risk estimate alone (Hart, Mitchie, & Cooke, 2007).

Results for the HCR-20 with females are currently unclear, as there is with heterogeneity among methodologies. The current study will utilise the Risk Assessment Guidelines for the Evaluation of Efficacy (RAGEE, Singh, Yang, Mulvey, & RAGEE Group, 2015), which provides reporting guidance for predictive validity studies for violence risk assessments (Appendix J).

3.3 Aims

This present study aimed to develop the literature on violence in inpatient settings, and to explore the effect of gender for the HCR-20v^3. The present study also aimed to explore the HCR-20 v^3 risk assessment tool by prospectively examining the impact of gender on its predictive efficacy for inpatient violence. In forensic psychiatric settings, the concurrent validity has been found to be 'high to very high' between the previous and current version of the HCR-20 (Douglas & Belfrage, 2014; Strub, Douglas, & Nicholls, 2014; Howe, Rosenfield, Foellmi, Stern, & Rotter, 2015). A strong evidence base is already being built for the utility of the HCR-20 v^3 for psychiatric in-patient predictive validity (O'Shea & Dickens, 2015; Strub, Douglas & Nicholls, 2014; De Vogel, Van Den Broek, & De Vries Robbe, 2014). However; little has been done to explore the impact of gender on the predictive efficacy of the HCR-20 v^3 in such settings.

This research aimed to explore if a incidents of violence differ between male and female patients in psychiatric populations, and if a gender difference exists for particular types of in-patient violence. Gender differences between HCR-20v^3 scores were also examined. The HCR-20 v^3 was also tested for its predictive accuracy for male and females when assessing inpatient violence.

3.4 Method

3.4.1 Design

This evaluation employed a naturalistic prospective cohort design, following male and female adult psychiatric patients over a 4-month period whilst in a secure setting.

3.4.2 Setting

CAS Behavioural Health provides specialist behavioural health services within the UK across a variety of specialist disciplines (E.g. Mental Health, Personality Disorder, and Learning Disability). Participants were recruited as part of a service evaluation for patients who were

informal, or admitted under the Mental Health Act (1983). For the purpose of the evaluation, data was extracted from specialist units for patients with a Personality Disorder (PD), Mental Health (MH), and Intellectual Disabilities (ID) diagnosis. All hospitals were psychiatric inpatient settings, and therefore did not possess levels of security. Participants had to be over the age of 18 years to be included, and were not directly contacted or approached. The participants were required to be detained in an in-patient setting to be included, and were all residents between April 2017 and August 2017. Participants were excluded if they were discharged or transferred during the follow up period.

3.4.3 Participants

An a priori power analysis was conducted using MedCalc for Windows, Statistical Software (Version 16.4.3). This indicated that 24 males and 24 female's subjects would be required, when employing a β-level =0.20 (80%) for detecting a large effect size when assessing with the traditional α=0.05 for statistical significance.

CAS Behavioural Health hospitals were contacted throughout the UK, and the sample was convenience based, depending on the responses received. Demographic information was provided for 53 males, and 29 females, and used to match a sample. Matching was based on Mental Health Act section, age, length of stay, and clinical diagnosis. Psychopathology was coded into Axis I, Axis II, and a third category of comorbid diagnosis (Axis I and II). Two of the females were excluded, as it was predicated that they may be released from hospital in the next three months.

The attrition rate for this study was 11.1 per cent (n=6). During the follow up period, three male participants were transferred or discharged from hospital, therefore these participants and their matched females were excluded from the sample. The final sample consisted of 48 individuals, with a matched sample of males (N=24) and females (N=24).

Further analysis conducted to investigate differences among the samples found no significant differences between the male and female participant demographics (Table 6).

3.4.4 Ethical Considerations

All of the researchers involved were trained in coding the HCR-20v^3 and had experience in forensic environments. HCR-20v^3 coding sheets were completed for each of the participants and were scored using available patient documentation. Access to patient information was managed to ensure that it was accessed and analysed securely. The researcher was under a contract with the company and had access to routinely collected data which was extracted and stored in a secure folder on the company's server by one of the supervising Psychologists. A data agreement contract was devised and signed (Appendix K), and Ethical approval was retrieved from both the University of Nottingham and CAS Behavioural Health (Appendices K and L). The researcher did not have any patient contact for this data analysis. With regards to the violent incidents, the researcher worked within the clinical field and is accustomed to exposure of violent incidents. The researcher's also had access to, and utilised, regular supervision. The evaluation was supervised by three Forensic Psychologists, Dr. Vincent Egan and Dr. Ruth Tully from University of Nottingham and Dr. Lydia Evans from CAS Behavioural Health. All supervisors were BPS and HCPC registered.

3.4.5 The HCR-20v^3

The HCR-20 v^3 (Douglas *et al.,* 2013) is a previously updated SPJ tool designed to assess future risk of violence, and to aid in decisions regarding this. This tool focuses on adult offenders (18 years +) and is intended for in-patient and outpatient settings, and has been utilised in forensic and civil psychiatric populations. The HCR-20 proposes to assess for recidivism and different types of violence including verbal, physical, and sexual. The HCR-20 v^3has 20 items which comprise three subscales; Historical, Clinical and Risk management (Table 5).

The assessment examines the relevance of items to violence on a 3-point scale to determine if the factor is relevant for the individual of the item to an individual's risk of future violence. For the purpose of this evaluation the relevance ratings were used as they are intended to inform the risk formulation and management of patients (Douglas *et al.,* 2013). Items are assessed as Low (0), Medium (1), or High (2) relevance to risk of violence. The factors added up to a maximum score of 40. The individual items and subscales (e.g. H, C and R totals) are not designed to inform levels of risk independently, but to inform the structured professional judgement made for a FRJ which represents the overall level of risk posed based on the itemized scores. This is categorised as Low (0), Medium (1) or High (2). For items with sub-items (E.g. History of violence – As a child, As an Adolescent, As an adult) the sub-items were scored appropriately and the overall relevance was reflected by the highest sub-item. For items which had been omitted, prorating was conducted following the HCR-20 manual (Webster *et al*, 1997).

Table 6.
Demographic information for included participants in empirical study including Mean (M), Standard Deviation (SD)

Demographic	Females n = 24	Males n = 24	*Test (df)*	*p*
Age				
M(SD), Range	35.42 (11.72), 18-59	34.71 (11.62), 20-62	*t = -.210 (46)*	.834
Ethnicity				

White British	21(87.5%)	16 (67%)		
Other	3 (12.5%)	8 (33%)	χ^2= .605 (1) *	.437
Psychopathology				
Axis I (Mental Illness) or Axiss II (Personality Disorder)	15 (62.5%)	16 (67%)		
Comorbidity (Axis I & Axis II)	9 (37.5%)	8 (33%)	χ^2= .091 (1)	.763
Length of Stay				
< 1 year	11 (46%)	13 (54%)		
1.1-3 years	13 (54%)	11 (46%)	χ^2= .087 (1)	.768
Section under the Mental Health Act (1983)				
2 or 3	17 (%)	19 (%)		
Criminal Courts (37, 37/41 or 47/49)	7 (%)	5 (%)	χ^2= .00 (1)	1
Hospital				
Mental Health	20 (83%)	14 (58%)		
Learning Disability	4 (17%)	10 (42%)	χ^2= 3.630 (1)	.057

Note. Demographics categorisation was taken from CAS Behavioural Health. *Df= Degree of Freedom*

*Likelihood Ratio applied due to 50% of cells being over expected count

3.4.6 Operational definition and measurement of aggression and violence

The HCR-20 v^3 manual defines violence as "actual, attempted, or threatened infliction of bodily harm of another person" with "the act, attempt, or threat must, to some degree, have been deliberate or willful" (Douglas *et al*., 2013, pp. 36).

Incidents of behavioural violence and aggression were extracted from incident logs (Appendix M) structured around the Short-Term Assessment of Risk and Treatability (START) guide (Webster, Martin, Nicholls, & Desmarais, 2009). This data was routinely

collected and used to code incidents by staff. The categories were defined as 'Verbal Aggression' (shouting, swearing and threats), 'Physical Aggression' towards others (patients and staff) or 'Sexual Aggression' (both verbal and physical). Violence towards property does not fall under the HCR-20's definition towards others, so was not included in this evaluation, unless the property was used as a form of weapon. Nor were acts of self-harm included in the definition of violence; therefore, these incidents were also excluded from this evaluation. A final category of 'Any violence' was also measured, which was the overall sum of all verbal, physical and sexual incidents.

3.4.7 Procedure

A protocol was written and the study was approved by the Research and Development at CAS Behavioural Health Group and the Ethics Committee, University of Nottingham. HCR-20v^3's were not routinely collected for this service, and were therefore completed in the context of research. The first author was trained in coding the HCR-20v^3 from a one-day training workshop given by a Consultant Forensic Psychologist, and had practice in developing and coding HCR-20v^3 reports in clinical practice. HCR-20v^3 coding sheets (Appendix N) were completed by the first author for each of the participants based on patient files. The Pre-Admission Assessments (PAA) and Care Programme Approach (CPA) document from the last 6 months were utilised to gather historical and recent clinical data from multi-disciplinary sources (nursing, psychology, psychiatry, and occupational therapy). The HCR-20 manual suggests it is good practice for a clinical interview be conducted, however file based assessments are also acceptable. The coding was completed blind, the coder did not have any patient contact and was not aware of further patient information. The second author of the study, a Forensic Psychologist, had been trained in the HCR-20v^3, and had experience with violence risk assessments and violence risk research. To obtain interrater reliability the second author completed a HCR-20v^3 assessment for randomly selected of

participants (N=6), using an online random number generator. Pearson's product-moment correlation (*r*) was adopted to test for agreement between the two raters. The C subscale yielded a weak correlation, the rest of the outcomes suggested a moderate to very strong correlation (see Table 7). Those which produced weaker correlational outcomes could be considered as dynamic factors, which may be more susceptible to subjective interpretations from assessors. The H subscale consists of static items and revealed very strong correlations between raters. Furthermore, there are a fewer number of items for both C and R scales, which may account for the weaker correlations, particularly with a small number of assessments being completed by the second rater.

Follow up time may confound data if not controlled (Belfrage *et al*., 2000; Gray *et al*., 2004). To overcome this, the follow up period for all patients was consistent and data was collected over a four-month period. The time at risk reflected the length of time available to collect data due to restrictions of the time available to data collection.

3.4.8 Statistical Analysis

Pearson's product-moment correlation (*r*) was conducted to determine the relationship between the two rater's outcomes for the totals of the H, C, R items, overall Total items, and the FRJ. Chi square analysis was applied to assess the rates of violent incidents between genders for verbal, physical, sexual or any violence. Multiple T-tests were conducted to assess whether the relationship between total number of violent outcomes (verbal, physical, sexual, and any) were significantly different between males and females. Differences in the predictive efficacy of the HCR-20 total items, subscale items, and FRJ between male and females were assessed using Receiver Operating Characteristics (ROC, Mossman, 1994; Rice & Harris, 1995) principles to gain an AUC statistic. ROC statistics are the preferred measure of predictive accuracy (Swets, Dawes & Monahan, 2000; Swets, 1988) for conducting risk assessment research. ROC analysis plots sensitivity (True Positive Rate) against specificity

(False Positive Rate) at various cut off points, which reveals the AUC. This outcome suggests the probability that a randomly selected participant who has been violent, would score higher than a randomly selected participant who had not been violent. The AUC outcomes can suggest a small, medium, or large effect size (.56, .64, and .7, respectively, Rice & Harris 2005). The established $p<.05$ significance level was adopted, and 95% confidence Intervals (CI) were employed for the analysis. Pairwise comparisons were also calculated using Hanley and McNeil (1982, 1983) method to assess differences between male and female AUC outcomes. All statistical analysis was conducted using SPSS version 23, unless stated otherwise.

Table 7.
Pearson's product-moment Correlations (r) between assessor's ratings

HCR-20 assessment section	Pearson's product-moment correlation (*r*)	Level of Significance *(α)*
H	.925**	*.008*
C	.313	*.547*
R	.539	*.270*
Total	.924**	*.008*
FRJ	.775	*.070*

*Note. N=6, *p<.05, **p<.01. Outcomes refer to Relevance ratings.*

3.5 Results

3.5.1 Statistical analysis

3.5.1.1 Prevalence of violence

In this sample of civil psychiatric patients, the rates of violence were assessed as a dichotomous outcome (no violence compared to violence) for males and females. The likelihood of a patient committing any violence did not significantly differ between males

(n=18, 51%) and females (n=17, 49%). When assessing the different types of violence, verbal violence did not to differ between males (n=15, 48%) and females (n=16, 52%). Similarly, no differences were found for physical rates of violence between males (n=9, 53%) and females (n=8, 47%). However, a Chi Square analysis identified a significant difference between males (*n*=12, 92%) and females (*n*=1, 8%) for sexual aggression, $X^2(1) = 12.765$, $p<.001$.

3.5.1.2 Relevance of risk between males and females

Each of the sub sections (H, C, R, and Total) were summed and assessed the differences between scores for males and females. The sample was <50 and data was tested for normality applying the Shapiro-Wilk test (Shapiro & Wilk, 1965). All data was found to be normally distributed. All tests assumed equal variances using Levenes test for equality (Levene, 1960).

Independent samples t-tests revealed that there was no significant difference between males and females for the C and R outcome scores (Table 8). However, significant differences were found for the H (*t=2.927, p<.01)* and Total scores (*t*= 2.657, *p*<.05), suggesting that males scored significantly higher for both. For the FRJ, a Chi-Square test was conducted due to the outcome measure being ordinal. The outcome suggested that 33.3% had an expected count less than 5, therefore Fishers exact test was applied and the analysis suggested that there was no significant difference between male and female FRJ (*p*=.305).

Table 8.
Independent samples t-test results for H, C, R, and Total items

	Male		Female		*t*
	Mean	*SD*	*Mean*	*SD*	
H	10.33	1.90	8.04	3.33	2.927*
C	6.63	1.95	5.38	2.43	1.966
R	3.92	1.18	3.21	1.82	1.603
Total	20.88	3.75	16.63	6.89	2.657**

Note. H=Historical, C= Clinical, R= Risk Management. T-tests are two tailed, not assuming equality of variances, DF=46.
***** *p<.05; ** p<.01.*

Table 9.
Mean (M), Standard Deviation (SD) and Chi Square analysis (χ2) for HCR-20 individual items scores for male and female participants

HCR item	Male		Female		χ^2
	M	SD	M	SD	
Historical items					
H1	2	0	1.42	. 72	18.57***
H2	.71	.69	.29	.46	6.89*
H3	1	.51	.79	.59	N.S
H4	.08	.28	.08	.28	N.S
H5	1.13	.95	.71	.75	7.20*
H6	1.88	.34	1.21	.72	15.34***
H7	.29	.62	.79	.88	N.S
H8	.75	.53	.96	.55	N.S
H9	1.08	.65	.79	.59	N.S
H10	1.54	.51	1.13	.68	7.54*
Clinical Items					
C1	1.38	.58	1.33	.64	N.S
C2	1.04	.55	.67	.64	N.S
C3	1.58	.50	1	.72	11.79**
C4	1.29	.55	1.46	.66	N.S
C5	1.29	.55	.96	.55	N.S
Risk Management Items					
R1	.13	.34	.08	.28	N.S
R2	.29	.46	.29	.62	N.S
R3	.83	.48	.42	.50	8.14*
R4	1.38	.58	1.13	.61	N.S
R5	1.33	.57	1.38	.58	N.S

*Note. df=2, *=p<.05, **=p<.01, ***=p<.001, N.S= Non-Significant*

Further exploration into individualised items suggested significant differences for H1 (History of violence), H2 (Antisocial), H5 (Substance use), H6 (Major Mental Disorder), H10(Treatment or supervision), C3(Symptoms of Major Mental Disorder), R3(Personal Support), all suggesting that males scored more highly on the relevance ratings (Table 9) .

3.5.1.3 Sub-group analysis

A sub group analysis was conducted based on the large, but not significant, difference between the number of participants from either Mental Health (MH) or Learning Disability (LD) hospitals. Independent samples t-test revealed significant differences between male H subscale and total, with significantly higher scores for participants from LD hospital (see table 10). For females, a significant difference was only found for the R subscale, with significantly higher scores for the LD hospital.

Table 10
Independent samples t-test for differences between learning disability and mental health hospitals

	Males			Females		
	LD *M(SD)*	MH *M(SD)*	*t*	LD *M(SD)*	MH *M(SD)*	*t*
H	11.60(1.17)	9.43(1.83)	3.292**	8.75(1.26)	7.90(3.61)	.458
C	7.10(1.85)	6.29(2.02)	1.008	6(1.41)	5.25(2.59)	.555
R	4.20(1.03)	3.71(1.27)	.997	5(2.31)	2.80(1.61)	2.333*
Total	22.90(2.81)	19.34(3.74)	2.476*	19.75(4.35)	16(7.20)	.994

Note. H=Historical, C= Clinical, R= Risk Management, LD= Learning Disability hospital, MH= Mental Health hospital.
T-tests are two tailed, assuming equality of variances and normality, DF=22.
***** *p<.05; ** p<.01.*

3.5.1.4 Predictive Validity

A contingency table presenting the number of those who were violent in relation to risk category is provided in Table 10.The predictive validity was examined for the Historical, Clinical, Risk Management items, HCR Total, and FRJ scores. This was assessed for dichotomised verbal, physical, sexual and any violence between males and females. Results of the ROC analysis are displayed in Table 11; also see Appendix O for ROC curves displaying sensitivity and specificity.

3.5.1.4.1 Verbal Violence

Excellent predictive accuracy was found for males and females, yielding significant AUC's, for C, Total and FRJ. Medium effect sizes were found for the H items for males, and the R items for females.

3.5.1.4.2 Physical Violence

For males, AUC outcomes were varied, and ranged with small (H and R items), to medium (Total score), and large effect sizes (C items). The FRJ's yielded excellent predictive validity (AUC=.767, $p<.05$). When assessing for females, the analysis found medium (H and R items) to large effect sizes (C, Total and FRJ), with FRJ also yielding significantly predictive validity (AUC=.770, $p<.05$).

3.5.1.4.3 Sexual Aggression

The AUC outcomes suggested excellent predictive accuracy for females when predicting non Sexual Aggressive behaviours for H, C, R, Total and FRJ's, and low-medium effect sizes for males.

3.5.1.4.4 Any violence

For females, significant AUC's >.71 were found for all violence measures across the H, C, R, Total score and FRJ predictors. For males, only the C and Total scores produced excellent predictive accuracy.

Table 11.
Violence rates based on risk Final Risk Judgement categorisation for male and female participants

Risk Category	Gender	n (%)	Violent	Non-violent
Low	Male	6 (12.5)	4	2
	Female	11 (23)	4	7
Medium	Male	12 (25)	8	4
	Female	10 (21)	10	0
High	Male	6 (12.5)	6	0
	Female	3 (6)	3	0

3.5.1.5 Pairwise comparisons between AUC's for male and female ROC curves

Pairwise comparisons between male and female AUC's were calculated utilising Hanley and McNeils (1982, 1983, http://vassarstats.net/roc_comp.html) method (Table 12). No significant differences were found for all hypothesis of male and female violence.

Table 12.
ROC and AUC outcomes for predictive validity of the H, C, R, Total, and FRJ's for each category of violence

	Verbal Violence			Physical Violence			Sexual Aggression			Any Violence		
	AUC	SE	95% CI	AUC	SE	95% CI	AUC	SE	95% CI	AUC	SE	95% CI
H												
Male	.633	.115	.408-.859	.541	.118	.310-.771	.660	.113	.438-.882	.523	.138	.252-.794
Female	.801*	.090	.623-.978	.648	.113	.426-.870	.783	.089	.607-958	.845**	.080	.687 - 1
C												
Male	.819**	.096	.630- 1	.719	.126	.472 - .965	.615	.121	.378 – 852	.755	.113	.533 - .976
Female	.859***	.078	.707 – 1	.781*	.096	.593 - .970	.739	.104	.535 - .943	.895**	.068	.762 - 1
R												
Male	.774*	.094	.589 - .959	.544	.132	.285 - .804	.583	.122	.345 - .822	.634	.115	.409 - .859
Female	.695	.123	.454 - .937	.676	.120	.441-.911	.978	.033	.914 - 1	.803*	.092	.623 - .982
Total												
Male	.874**	.081	.715 - 1	.674	.117	.445 - .903	.681	.112	.461 - .900	.750	.116	.524 - .976
Female	.801*	.097	.610 -.991	.711	.105	.504 - .918	.848	.076	.699 - .997	.874**	.074	.729 - 1
FRJ												
Male	.833**	.084	.669 - .998	.767*	.108	.555 - .978	.625	.116	.398 - .852	.667	.114	.443 - .890
Female	.824*	.089	.651 - .998	.770*	.102	.569 - .970	.957	.049	.860 - 1	.882**	.069	.747 - 1

*Note. N =24 males and 24 females. Total score= H, C, and R items. Significance levels *p*, .05, **p< .01, ***p<.001, AUC = Area Under the Curve, SE= Standard Error, CI = Confidence Interval.*

Table 13.
Pairwise Comparisons between AUC for male and females, for H, C, R, Total and FRJ's when assessing types of violence using Bonferroni Corrections (Hanley & McNeil, 1982, 1983)

	Verbal Violence			Physical Violence			Sexual Aggression			Any Violence		
	AUC Difference	SE of difference	z	AUC Difference	SE of difference	z	AUC Difference	SE of difference	z	AUC Difference	SE of Difference	z
H	-.168	.148	-1.139	-.107	.176	-.607	-.123	.303	-.407	-.322	.160	-2.019
C	-.04	.115	-.349	-.062	.157	-.395	-.124	.317	-.391	-.14	.124	-1.138
R	.079	.146	.540	-.132	.175	-.756	-.395	.158	-2.493	-.169	.157	-1.08
Total	.073	.116	.631	-.037	.168	-.221	-.167	.273	-.612	-.124	.129	-.964
FRJ	.009	.119	.076	-.003	.154	-.025	-.332	.186	-1.791	-.215	.140	-1.531

Note. AUC Difference = $Area_A$ - $Area_B$, *p=two tailed, *=p<..0025(Bonferroni Correcti*

3.6 Discussion

The HCR-20 version two was a well-researched and validated violence risk assessment but assumed equal validity across genders. The HCR-20 was updated to the version three in 2013, and is being explored in to its applicability for various populations. This study extended the literature on the predictive validity of the HCR-20v^3 for inpatient violence comparing a matched group of male and female civil psychiatric patients. This is the first study to examine gender differences with the HCR-20v^3 for violence prediction.

3.6.1 Prevalence of violence

There were no significant differences for incidents of verbal, physical or any violence between males and females. This finding is consistent with previous research suggesting a less defined violence gender gap between males and females than before (Nicholls, Ogloff, Douglas & Grant, 2004; Sturup, Monohan, & Kristiansson, 2013; Green *et* al, 2016). A significant difference was found for Sexual Aggression, where males had committed more incidents than females. This outcome is in agreement with previous research, which has found that males engage in more sexual aggression and commit more sexual crimes (Green *et al*., 2016; Strand & Belfrage, 2001); UK national statistics show sexual offences are mostly committed by males (96.7%, MoJ, 2013).

When assessing differences between scores on the HCR-20v^3, the outcomes suggested significantly higher scores for males for the H and Total items, but not for the C, R and FRJ's. Earlier research found varying outcomes. The significantly higher score for males on the H and Total items in this study supports the previous research for forensic and civil psychiatric samples (Nicholls, Ogloff, & Douglas, 2004; Garcia-Mansilla *et al*., 2011). Varying HCR-20 scores can be sometimes attributed to the subjective nature of the scoring, which is down to the clinical experience and judgement of the professional conducting the assessment. The HCR-20v^3manual

(Douglas *et al*., 2013) suggests clear guidelines on how to populate each item and for scoring, which should be adhered to ensure validity and consistency across assessments.

The subgroup analysis to explore the effect of hospital type (mental health or learning disability) on the outcomes of the H, C, R and total subscales suggested some significant differences. Particularly that participants considered to have a learning disability scored significantly higher for males (H and total subscale) and females (R subscale). Previous research has suggested that the HCR-20 revealed predictive efficacy when applied in a LD population (O'Shea, Picchioni, McCarthy, Mason, & Dickens, 2015). Some research suggesting greater predictive validity when compared to mentally disordered participants (Gray, Fitzgerald, Taylor, McCulloch, & Snowden, 2007). This area is currently under researched and would be beneficial to explore risk of violence across sub-groups to inform risk management plans and appropriate allocation of resources and interventions.

When taking the other demographic information into consideration, it was noted that the sample was predominantly white British. As this sample was taken from private hospitals based in the UK, a higher prevalence of white British participants would be expected. Having such a bias in the sample reduces the diversity of the exploration. Additionally, with the female sample being largely white British, this may have resulted in bias when matching the sample towards this demographic, and in turn undermines the external validity of the results.

3.6.2 Predictive validity and gender

In line with the literature (O'Shea *et al.*, 2013; De Vogel & Ruiter, 2005; Nicholls, Ogloff & Douglas, 2004), this study suggests that the HCR-20v^3 is efficient in predicting in-patient violence for females and males. This research contradicts research finding that the HCR-20v^3 is more predictive for males than for females (Green *et al*., 2016).

HCR-20v^3 sub categories revealed greater AUC values for females, compared to their male counterparts for all violence. This was evident for H, C, R, Total and FRJ's, and is in line

with previous research (O'Shea's *et al.,* 2014). Pairwise comparisons found no significant differences between male and female AUC outcomes. These outcomes support the HCR-$20v^3$being effective as a measure of violence risk for both males and females.

The existing literature for civil psychiatric settings has found moderate effect sizes for the H subscale with females (Nicholls, Ogloff & Douglas, 2004; Garcia-Mansilla, Rosenfield & Cruise, 2011; Strub, Douglas & Nicholls, 2016; Viljeon *et al*., 2016). This study produced outcomes in line with forensic samples (O'Shea *et al.,* 2014; Coid, Yang, Ullrich & Zhang, 2009; de Vogel & de Ruiter, 2005; Green *et al*., 2016; Shaap, Lammers & de Vogel, 2009), suggesting that H items for females yielded larger AUC outcomes for verbal and any violence, compared with males who had low to moderate effect sizes. Previous research has utilised Version two of the HCR-20. This data proposes that an update of the assessment tool may have increased the predictive accuracy for females.

It has also been suggested that C subscale is less predictive of violence, particularly for retrospective research using case notes (Douglas & Webster, 1999) due to the dynamic nature of some items. This study found that C subscale yielded moderate to large effect sizes for predicting all violence for males and females, which is line with existing literature (Stub, Douglas & Nicholls, 2016; O'Shea *et al*., 2014). It may be that C items are more predictive than previously assumed, or that the updates to the items are more relevant to female risk of violence.

FRJ outcomes for this study revealed a large effect size for females, compared to the male medium effect size, in line with previous research (de Vogel & de Ruiter, 2005). However, the AUC outcomes were not significantly different for gender. It is recommended (Webster *et al.*, 1997) that FRJ (low, medium or high) scores be utilised for assessing risk over the HCR-20 scores.

3.6.3 Implications for theory and practice

This research aimed to explore the predictive validity of the most recent HCR-20v^3 between male and female civil psychiatric clients. The results suggest that the risk assessment tool has predictive validity for both males and females. Therefore, suggesting that the HCR-20v^3 is adequate for assessing violence risk with females in clinical practice. Developments in the 'gender-responsive' literature suggest that the Female Additional Manual (FAM, de Vogel, de Vries Robbe, van Kalmthout & Place, 2011) additional items are required when assessing risk in females. However, this research suggests that this is not essential when applying the updated HCR-20v^3. It may be clinically appropriate to consider the FAM additional items as prompts to explore an individual's historical or current difficulties (e.g. pregnancy at a young age) and how they fit to the current existing items of the HCR-20v^3(e.g. problems with traumatic experiences) to ensure that a validated risk assessment is completed. This study suggested that males scored significantly higher for the H and FRJ; however prevalence of violence did not significantly differ between genders. Therefore, perhaps a more detailed consideration of female risk factors would reduce the differences in HCR-20 outcomes between genders. Alternatively, as discussed earlier, perhaps it is the limited definition which has been applied in this study which has inadvertently not recorded the internalised expressions of violence more commonly associated with females (e.g. self-harm manipulation or self-neglect). Therefore, to further improve this research, and other predictive efficacy studies, a more comprehensive exploration into violence may be beneficial.

The understanding of violence has also been discussed in this research. For the purposes of this study a pragmatic approach was taken to define violence. The definition which is used has implications for future research and clinical practice. Greater attention to this can have practical implications regarding recording violence incidents, as well as formulation and treatment. Similarly for research, a change in the definition of violence, such as including self-harm, may have produced varying outcomes. Research conducted by O'Shea, Picchioni, Mason, Sugarman,

and Dickens (2014) suggested that the HCR-20 revealed greater predictive efficacy for females when assessing for self-harm. Therefore, it is important that researchers and clinicians consider the nature of violence, and how this is expressed between males (e.g. externalised) and females (internalised), when assessing for future risk.

This study, and previous research, has found a less defined gender gap for institutional violence (Nicholls, Ogloff, Douglas & Grant, 2004), particularly in civil psychiatric settings (Sturup, Monohan, & Kristiansson, 2013). Violent incidents in psychiatric settings are common, and appropriate assessment of violence risk is necessary to reduce and manage this behaviour (Barlow, Greyner & Ilkiw-Lavalle, 2000; Daffern & Howells, 2002; Bowers *et al.*, 2011). Outcomes from this study would suggest that understanding and formulating violence goes beyond forensic and civil psychiatric settings, and that further demographic variables may need to be considered when assessing for violence (e.g. diagnosis).

3.6.4 Limitations

Whilst the outcomes for this research have contributed to the field of risk assessment, and has developed exploration into the third version of the HCR-20, results must be considered with acknowledgement of some limitations. Firstly, although the sample had been matched, the limited size can impact on the generalisability of the results to the general civil psychiatric population. As noted in the subgroup analysis, the differences in diagnosis or hospital type had a significant impact on the outcome of the HCRC-20 subscales. Some of the AUC outcomes were suggestive of excellent predictive validity; however these were not statistically significant. It is possible again that the restricted sample size may have impacted on the statistical outcomes of the study. Therefore, findings should be generalised and interpreted with caution.

Furthermore, the nature of risk assessment research has an effect due to structured professional judgement, and subjective element of risk ratings. The HCR-20 is typically conducted by a clinical professional with a greater understanding of the individual, who has completed a

formulation of violence, and this disparity in research may impact on the outcomes. For the current study, reliability was assessed with 10 per cent (n=6) of the assessments being conducted by another professional to assess for reliability. This process alluded to a difficulty with administering the HCR-20v^3risk assessment tool; that it can be time consuming for practitioners to complete. Lastly, the generalisability of this research is limited by the nature of the population which included solely civil psychiatric patients, and the HCR-20v^3 is typically recommended for individuals with a history of violence risk.

A final limitation to consider is the usefulness of predictive validity studies of this nature. As previously mentioned, HCR-20 subscales are not recommended to be used in isolation to inform of current risk (Webster *et al*., 1997). Therefore, ratings found in this study are merely suggesting directions for consideration of items when considering FRJ, and when formulating risk.

3.6.5 Future research

This study found a significant difference for sexual aggression only, which may be due to the limited number of incidents recorded for females. More specialised risk assessments are available to measure and predict sexual aggression and violence, therefore these could be utilised in clinical settings as validated tools.

With regards to violence risk assessment, future exploration into the application of updated HCR-20v^3data is required across populations. It would be beneficial to continuing building a strong empirical research base for HCR-20v^3 use with both genders in various settings.

With regards to methodology, a robust approach is crucial for assessing risk due to the confounding variables which may impact on the diagnostic accuracy of a risk assessment. Therefore, future research would benefit from adhering to the RAGEE guidelines (Singh, Yang & Mulvey, 2015) to reduce heterogeneity among empirical outcomes.

Lastly, a key element of the HCR-20v^3 is the development of formulation of violence, which links the process of risk assessment and management. Therefore, literature would benefit

from exploring the development on formulation for violence and risk management using the HCR-20v^3 data, and test how effective these strategies are for reducing violence.

3.6.6 Conclusions

Overall, this study has explored the predictive validity of the HCR-20v^3 for a matched sample of male and female civil psychiatric patients for inpatient violence. This study suggested no significant difference between violence outcomes, except from sexual violence, where males had a higher prevalence. For the HCR-20v^3 outcomes, males have significantly higher scores for the H and FRJ's compared to females. However, AUC outcomes suggested no significant differences between predictive validity for males and females. Therefore, this study suggests that the HCR-20v^3 is a valid tool for assessing and predicting violence for male and female psychiatric in patient violence.

4 Chapter Four: Research Case Study

HCR-20 Version 3: A Case Study in Collaborative Risk Formulation and Management for a Forensic Psychiatric Female In-Patient

4.1 Abstract

The HCR-20 was developed and validated predominantly with males. The HCR-20^{V3} focuses on the use of formulation to draw risk assessment and management together. Limited research exists for its validity for females, and current results are mixed. This case study sought to explore the benefits of developing a collaborative formulation using the HCR-20^{V3}violence risk assessment tool, with a female in a forensic setting. The client met the criteria for the violence risk assessment based on a history of violent behaviours, and an index offence involving physical violence with use of a weapon. This case aimed to assess the usefulness of the HCR-20^{V3}assessment and formulation with a female. A collaborative approach was used to complete the HCR-20^{V3}risk assessment, formulation and risk management plan. This case study found the HCR-20^{V3}assessment proved a useful structure for developing a formulation, and, in turn, a risk management plan. With a risk management plan implemented, the client showed a short-term reduction in recorded violent incidents compared to her violence prior to the collaboration. The Client appeared to respond and develop insight around her own behaviours, and risk of violence.

4.2 Introduction

The HCR-20^{V3} defines violence as; "actual, attempted, or threatened infliction of bodily harm of another person" with "the act, attempt, or threat must, to some degree, have been deliberate or wilful" (pp.36, Douglas, *et al*, 2013). Historically, males have been considered to be more violent than females (Mica, Oesterle, Werner & Simmen, 2015; De Vogel & De Vries Robbé, 2013). As a result, violence risk assessment tools have been predominantly validated for men (McKeown, 2010). The Historical Clinical Risk Management 20 (HCR-20, Webster, Eaves, Douglas, & Wintrup, 1995; Webster, Douglas, Eaves, & Hart, 1997; Douglas, Hart, Webster, & Belfrage, 2013) is a violence risk assessment employing a Structured Professional Judgement approach (SJP). Studies have explored the use of the HCR-20 with women; mostly with retrospective cohort designs. There is minimal data for females, and little empirical exploration into the individual application with a female. Therefore, this case study sought to explore the application of a collaborative HCR-20^{V3} risk assessment following a shared decision making model (Charles, Gafni, & Whelan, 1997).

4.2.1 Violence in females

Historically, female violence was considered so minor that it is not worth researching (Buss, 1961). However, evidence indicates violence committed by females has seen a rise. UK Government statistics (2014) suggest that only a small percent (5%) of the prison population is accommodated by females. However, this subgroup have seen an 81per cent increase in conviction of violent offences from 1998-2007 (MoJ, 2009). Violence risk has typically assumed that males express more violent behaviours compared to their female counterparts (Rowe, Vazsonyi, & Flannery, 1995; Harer & Langan, 2001; MoJ, 2013; Mica *et al.*, 2015). However, contemporary studies propose a relative increase for female violence,

and as a result a narrowing gender gap for incidents of violence for institutional settings, (de Vogel & de Ruiter 2005; Nicholls, Ogloff, Douglas, & Grant, 2004) and in the community (Holmes, 2010).

4.2.2 Violence risk factors

Daly (1992) explored life experiences of male and female offenders and suggested a 'pathways' perspective. This approach proposed that vulnerabilities (such as abuse and substance misuse) existed more for females. This research was based on a small sample (n=40) of females. However, the study was influential in its time, and has since been explored, and supported, in the gender-responsive offending pathways literature (Salisbury & Van Voorhis, 2009; Marquet, Brewer, Simon & Morse, 2000). Gender sensitive violence risk factors have been proposed in the literature (Bloom, Owen & Contington, 2003; Banyard, Williams & Siegel, 2001; Daly, 1992; Muller & Kempes, 2016). For example, female offenders have been suggested to be more likely than males to have experienced depression, engage in self-injurious behaviours, and suffered adverse childhood experiences (Muller & Kempes, 2016). Victimisation and experience of traumatic events has been suggested as a consistent moderator of violent behaviours in females throughout the literature (Bloom, Owen & Contington, 2003; Banyard, Williams & Siegel, 2001; Daly, 1992). However, it is possible that males have also experienced trauma and victimisation. The differences in gender appear to lie more so in how these experiences are processed and managed, rather than the experiences themselves. Experiences of trauma are suggested to be internalized in a way which can impact emotional self-regulation (Ford, Courtois, Steele, van der Hart, & Nijenhuis, 2005). Therefore adverse effects can become apparent in maladaptive coping techniques such as externalizing behaviour (e.g. aggression) and internalizing disorders/difficulties (e.g. isolation, depression, substance abuse) (Sheeringa & Zeanah, 2001; Johnson, Sheahan & Chard, 2003; Meng & D'Arcy, 2016). Muller and Kempes (2016)

identified, females were more likely to engage in internalizing maladaptive behaviours such as self-harm, whereas males were more likely to participate in externalizing behaviours such as aggression. Therefore, when considering development of violent behaviours, it is important to consider the reaction and management of trauma, and how this impacts on the individual's view of themselves, others and the world.

Logan and Taylor (2017) discussed the issues of managing women I secure services, and particularly focused on the impact of difficult personality traits. This paper acknowledges that impact of risk factors and how they have shaped females perception of others. Logan and Taylor explain that the societal expectation of women to be a care giver can compromise the fulfillment of their own needs. As a result, internalized disorders, such as depression or borderline personality disorder are more common among the female population (Cooke & Harte, 2004). Common symptoms may be inclusive of internalized violence, such as self-harm, substance abuse or relational aggression (Sheeringa & Zeanah, 2001; Johnson, Sheahan, & Chard, 2003; Meng & D'Arcy, 2016). Therefore, consideration of risk factors may require a deeper understanding of the individuals processing of the world, and how this impacts on their view of self, and as a result their expressions of violence.

4.2.3 Violence Risk assessment

Violence risk assessments are "the attempt to predict the likelihood of future offending to identify individuals in need of intervention" (Brown & Singh, 2014, pp. 49). Violence risk assessments are typically established, and validated, with male samples (McKeown, 2010). Therefore, risk assessment tools have been applied in clinical practice to females with little empirical support.

4.2.4 Collaborative Violence Risk Assessment

Best practice principles recommends risk assessment and management be completely collaboratively with the service user, where possible (Department of Health, 2007; NICE,

2015). Collaborative assessment of risk encompasses the shared decision-making model which focuses on patient empowerment and autonomy (Charles, Gafni, & Whelan, 1997). The Identifying Risks Programme (IRP, Braha, 2013) has been developed as a collaborative process to complete HCR-20 risk assessments. This has been piloted in forensic psychiatric hospitals and has gained positive feedback from participants (Braha, 2013).

A greater empirical understanding of working with females is currently being developed. For females in forensic environments the literature is suggesting a model of care which provides an appropriate environment with relational security, trained staff to preserve levels of respect, appropriate gender responsive treatment pathways, and a systemic approach to maintaining and developing significant relationships in the community, whilst allowing the women to have an element of autonomy in their own care (Logan & Taylor, 2017).

4.2.5 Historical Clinical Risk-20 assessment

The original HCR-20 was published in North America by Webster, Eaves, Douglas and Wintrup (1995). Developments in violence literature, and more substantial exploration into the structure of the HCR-20, have resulted in two updates; HCR-20 (Webster *et al.*, 1997), and the HCR-20 version 3 (HCR-20^{V3}, Douglas, Hart, Webster & Belfrage, 2013). The HCR-20^{V3} (Webster *et al*., 2013) encompasses the SPJ approach to assess future risk of violence. The HCR-20^{V3} is inclusive of an actuarial measure of relevance and presence of items, as well as formulation and risk management. The HCR-20^{V3} consists of 20 items and comprises three subscales: Historical, Clinical and Risk management. The historical scale has 10 static factors, and the clinical subscale focuses on recent dynamic factors (emotional, cognitive and behavioral functioning). The risk management items pay attention to changeable factors which may contribute to violence, which can be considered for secure settings and community.

4.2.6 Formulation

The HCR-20^{v3} emphasises formulation, a "tool used by clinicians to relate theory to practice" (Butler, 1998, p.2). The process of formulating a client's experiences can be useful for: 1) organising information; 2) developing an understanding between client and therapist; 3) identifying connections between information; 4) to be a basis for recognising needs (i.e. intervention); and 5) a means of communicating most risk relevant factors about a client (Logan, 2014). The format of the HCR-20^{V3} assessment provides a basis for organising information to gain a better understanding of the individual's violence, which in turn provides a basis for future risk management (Douglas, Hart, Webster, Belfrage, Guy, & Wilson, 2014).

4.2.7 HCR-20 for females

The literature exploring the validity of the HCR-20 and predict violence in the female forensic population is minimal (de Vogel & de Ruiter, 2005). Studies assessing both genders tend to have a smaller sample of females compared to male counterparts (Dernevik, Grann, & Johansson, 2002; Douglas *et al*., 1999). Studies examining the usefulness of the HCR-20 tool in females have been mixed. In some studies, no significant difference of validity between males and females is found (Garcia-Mansilla, Rosenfiled & Cruise, 2011). Broken down, the HCR-20's H and C items, show greater predictive efficacy than R items for females being assessed (Coid, Yang, Ullrich, Zhang, Sizmur, Roberts, Farrington, & Rogers, 2009). For institutional violence, results are mixed, with some finding the HCR-20 has significant predictive validity for 'All' (verbal or physical) violence (AUC= .76, $p<0.01$), R (AUC= .76, $p<0.01$) and Total items (AUC= .78, $p<0.01$ O'Shea *et al*., 2015). Other results have found good AUC's; however, because of small sample sizes, they have not been significant (Strub *et al*., 2014; Green, Schneider, Griswold, Belfi, Herrera, & DeBlasi, 2016; de Vogel & Ruiter, 2005).

4.2.8 Aim

This case study aims to explore the process and the benefits of producing a collaborative HCR-20^{V3} risk assessment with a female. Research thus far has mostly taken form in retrospective and prospective cohort studies. The HCR-20^{V3} is often utilised as a tool to predict and manage violence with females in forensic settings, though the research on this is limited. Therefore this study aimed to explore the utility of the HCR-20^{V3} with a forensic female client using a single case method.

4.3 Sampling

For each referral to the MHIRT patients are screened for needs of risk assessment (self-harm, suicide, and violence). A number of clients were forwarded for a violence risk assessment utilising the HCR-$20v^3$. Each individual who completed a risk assessment were considered for write up of a single case study. Client T was chosen due to her consistent engagement and completion of the assessment. Therefore, Client T's involvement was considered to purposive sampling. It is acknowledged in this case that the sampling method is subjective and can produce inclusive bias, whereby Client T was chosen based on her engagement and adherence to the risk assessment.

Another client was considered for the case study, Client D, however she had some difficulty reviewing some items in the assessment. The historical items were particularly difficult when discussing traumatic events from her past. Therefore, it was considered to be re-traumatising, and detrimental to her care. Adaptations were made whereby we would discuss her history in a timeline of events which she considered to be negative and positive experiences, which allowed her to discuss events she was able to discuss, and how this was impacting on her risk of violence. Therefore, it is important to consider that collaborative

risk assessment should only be consider where possible, and the Risk-Need-Responsivity model (Andrews & Bonta, 2010) be applied for each case.

4.4 The Client

The Client was a forensic psychiatric patient in prison, referred to as Client T. She was referred to the Mental Health in Reach Team (MHIRT) by her GP for anxiety management. A consent form was completed by the client (Appendix P).

Client T was a Caucasian woman, who as 21 years of age when referred to the MHIRT. She was on remand awaiting her sentence at the time of the first meeting, and received a 6 year sentence during our meetings. Client T reported being happy with this as she had expected more years. She was born and raised in the same area (UK) and described having an "ok" upbringing. She stated that she felt close to her dad, but would argue with her mother. Her dad was in a band and travelled a lot, and she stated that he lived a "Rockstar" lifestyle, characterised by drinking and partying. Her mother re-married to her step-father who was attentive in her childhood, but became abusive towards her in her adolescence. Client T attended mainstream schooling, however she did not complete her education here due to her disruptive behaviour, and she later completed her education at a Pupil Referral Unit. Client T started experimenting with substances at a young age (14 years) and was socialising with a group of people who she would do substances with. She described a period of stability where she completed a degree in fine arts, but stated that she would deteriorate when romantic relationships would breakdown. When Client T was 19 years old she had a child with an older man, but quickly had to put her child in her mother's care as she experienced post-natal depression and had violent thoughts about hurting her child, which she never acted upon. The Client maintained contact with her daughter via visits, telephone calls and letters.

4.4.1 Psychometric assessment

A standard psychometric battery was completed upon her referral to the MHIRT. Client T completed the following assessments. Buss and Perry's Aggression Questionnaire (BPAQ, Buss & Perry, 1992) is a psychometric self-report measure assessing four factors; physical aggression, verbal aggression, anger and hostility. The BPAQ has revealed satisfactory reliability-retest (.72 to .80) and good internal consistency amongst the four subscales (.72 to .89) (Buss & Perry, 1992). However, the BPAQ was developed using a non-clinical, student sample and should be interpreted cautiously when applied to forensic psychiatric patient. She also completed the Generalised Anxiety Disorder-7 (GAD-7, Spitzer, Kroenke & Williams, 2006), a screening tool which queries symptoms of anxiety over the past two weeks. Spitzer and colleagues evaluated the psychometric properties of the tool on 2,739 primary care patients (male and female) and reported good internal consistency (α -.92) and test-retest reliability (ICC =.83). Lastly, she completed the Patient Health Questionnaire-9 (PHQ-9, Kroenke, Spitzer & Williams, 2001) measures severity of depression. The scale utilises DSM-IV (APA, 1994) criteria and asks patients the regularity of such symptoms in the past 2 weeks. It has been validated for use for primary care patients (Cameron, Crawford & Lawton, 2008) and for general population (Kocalevent, Hinz & Brähler, 2013). Client T's assessment scores suggested she had experienced difficulties with symptoms of anxiety and depression over the past two weeks which was considered when meeting and finding appropriate spaces to meet.

4.4.2 Forensic history

Client T was serving 6 years for attempted murder, Grievous Bodily Harm (GBH) with intent, carrying an offensive weapon, robbery and attempted robbery. The Client did not know her victim, but described her as a victim based on "opportunity" as she was looking for money to fund her substance addiction. Client T stated that this was not planned, but could not explain an alternative explanation as to why she had a weapon on her. She described

being "desperate" for money to buy substances, and saw the victim leave a shop with a handbag. She approached the victim and threatened her with a weapon, whilst demanding money. During this incident a civilian passed by and witnessed what was happening and attempted to restrain Client T. However, this resulted in a fight where the first victim received a stab wound to the arm, and the second victim was stabbed in the abdomen. Client T stated that it was never her intention to use the weapon, but she found herself in a scenario where she felt it was necessary. Prior to this, Client T had an extensive history of verbal threats and physical violence both with and without a weapon (Grievous Bodily Harm and Common assault), which had not always lead to prosecution and conviction. She stated that all of these were when she was using substances, or seeking means to access substances. This was Client T's first custodial sentence; she had previously received community orders. Client T attributed her aggressive and offending behaviours to her anxiety. She did not disregard the influence of substances, but felt that her aggression was mostly attributed to feelings of anxiety. Client T was referred to the GP and substance misuse worker to address these needs.

4.4.3 Diagnosis

Client T had a clinical diagnosis of Borderline Personality Disorder (BPD). World Health Organisation (WHO) defines Personality Disorder (PD) as a "severe disturbance in the characterological constitution and behavioural tendencies of the individual, usually involving several areas of the personality, and nearly always associated with considerable personal and social disruption" (ICD-10, p. 40). Behaviourally, Client T experienced mood instability, unstable interpersonal relationships, and engaged in self-damaging and/or impulsive behaviours, such as substance misuse. Client T also had a diagnosis of Generalised Anxiety Disorder (GAD, ICD 10 Code: F41.1), which is characterised by persistent worrying about "impending actual or imagined danger" (ICD-10, p.33). The client expressed that her anxiety became worse by the "unknown" and change. Client T reported that her index

offence had been directly linked to her experiences of anxiety.

4.4.4 Previous psychological input

Client T had previous input from community mental health team to address her anxiety. She stated that she was offered a monthly meeting with a nurse, however she did not feel that this was enough. At times she did not attend these meetings as she was not in a "good place". She felt that this was unhelpful for her and "not enough" to actually help her. She regularly attended GP appointments requesting for medications, however she felt ignored and that people did not take her seriously. She stated that she had been given leaflets for self-help, but had not completed or engaged in this well as she had chosen substances as a means of coping.

4.5 Client Considerations

Given client T's difficulties with interpersonal relationships, therapeutic rapport was a key focus. A particular emphasis was made on building trust, and being consistent. This was fundamental due to her history of unsuccessful relationships (professional, intimate and non-intimate), which had led to lack of trust and feeling as though everyone would let her down or not take her seriously. Motivational interviewing techniques were utilised to developing discrepancies, encourage self-discovery, and to provide autonomy for the client in their own care (Miller & Rollnick, 2002).

4.5.1 Behavioural monitoring

Client T's behaviour was monitored during sessions utilising mental state examinations, and from general observations of presentation and engagement. This was also monitored by other agencies in the prison. Client T's incidents of aggression were monitored via the Prison Security Intelligence Reports (SIR). The reports are based on intelligence provided by members of staff in the prison. This may include information around violence, substances and illicit property/behaviours. Positive behaviours were not recorded in a similar fashion, therefore verbal feedback from wing staff was required to gain this information.

4.6 Intervention

Client T engaged in a collaborative assessment of her own risk of violence and formulation. Collaborative risk assessment has been recommended as best practice for managing risk (Department of Health, 2007; NICE, 2015). The process of collaborative assessment of risk followed the principles set out in the Identifying Risks Programme (IRP, Braha, 2013). The IRP works within a Shared Decision-Making Model (SDM, Charles, Gafni & Whelan, 1997) which focuses on the role of clinician, patient and interaction they have to form collective understanding of risk to make informed decisions (Elwyn *et al.*, 2012). The Mental Health Act Code of Practice (2015) suggests involvement of patients in this process will empower them. This process was carried out by describing items of the HCR-20^{V3} with the client, which provided an opportunity to identify links between past experiences with current thoughts, feelings and behaviours. This process also enabled opportunities to develop discrepancies around her risk of violence.

4.6.1 Plan

Client T met criteria for a HCR-20^{v3} assessment, required formulation of specific treatment needs, and a risk management plan. Client T was offered 12 sessions. She missed one session due to heightened anxiety and she was not able to engage in conversation at that point and she chose to utilize other coping methods at the time (e.g. smoking and art work) over talking therapies.

4.7 HCR-20^{V3}

A HCR-20^{V3}was completed collaboratively, the items have been summarised here. Please refer to Table 13 for relevance and presence ratings.

4.7.1 Historical factors

4.7.1.1 H1: History of Violence

Client T was withdrawn as a child and had been a victim of violence from her mothers' partner. Her first violent incident was when she was 13 years old to "show off", and

to gain attention. She described feeling "nothing" after this attack, and was involved in fights at school, so people would be fearful of her. Client T was at her "worst" between the ages of 16 and 22 as she was involved with assaults, criminal damage, threats to kill, and domestic violence. Client T's violence has been directed towards strangers, acquaintances, family, friends, and a partner.

4.7.1.2 H2: Other Antisocial behaviour

Client T spent a lot of time "hanging around" on the streets and got involved with a "bad crowd". During this time, she lied to her parents and described her life as characterised by alcohol consumption, sleeping at "random flats" and having a lot of arguments.

4.7.2 H3: Relationships

Client T reported she had never had "normal" romantic relationships. Every relationship she described was characterised by cheating, lies, or domestic violence. She described relationships as "horrible", "turbulent", "drug fuelled", and said she had been "used and abused". She had relationships with older men, who introduced her to illegal substances and would pay her for sex. She found this fun at the time, and an easy way to make money to fund her own substance use.

Client T's relationship with her mother was also discussed as "turbulent". She described her relationship with her dad as "best friends". Client T had a daughter who was being cared for by her mother.

4.7.2.1 H4: Employment

Client T was "kicked out" of school and did not gain qualifications. She later attended a Pupil Referral Unit (PRU) and gained GCSE's, completed a foundation year, then acquired a degree in fine arts. She had not had legitimate long-term employment.

4.7.2.2 H5: Substance Use

Client T reported misusing substances, starting with cannabis from a young age and then experimenting with Class A (Cocaine and Diamorphine) substances during her adolescence. The latter developed into an addiction. Client T described being violent at times when she was using substances or seeking access to them.

4.7.2.3 H6: Major Mental Disorder

Client T's first incident of self-harm was around eleven years old. After this, she engaged in regular self-harming behaviours (e.g. cutting). She had taken purposeful overdoses in the past, usually preceded by a relationship breakdown. Client T had post-natal depression after the birth of her daughter and obtained a diagnosis of GAD. She described experiencing "horrible" ruminating thoughts which scared her.

4.7.2.4 H7: Personality Disorder

Client T had a formal diagnosis of BPD, and reported difficulties with controlling her emotions, relationships, self-harmful behaviours, sense of self, and impulsivity.

4.7.2.5 H8: Traumatic experiences

Client T was bullied at school and found her step-father "ridiculously caring". He then changed and became physically and verbally abusive. Client T disclosed being sexually assaulted twice but did not disclose any more information about this.

4.7.2.6 H9: Violent attitudes

Client T reported thoughts of violence and aggression, which she used to think were "cool". She would not have any remorse and would "go looking" for fights, because she enjoyed being violent. Client T also reported engaging with anti-social peers who would encourage her to participate in violent behaviour.

4.7.2.7 H10: Treatment or supervision response

Client T had engaged with MHIRT sessions to complete this assessment. She viewed previous services as never getting it "quite right" for her when attempting to address her anxiety and anger.

4.7.3 Clinical Factors

4.7.3.1 C1: Insight

Client T appeared to have an awareness of her mental health difficulties, and the impact on her feelings and behaviours. Client T disclosed that her mental health was not stable at the time of her offence. She did not believe she was an aggressive or violent person and described her violence as "justified", when getting revenge.

4.7.3.2 C2: Violent ideation or intent

Client T expressed violent and sadistic ideation and intent towards staff and inmates. She would write down her violent fantasies and drew pictures, which included kidnap, torture and use of weapons.

4.7.3.3 C3: Symptoms of Major Mental Disorder

Client T described her anxiety as "terrible" and had "massively impacted" on her violence. She used her mental health difficulties and substances misuse to explain why she was a violent person. Despite this, she had been manging her violence well whilst in the prison.

4.7.3.4 C4: Instability

Client T reported feeling "over emotional", worried, guilty, and angry. These emotions resulted in her not being able to cope well and utilising unhelpful thinking styles such as catastrophising, for example "if things do not go right, it is the end of the world". She also felt her behaviour was "not stable" due to her index offence and aggression. Client T reported intrusive and ruminating thoughts of violence.

4.7.3.5 C5: Treatment or supervision response

Client T attended the gym, church, psychology appointments, and employment. She was aware that she needed to keep herself occupied. During sessions, Client T engaged well and contributed. She completed between session tasks and was autonomous in her recovery by creating her own goals.

4.7.4 Risk Management Factors

Due to the length of sentence, her risk management factors were assessed regarding her being in prison.

4.7.4.1 R1: Professional Services and Plans

Client T's risk increased when she accessed substances, lacked routine, and had difficulty accessing services. However, due to her current placement, she did not appear to have problems with access to, and motivation to engage with, services.

4.7.4.2 R2: Living situation

Client T was provided with a 24-hour secure environment with some activities to provide to suit her physical, emotional and health needs. She was also under the supervision of the Mental Health In Reach Team. Client T said being around women who were violent increased her risk as they would justify and encourage it.

4.7.4.3 R3: Personal Support

Client T maintained a good relationship with her mother, father and child, and had with regular telephone contact and monthly visits. She also wrote letters to friends and family, which she felt helped her to express her emotions.

4.7.4.4 R4: Treatment or Supervision Response

There is currently no evidence to suggest Client T would not comply with treatment. During her period of instability, she still attended sessions and engaged throughout.

4.7.4.5 R5: Stress or Coping

Client T reported not coping well emotionally, which resulted in thoughts of self-harm or violence. She reported her methods of coping were; smoking, screaming/shouting,

throwing things, making threats, substance misuse, and violence. Client T therefore appeared to engage in maladaptive coping strategies, as she was artistic and enjoyed writing, but would not choose these strategies.

Table 14. *HCR-20$\boldsymbol{v^3}$ Violence risk assessment scoring for Client T*

HCR-20^{V3} items	**Presence**				**Relevance**			
	Omit	**N**	**P**	**Y**	**Omit**	**N**	**P**	**Y**
Historical Scale (History of problems with…)								
H1. Violence				✓				✓
As a child (12 and under)		✓				✓		
As an adolescent (13-17)				✓				✓
As an adult				✓				✓
H2. Other Antisocial Behaviour				✓				✓
As a child (12 and under)		✓				✓		
As an adolescent (13-17)				✓				✓
As an adult				✓				✓
H3. Relationships				✓				✓
Intimate				✓				✓
Non-intimate				✓				✓
H4. Employment				✓				✓
H5. Substances Use				✓				✓
H6. Major Mental Disorder				✓				✓
Psychotic Disorders		✓				✓		
Major Mood Disorders				✓				✓
Other Major Mental Disorders				✓				✓

H7. Personality Disorder			✓			✓
Antisocial, Psychopathic, and Dissocial		✓			✓	
Other			✓			✓
H8. Traumatic Experiences			✓			✓
Victimisation/trauma			✓			✓
Adverse childrearing experiences			✓			✓
H9. Violent Attitudes			✓			✓
H10. Treatment or supervision	✓			✓		
Clinical Scale (Recent problems with…)						
C1. Insight		✓			✓	
Mental Disorder	✓			✓		
Violence Risk		✓				✓
Need for Treatment	✓			✓		
C2. Violent Ideation or intent			✓			✓
C3. Symptoms of Major Mental disorder			✓			✓
Psychotic Disorders	✓			✓		
Major Mood Disorders			✓			✓
Other Major Mental Disorders	✓			✓		
C4. Instability		✓				✓
Affect		✓			✓	
Behavioural			✓			✓
Cognitive		✓			✓	
C5. Treatment or Supervision Response	✓				✓	
Compliance	✓			✓		
Responsiveness		✓			✓	
Risk Management (Future problems with…)						
R1. Professional Services and Plans	✓			✓		
R2. Living Situation		✓			✓	
R3. Personal Support	✓			✓		
R4. Treatment or Supervision Response		✓			✓	
Compliance	✓			✓		
Responsiveness		✓			✓	
R5. Stress or Coping			✓			✓
Future Violence/Case Prioritisation	**Serious Physical Harm**			**Imminent Violence**		
Moderate	Moderate			Moderate		

Formulation

A formulation was written using Weerasekera's (1996) four P model and is summarized below.

4.7.5 Predisposing Factors

Client T's basic needs were met as a child (i.e. clothing, shelter, food etc.), however emotional support and nurture was not provided. She has alleged that she was abused by her mother's partner, and she had a poor relationship with her mother. Client T had contact with mental health services from a young age. She had difficulties trusting people as she may have developed insecure attachments as a child following the uncertainty of the relationship with her step father, and invalidating relationship with her mother (Young, 1999).

Client T was a withdrawn child who did not socialise, did not enjoy school, and experienced bullying. Around the age of thirteen years she recalled her first violent incident, where she gained respect and attention from her peers. She reported using violence as a successful strategy to stop bullying and to gain acceptance from peers, which may have reinforced her pattern of maladaptive coping via social learning (Bandura, 1973). At this point in her life, Client T engaged with antisocial peers who would positively reinforce her violent and aggressive behaviour (Skinner, 1948). She also reported getting into a relationship with an older male who was a heroin addict and introduced her to drugs. Client T continued to use substances and reported her teenage years as characterised by this, and prostitution. Around this time, she was sexually assaulted on two occasions. Client T has a history of domestic violence as both a victim and perpetrator. Therefore, her experiences of relationships continued to be unstable throughout her adolescence.

4.7.6 Precipitating Factors

Client T reported that her anger was precipitated by feelings of anxiety. After some exploration, Client T identified that she had been aggressive in the absence of anxiety, therefore suggesting that her aggression cannot be solely attributed to her mental health difficulties. Client T's nerves would incite anxiety, and if she was unable to manage this, it would be preceded by anger. She identified that when someone disrespected her she would

become aggressive, and she described this as immediate reaction. She explained that when she perceives she has lost someone, such as a partner, she is unable to cope, and this can lead to maladaptive coping. Such emotional dysregulation and lack of effective coping is characteristic of BPD (Linehan, 1993), and may be explained by her lack of pro social modelling as a child, and maladaptive relationships during adolescence.

Further precipitating factors for aggression were unknown situations, change, and perceiving people as being "rude". Client T's earlier experiences of bullying and abuse contributed to this. Following a cognitive behavioural model, client T's core belief contributing to her behaviour was explored. She identified, "You can't trust people, they hurt you". This may be indicative of development of Early Maladaptive Schemas (EMS, Young, 1999) around mistrust/abuse, which was supported by client T's unstable upbringing and experience of abuse. Client T also acknowledged a core belief "I have to get the better of people before they get me", which may contribute to her impulsive behaviours. This belief may have formed due to her experience of bullying and learning to gain respect via violence as a means of gaining control.

4.7.7 Perpetuating Factors

The biosocial theory depicts BPD as being characterised by emotional vulnerability and inability to regulate negative affect due to environments which have been invalidating and lack stability, which create maladaptive patterns of coping (Linehan, 1993). Client T stated she is a "very sensitive" person; therefore, she could "over react" to triggers which appear inconsequential to others (e.g. "someone looking at me funny"). This may have evolved from childhood where she lacked emotional nurture and learnt to cope via isolation, and later violence.

Client T's difficulty with relationships may also contribute to her risk of violence. She explained problems with developing and maintaining relationships due to her mistrust of

others. If relationships broke down, she felt her trust was broken (mistrust schema activation), then utilises maladaptive coping which can be reckless and impulsive in nature. Such behaviours are over compensatory as she would then become aggressive and violent towards others (Young, 1999). Such behaviours have resulted in a loss of relationships as she would push them away, which reinforced her belief that people cannot be trusted and will leave her.

A further perpetuating factor, identified by Client T, was her feelings of anxiety. She described being triggered by situations where she is out of control, which would develop to feelings of anger as she feels vulnerable. Deschenes, Dugas, Fracalanza and Koerner (2012) suggest that anxiety and anger follow similar thought processes, which may explain the combination and confusion. If Client T is unable to label her emotions correctly, and adopt an effective coping strategy, this may contribute to her use of violence.

4.7.8 Protective Factors

Rogers (2000) argued that risk assessment tools only assess the likelihood of increased risk, and are therefore systematically skewed in application. Therefore, emphasis on protective factors as a means of identifying risk reducing dynamics is important. Client T had a close relationship with her father, who she was in regular contact with. She described this relationship as strong and saw him as her "best friend". Client T also had a 5-year-old daughter, who she considered a protective factor. Client T appeared to have good insight into her mental health needs and made use of legitimate coping strategies. Client T also had a strong academic background, having gained a degree in fine arts. She was talented at drawing and made use of this to aid her sessions. Lastly, Client T appeared motivated, engaged well and was responsive during sessions, at the time of assessment.

4.8 Conclusions

The General Personality and Cognitive Social Learning model (GPCSL, Andrews & Bonta, 1994; 2010) suggests experiences of antisocial environments, peers, personality characteristics (e.g. impulsivity and reckless behaviour), poor emotional regulation, and a history characterised by criminal conduct could contribute to an increased risk of violence. Following this model, Client T's risk of violence may have been considered as high; however her current behaviour, placement, and protective factors led her current risk to be considered as **moderate,** whilst she was detained within the prison estate, monitored by a regime, and under 24-hour surveillance.

4.8.1 Risk management

Risk management is "the development of a systematic approach within an organisation which allows for the planning of strategies, monitoring, reviewing accountability, and support for staff" (Titterton, 2005, p.92). Client T's risk management plan and strategies were created in a collaborative style, and written to inform the prison. The risk management plan was outlined following the guidance of the HCR-20^{V3} (Douglas, Hart, Webster & Belfrage, 2013), which suggests that three future risk scenarios are considered to assess possible future risk of violence. These include a possible escalation of violence, and a 'twist'. For Client T we considered future verbal or physical violence, violence with a weapon. As a twist we considered torture based on her drawings and fantasises which she had disclosed, which included sadistic torture of others. For this case study the possibility of verbal or physical violence is discussed, due to its imminence and relevance at the time of writing.

4.8.1.1 Nature of risk

It was assessed that Client T was likely to engage in verbal and physical aggression towards others, for example punching, kicking, pulling hair, and using available weapons (E.g. bottles, knife). It was suggested that any adult who encounters her may be at risk,

especially authoritative figures. Likely motivations for violence are to fulfil short term goals, assert control, or to get away from situations.

4.8.1.2 Severity of risk

Client T explained the consequences could be "awful" and the violence could lead to life threatening situations, like her index offence. She is likely to make use of weapons, not necessarily of an obvious nature. For example, in the past she sought out weapons using objects around her, such as a chair or a book.

4.8.1.3 Imminence of risk

Client T's violence was precipitated by verbal aggression (screaming, shouting and swearing). She described her violence as impulsive and instrumental, in that she could react to small triggers and ruminate on violent thoughts. Considering her current environment, level of apparent triggers and emotional instability, Client T's risk was considered to be imminent.

4.8.1.4 Frequency/duration of risk

Client T had frequent ideations around violence, which were detailed and sadistic in nature. She described her violence as less frequent. However, when she was violent it could be severe. Client T reported feeling overwhelming feelings of guilt and shame after incidents of violence, which stopped her from acting in this way for some time after (at least a few days).

4.8.2 Risk Management Strategies

4.8.2.1 Risk enhancing factors

This clients risk was increased when she accessed illicit substances in the community. In prison, her risk was increased when she perceived that she was not being listened to, had a change in her environment (new cell mate, move wings etc.), or felt that her trust had been broken. Therefore, it was advised to use open and regular communication, and to inform

Client T of change in a timely manner. Client T appeared to benefit from self-monitoring, therefore it was also recommended to guide her to her diary. Additionally, mandatory drug testing was used to monitor if she had access to illicit substances.

4.8.2.2 Risk-protective factors

Client T appeared to benefit from self-soothing techniques, such as: breathing, artwork and writing. She also benefited from a routine, and the gym. Ensuring Client T attended work, gym and education contributed to reduction of her risk. Client T was motivated by her daughter, and being with her family again. Therefore, she was encouraged to keep in regular contact, and to arrange a family visits, where possible.

4.8.2.3 Monitoring

Building a professional relationship was encouraged so she was able to approach members of staff when feeling distressed which could reduce risk of violence. Monitoring via the prison regime was deemed sufficient to manage Client T's risk.

4.8.2.4 Recommended Treatment

It has been suggested that females can develop poor coping methods, compared to males, in response to symptoms of anxiety (Barlow, 2001; Kelly, Tyrka, Price & Carpenter, 2008). Poor coping strategies can result in poor social cognitive process, management of emotions, and violent behaviours (Babcock *et al.*, 2003; Leschied, *et al.*, 2001). Considering this research, and following client T's formulation, a more in-depth understanding of her diagnosis would be beneficial via psychoeducation, and exploring cognitive behavioural processes contributing to her violent behaviour. Client T's treatment prior to prison was with a community MH team, who she met once a month. She did not perceive this as effective due to the time between sessions. Therefore, we met regularly on a weekly basis to build a therapeutic relationship and rapport.

Deschenes, Dugas, Fracalanza and Koerner (2012) suggest internalised anger can increase the symptoms of anxiety, and this can be detrimental to treatment. Therefore,

addressing her anger, prior to mental health intervention, was recommended. Best practice suggests interventions should be holistic, consistent and followed up (Batchelor, 2005), and follow the Risk-Need-Responsivity model (Andrews & Bonta, 2010). Considering her risk of violence, her responsivity issues due to difficulties with building trust and maladaptive coping strategies, Client T may find it more beneficial to initially work on a one to one basis.

4.8.2.5 Supervision

Client T was being managed effectively by the prison regime and appeared to benefit from this. She could speak with staff when necessary, and was monitored on a 24-hour basis by prison staff, CCTV, and the prison regime.

4.8.2.6 Victim safety planning

This referred to Client T's placement in the prison estate. Staff within the prison service was required to monitor and observe any difficulties on the wing, and manage these operationally to reduce risk. Staff were also advised to be aware of risks, and be trained in de-escalation.

4.9 Behavioural observations and considerations

For this case, behavioural changes were noted. Initially, Client T had some difficulty communicating and expressed concern around building a trust in the therapeutic relationship. However, throughout the assessment and formulation process she began to engage well, and appeared responsive by attending the sessions and engaging with the work both in session and between them. Her motivation appeared to improve as her confidence, engagement and responsiveness increased. This was observed via her good use of eye contact, calm speech, increasing use of humour, and disclosure of difficult information. The client also completed a client feedback form and commented that she felt she had received "excellent" service from the MHIRT, and that "someone was actually listening to me". This view was apparent throughout the sessions as she would make comments around enjoying talking to someone. Also, outside of sessions, Client T would make a conscious effort to approach me and

exchange pleasantries on the wing, which she had not done at the beginning of our meetings. When considering Client D, the client who had difficulty engaging in the process, it is possible that she was not ready to have such discussions. Client D had reported being traumatised by her own index offence, and the idea that she could have done this, therefore a level of guilt and shame may have also impacted on her ability to engage in a therapeutic relationship. When Client D was able to speak with me, her experience of the criminal justice system, thus far, had been characterised by punishment. She appeared to find the process of arrest, court and prison another experience of trauma, and it was theorised that I too represented the criminal justice process. Further considerations around feeling 'listened too' were that of providing an enabling environment, which provides autonomy and a reinforcing atmosphere for progress. For Client D, her experiences of anxiety were prioritised for her treatment pathway to develop strategies to be able to leave the wing and engage with any further work.

During the assessment process, Client T appeared to develop greater insight into her risk of violence as she had acknowledged her justifying thoughts, and realised her anger is not always precipitated by anxiety. She had been reporting to an officer when she was feeling anxious and was implementing effective strategies for this (e.g. time in the garden for air). She also completed work around goals and self-monitoring without prompt, and utilised her artistic skills. She had clearly spent time and effort on these pieces of work as she developed a self-portrait with words scattered over the top of her face detailing things contributing to her 'pain' (e.g. anger, unloved, relationships). Some of the words were capitalised or had been drawn over a number of times. She described this as representing her life, with the 'words' on top of her. This piece of work could not be included due to confidentiality as she had named people in her life.

Client T expressed thoughts of self-harm and aggression regularly at the start of the sessions, and these were then mentioned less frequently. It was considered that the reduction in risk disclosures was due to Client T becoming more aware that I would remain consistent; therefore she did not need to express such a need for care. When developing the formulation, the client was creative and designed a visual representation of links to understand her violent behaviour; this has been typed up for the purposes of the case study to maintain client anonymity (Appendix Q).

Client T desisted from incidents of violence for two months, according to recorded data (Figure 5). During this time, Client T reported she was making use of her diary, gym, art, or walking, as a means of coping. Although she still reported feelings of anger, she did not act on these. However, when Client T was moved wings, and informed that the therapist was leaving, she had difficulty managing her emotions and became verbally aggressive towards an officer, as indicated in Figure 5 (April). Incidents of aggression are those which were reported via the prison security, and cannot account for any incidents which may not have been reported. Other SIR's included intelligence around substance misuse, as she was heard talking about substances in her cell. Client T was subject to mandatory drugs testing, all of which were negative during this period.

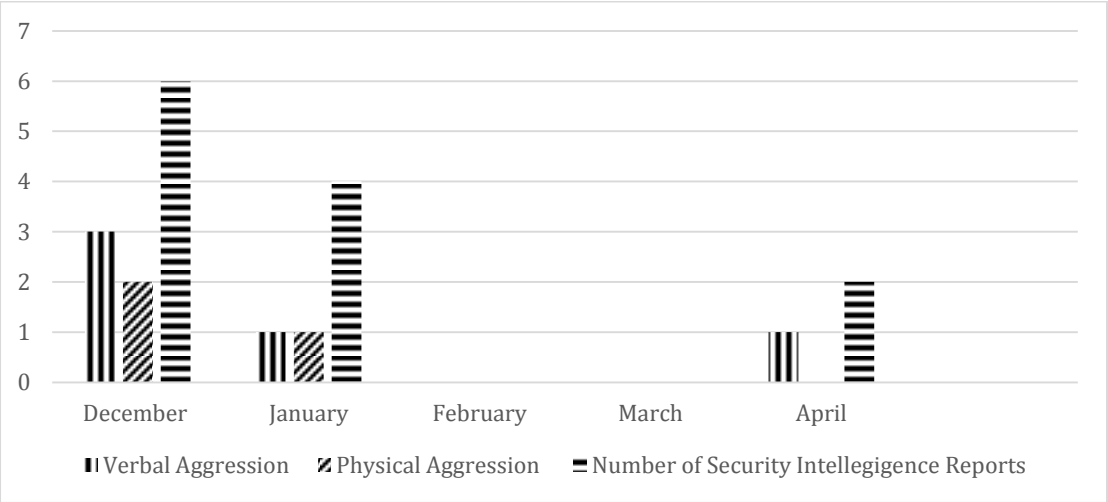


Figure 8. Incidents of verbal aggression, physical aggression and total Security Intelligence Reports for Client T from December to April

4.10 Discussion

The exploration for the collaborative process of the HCR-20^{V3} is limited. Research thus far has focused on the predictive validity of the tool, rather than the application of the tool as a format for developing collaborative risk and formulation in a forensic setting.

For this case, the process of a collaborative HCR-20^{V3} appeared to contribute to building a therapeutic relationship and developing a risk management plan. The client had reduction of incidents of violence for two months, and presented as more stable. The client also revealed behavioural changes of increased ability to adopt effective coping strategies and discuss her views of herself and the world. Developing common factors in a therapeutic relationship (e.g. empathy, warmth, mutual understanding) have been shown to correlate with client outcomes, more so than interventions themselves (Lambert & Barley, 2001). On reflection, it would seem plausible that recorded incidents and behavioural change may have been influenced by the therapeutic alliance which was characterised by consistency, which was something she had desired throughout her life. As a result, adherence to the risk management plan may have been a result of feeling heard and having a forum to express herself in a more prosocial way. It is possible that engagement with the MHIRT provided a space for Client T which was 'ordinary', and has been suggested to reduce risk (Bainbridge, 2017). By taking on a collaborative approach to understand the route to violent behaviours, whilst also developing the appropriate relational conditions may have resulted in Client T feeling accepted and valued. This provides an example of how Logan and Taylor's (2017) proposed model of care for females can be effective, whereby Client T was provided with trained staff to deliver a level of respect, with a space for autonomy in her own care. However, according to the data on incidents, the collaborative process appeared to lose its clinical applicability as the client then became verbally aggressive, had difficulties managing

her emotions and was reported to be discussing substances on the wing. It is possible that the therapeutic relationship was not sufficient, and required the extra level of care proposed by Logan and Taylor (2017) by providing a therapeutic environment. It is also considered that this relationship suffered similar experiences to the Hawthorne effect, or observer effect, (Landsberger, 1958; Franke & Kaul, 1978; Mayo, 1993), which suggests that behavioural change is temporary based on the increased attention provided, but that the novelty of the attention may reduce. However, this assumption is difficult to assess due to drawbacks in the ability to measure the concept and understand the mechanism it effects (McCambridge, Witton, & Elbourne, 2014). The content of this case may have been improved with inclusion of assessment of her perception of the therapeutic alliance and its potential influence via interviews or psychometric assessment (e.g. Working Alliance Inventory, WAI, Horvath & Greenberg, 1989).

The client commented that the formulation process was useful for collating information, and making sense of how the risk factors link. Therefore, the process of the HCR-20^{V3} guidelines as a contributing factor to behavioural change cannot be disregarded. Client T reported that she "really liked" the visual formulation as it "pulled" her life together. Therefore, providing a structure which explored relevant areas of her life and provided an opportunity to collate this appeared to also influence her understanding.

The risk management plan was devised in a collaborative format and shared with the prison. This provided an open environment and reassurance that officers had a greater understanding of her risk, and provided the opportunity for autonomy whilst in a restrictive and controlled setting. According to data recording incidents of violence, it appears the risk management plan was effective over a period of two months. Therefore, this case study suggests that the structure and process of the HCR-20^{V3} combined with therapeutic alliance resulted in improved insight and management of violence in the short term.

A further consideration of behavioural change may have been the client understands that the therapeutic relationship would be coming to an end as she was being handed over to another therapist. It is possible that this loss of relationship could have been interpreted as feeling rejected or let down. The client had spent much of her life coping with rejection via substance abuse and violence. Therefore, it may be considered as a development in management strategies that she reacted to this news with some irritability and uncertainty, and was able to refrain from substance sue of physical violence.

4.10.1 Considerations for this case study

The sampling method utilised in this case study is considered to be subjective and can produce inclusive bias, whereby Client T was chosen based on her engagement and adherence to the risk assessment. Therefore, the outcomes are viewed tentatively as she expressed motivation for change, and was prepared to take steps towards change (Prochaska & Velicer, 1997). It would appear likely that an individual seeking aid to change, who engages well and is able to discuss historical influences on behaviour both independently and in session would produce positive outcomes, compared to Client D, an individual who is not ready for change, not prepared to discuss their risk, and had more difficulty building a therapeutic alliance.

On reflection of this piece of work, it became apparent that the formulation stood out as a crucial element of the process for the client. A formulation is an attempt at understanding the complex problems, and can inform treatment and allocation of appropriate services. Therefore, ensuring quality of such a piece of work is essential to produce clinically valid decisions. McMurran, Logan and Hart (2012) devised a Case Formulation Quality Checklist (CFQC) which consists of 10 items which have been developed from Hart, Sturney, Logan, & McMurran's (2011) recommendations for quality case formulation. Each item provides a four-point scale (1=does not meet this criterion, to 4= meets this criterion well). The ratings

can be summed to provide a level of quality of the written formulation, and can identify areas in which the formulation lacks quality. The tool has revealed good reliability and internal consistency (McMurran, Logan & Hart, 2012). Application of this tool can aid in developing formulations which are of value to both the client and service. On reflection, applying this tool could have improved the quality of the formulation and in turn the client's insight and risk management. And so, the application of the CFQC could have significantly improved this single case study and it is recommended for future research and to improve consistency clinical formulation.

4.10.2 Practical issues of the HCR-20^{V3}

The practical utility of the HCR-20^{v3} is limited. Firstly, when conducting collaboratively it can take a considerable amount of time. It is also time consuming to read as a document, particularly for other agencies/individuals, such as officers. In addition, the assessment explores individual's past and focuses on emotive topics. This can cause some distress, and therapists need to be mindful of re-traumatising the client, whilst maintaining focus on the future risk element of the assessment. A further important consideration here is to develop rapport and therapeutic alliance to encourage development of discrepancies between client self-rapport and recorded information.

A further significant consideration of the HCR-20^{v3} as a collaborative tool became apparent when sampling for this case study. Client D was eliminated to be written up for this case study due to her lack of engagement, and inability to discuss themes from her past. This leads us to consider the potentially re-traumatising effect of collaborative risk assessment. It is acknowledged that collaboration can empower and encourage autonomy, but what about those who are not ready, nor able to manage such independence? Clinicians are bound to adhere to ethical practices, and are recommended to be trauma-informed as an organisation and as a therapist. Therefore, the process of a collaborative risk assessment may have

produced positive outcomes for this case, but it appears that this intervention was responsive and appropriate to the client's needs and abilities. As a result, this study would recommend collaborative risk assessment and formulation using the HCR-20^{v3} model; however this should only be applied to individuals who are assessed as able and ready to engage in such a process.

4.10.3 Recommendations

Future research may benefit from further exploring the collaborative process of risk assessment and the impact of the therapeutic relationship on this process. For future case studies, authors may also consider utilising the McMurran, Logan and Hart's (2012) CFQC to ensure a high quality formulation to inform risk management.

This case study utilised the HCR-20^{V3} only, and did not explore what are considered to be 'female-specific' additional items. Although the addition of the Female Additional Manual (FAM, de Vogel, de Vries Robbe, van Kalmthout & Place, 2011) items may not be necessary, it may be worth considering the content of the additional items and if these play a role in the individuals risk. For example, considering an item recommended by the FAM, such as 'pregnancy at a young age' as a factor under 'traumatic experiences' may be more effective than having additional items.

4.10.4 Conclusions

This single case study has demonstrated that a collaborative risk assessment following the structure of the HCR-20^{V3} can aid in developing insight and a collective risk management plan. This case suggests that engaging in this process can be therapeutically rewarding, reduce risks in the short term and can provide autonomy in clients future care pathways. This case has also revealed that collaborative violence risk assessment is not applicable to all patients and requires a patient-centred approach to considering appropriateness and method. A final conclusion from this piece of work is the importance of the therapeutic relationship

on the process of any collaborative work. For this client, the role of therapeutic alliance appears to have contributed to her ability to engage in the work, and behavioural changes. Therefore, it is recommended that this be of greater focus in clinical practice and when training for interventions.

5 Chapter Five: Methodological Critique

Appraisal of the Female Additional Manual (FAM) for assessing risk for violence in women

5.1 Abstract

This critique provides an overview of the Female Additional Manual (FAM, de Vogel, de Vries Robber, Kalmthout, Van & Place, 2014) as a novel risk assessment tool for predicting risk of violence with female populations. The Historical Clinical Risk Management-20 tool (HCR-20, Webster, Eaves, Douglas & Wintrup, 1995, Webster, Douglas, Eaves & Hart, 1997; Douglas, Hart, Webster & Belfrage, 2013) has been utilised with females in clinical practice, though primarily developed and validated on male samples. The FAM was developed in response to the need for a gender-sensitive risk assessment for violence, and was updated in 2014 to be used as an extension alongside the HCR-20v^3. The FAM is still in its infancy and has limited empirical research to date. This critique explored the properties and research implications of the FAM.

5.2 Introduction

Violence risk assessment is defined as "the attempt to predict the likelihood of future offending in order to identify individuals in need of intervention" (Brown & Singh, 2014, pp. 49). Risk assessments have predominantly been established and validated with male samples, then applied to female cohorts (McKeown, 2010). Males and females are suggested to have distinct predictors for risk of future violence (Muller & Kempes, 2016), which questions the

clinical utility of existing male-oriented tools tools for females. A gender-specific tool designed to be utilised with females has been developed, the Female Additional Manual (FAM, de Vogel, de Vries Robber, Kalmthout, Van & Place, 2014). The FAM promotes additional guidelines to SPJ tools, such as the Historical Clinical Risk-20 management tool (HCR-20, Webster, Eaves, Douglas & Wintrup, 1995, Webster, Douglas, Eaves & Hart, 1997; HCR-20v^3, Douglas, Hart, Webster & Belfrage, 2013). This review intends to outline the development of the tool and critically evaluate the validity, reliability and clinical value of the FAM, based on the research so far.

5.2.1 The HCR-20

The HCR-20 provides an empirically based framework for clinicians to predict future risk of violence (Douglas *et al*, 2014). Early research on the HCR-20 was conducted with male samples only (Douglas, & Webster, 1999; Strand, *et al.*, 1999), with only later research including small samples of females (E.g. Gray, Taylor & Snowden, 2008).

Research into the clinical utility of the HCR-20 across genders has mixed results, with some studies suggesting good predictive validity for females (Geraghty & Woodhams, 2015) and others showing poor predictive validity (de Vogel & Ruiter, 2005). It has been suggested that risk assessment tools designed for specific populations have greater predictive validity than those designed for a breadth of populations (Singh, Grann & Fazel, 2011). As there is a narrowing gender gap for incidents of violence in institutional settings (Greig, 2014; de Vogel & Ruiter 2005), it is important to investigate the validation of risk assessment tools for specific populations, such as females (de Vogel et al., 2014).

5.2.2 The need for the FAM

The FAM was developed in response to the need for gender-sensitive additional guidelines and are based on the HCR-20, and designed for mental health professionals to assess risk of violence exclusively with women. The FAM authors suggest that Singh, Grann,

& Fazel's (2011) conclusion that risk assessments are more valid when specified to a particular group can be applied when considering risk for females. Female violence is a phenomenon which is under researched due to the lower prevalence and small samples to evaluate. However, de Vogel *et al.* (2014) suggest that mental health professionals are calling for a gender sensitive tool when considering risk assessment, based on clinical experience and varying outcomes of pathways to violence between genders. Adams (2002) explored views of professionals working with domestic violence and found that there was a lack of appropriate guidelines for assessing and managing violent females. Further justification for the development of the tool has been the growing research of familial effects on violence including Bandura's (1977) Social Learning Theory (SLT), where female youths were more likely to mimic the behaviours of those with similar characteristics, such as adult females. This theory also suggested that children were more likely to mimic a behaviour they think they should perform. And so, for children with violent mothers it has been found that they are more likely to be disruptive and aggressive (Kim *et al*, 2009). Therefore, de Vogel and colleagues (2014) argue that female violence is an emerging issue which has little understanding or guidelines for assessing, and therefore developed the tool due to the need for a gender-sensitive risk assessment tool.

5.2.3 The development on the FAM

The first draft of the FAM was formulated in 2007 and based on empirical literature and interviews with experienced clinicians (Van Kalmthout & Place, 2007); de Vogel *et al*, 2013). De Vogel and colleagues researched and validated this tool in a psychiatric hospital in the Netherlands, which resulted in a revision of the FAM which they called the Female Additional Manual: Research Version (FAM:RV, De Vogel, De Vries Robbe, Van Kalmthout, & Place, 2010). The FAM:RV was piloted by Stam (2010) which led to further adjustments to items based on poor inter-rater reliability and suitability for females.

The FAM has been modified in response to the updated HCR-20v^3 (Douglas, Hart, Webster & Belfrage, 2013). The FAM includes adaptations to two historical HCR-20 items (Table 15) and nine additional items (Table 16) which are empirically based risk factors, suggested to be specifically associated with female violence. The FAM also assessed Harm and Imminent Violence, as well as additional risk ratings for Self-destructive Behaviour, Victimization and Non-Violent Criminal Behaviour. All of the final risk ratings are scored on a 5-point scale (i.e. Low, low Moderate, Moderate, Moderate High and, High, de Vogel, *et* al., 2014). The FAM also includes final risk ratings for Future Violence, Serious Physical

The FAM's definition of violence is similar to that of the HCR-20: "actual attempted or threatened infliction of bodily harm on another person" (Douglas *et al*., 2013, p.36). However, the FAM professional manual suggests an extension of this to include "influencing someone else to commit violence or being an accessory to violence" (De Vogel *et al*, 2014, p. 34) in response to the nature of female criminality.

5.2.4 Reviewing the FAM

This review explores the validity and reliability of the FAM properties, and the research and clinical implications. Literature reviewing this tool is limited, so research conducted on all versions of the FAM have been covered.

Table 15. *A summary of the FAM adaptations to the HCR-20v^3 items (de Vogel, et al., 2014)*

Historical items (H)	
HCR-20v^3 **items**	**FAM adaptations**

H7 – Personality Disorder	H7 – Personality Disorder
a. Antisocial, Psychopathic, and dissocial.	a. Antisocial, Psychopathic, and dissocial.
b. Other	b. Other:
	1. Cluster B (other than antisocial) or traits of suspiciousness.
	2. Other Personality Disorders
H8 – Traumatic Experiences	H8 – Traumatic Experiences
a. Victimisation/Trauma	a. Victimisation/Trauma
b. Adverse Childhood Experiences	1. During Childhood
	2. After Childhood

Table 16. *A summary of the FAM additional items to the HCR-20v^3 (de Vogel, et al., 2014)*

HCR-20v^3 **items**	**FAM Additional items**
Historical (H)	

H1 – Violence	H11 – Prostitution
H2 – Other Antisocial Behaviour	H12 – Parenting difficulties
H3 – Relationships	H13 – Pregnancy at a Young Age
H4 – Employment	H14 – Suicidality/Self-harm
H5 – Substance Use	
H6 – Major Mental Disorder	
H7 – Personality Disorder	
H8 – Traumatic Experiences	
H9 – Violent Attitudes	
H10 – Treatment or Supervision Response	
Clinical (C)	
C1 -Insight	C6 – Covert/Manipulative Behaviour
C2 – Violent Ideation or Intent	C7- Low Self-Esteem
C3 – Symptoms or Major Mental Disorder	
C4 - Instability	
C5- Treatment and Supervision	
Risk (R)	
R1 – Professional Service Plans	R6- Problematic Child Care Responsibility
R2 – Living Situation	R7 - Problematic Intimate Relationship
R3 – Personal Support	
R4 – Treatment and Supervision	
R5 - Stress or Coping	

5.3 Reliability

5.3.1 Inter-rater Reliability

Inter-rater reliability refers to the extent to which two independent raters coding the same information for the same case coincide (Gwet, 2014). This concept can be calculated

using Kappa or Intraclass Correlation Coefficient (ICC). The ICC is interpreted as 'Excellent' (ICC= ≥ .75), 'Good' (ICC= .60 to.75), 'Moderate' (ICC= .40 to .60), and 'Bad' (ICC = <0.40) (Fleiss & Shrout, 1978). A preliminary study carried out by Stam (2010) investigated the psychometric properties of the FAM for 42 females and 42 matched males. Inter-rater reliability was assessed by two independent raters (*N*=20). Additional and adapted items for the FAM revealed excellent to good inter-rater reliability (See Table 17), most of which were significant, apart from R6 (Problematic Child Care Responsibility). The total score of the FAM and final risk judgement for predicting 'Future Violence' revealed excellent reliability (ICC =.94, p<.001, ICC=.95, p<0.001, respectively). For the additional final risk judgements of Self-destructive Behaviour, Victimization, and Non-Violent Criminal Behaviour, moderate to excellent reliability was found (ICC= .85, .54, .73, p< .001, respectively). This study was a respectable start for assessing the inter-rater reliability of the FAM as it focused on formal assessment of real patients, with almost half being rated by two independent assessors.

Greig's (2014) exploration of the FAM in a sample of 41 female civil psychiatric patients also suggested excellent reliability for the total score (ICC=0.86, p<.017). Two raters completed 10 of the FAM assessments and found further excellent inter-rater reliability for, Historical (ICC= .90, p = .007), Clinical (ICC=.83, p =.025) and, Risk (ICC= .86, p = .017) sub-scale means. This study also found excellent reliability for 'Future Violence' risk judgement (5-point scale; ICC= .92, p =.003). Similar to Stam (2010), the inter-rater reliability for the FAM's additional final risk judgements, 'Self-destructive Behaviour' and 'Victimization' resulted in non-significant ICCs (.62 and .66, respectively), which may be attributed to the small sample size. De Vogel and De Vries Robbe (2013) have suggested that the FAM is not for predicting future risk of self-harm/suicide, and that the final risk judgements should be considered as provisional and require further exploration.

5.4 Internal Consistency

Good Internal consistency would suggest that all scale items measure the same construct (Wang, 2014). With regards to the FAM, this would be the degree to which the items determine future violence for females. Stam (2010) reported good internal consistency for the integrated scores (HCR-20 and FAM items) for the H, R and total scores (α = .70, .86 and .85, respectively). For the C sub-scale, a moderate internal consistency was found, α =.58.

Stam's (2010) findings were from a preliminary study which utilised the FAM-RV (De Vogel *et al.*, 2010). The FAM has been updated following the third revision of the HCR-20, therefore, statistical analysis on the up to date FAM items is also required.

5.5 Validity

Validity refers to whether an assessment actually measures, what it claims to measure (McLeod, 2013). For the FAM, this would be assessing whether it truly assess actual violent behaviour for female samples.

5.5.1 Face Validity

Face validity is a less scientific form of validity and refers to the whether the tool appears to measure what it is intended (McLeod, 2013). Each additional and adapted item of the FAM has empirical support of its link to violence in females, each of which appear to be relevant, which suggests a level of face validity. The FAM follows a SPJ approach which has been found as a valid method for assessing risk of violence (Graf & Dittmann, 2010), which also contributes to inherent face validity.

5.5.2 Predictive Validity

The concept of predictive validity refers to the ability of a test gathered at time one to predict an outcome on a related measure at time two (McLeod, 2013). With regards to the FAM, predictive validity refers to the tools ability to be able to predict the risk of future violence for adult females. Predictive validity is commonly measured using the, Receiver

Operating Characteristic (ROC) Area Under the Curve (AUC) coefficient statistic. This measures the associations between risk assessment constructs and a dichotomous outcome, such as violent or not, and plots sensitivity against specificity to produce a coefficient between 1 (perfect predictive value) and 0.5 (no predictive value).

De Vogel and De Vries Robbe (2010) conducted a preliminary study of 46 females and reported moderate to large effect sizes for the FAM's H, C, and R items (See Table 17), and total score (AUC = .76, $p< 0.05$). For predictions of future violence to others, self-destructive behaviour (later defined as suicidality) and non-violent criminal behaviour had large effect sizes (AUC=87, .97 and .99, respectively).

Grieg's (2014) research measured the predictive accuracy of the FAM with a two year follow up examining subsequent violence (threatening, physical to others, physical to property, and sexual). Grieg documented the violence and conducted 6 monthly routine follow-up FAM assessments. For the 0-6-month follow-up, moderate violence prediction effect sizes were found for the FAM's total H, C, and total score (AUC= .69, .68, .70, respectively). For the longer-term follow-up (6-12 months) the C scale (AUC=.73) had a larger effect size than the shorter follow-up, whereas the H scale (AUC= .62) and the total score AUC=.67) had reduced. And so, only the FAM's total C scale maintained predictive validity across time.

With regards to type of violence, the FAM had significant predictive validity for threatening behaviour from the H scale (AUC= .72, $p< .05$), C (AUC= .76, $p< .05$), total score (AUC= .73, $p< .05$) and final risk judgements (AUC .85 to .87, $p< .001$). However, the FAMS prediction for physical violence towards others was no better than chance for the H, C ad R items, total score and risk judgements (AUC's ranging from .50 to .57). Similar results

were found for physical violence towards property.

FAM prediction of violence severity, showed low to moderate AUC's. AUC predictions of high violence severity were statistically significant ($p < .05$) for the H (.76), C (.72), and Total Score (.76). Hence, the FAM has good predictive efficacy for forecasting violent incidents of a more serious nature. Grieg (2014) suggests that the FAM is better suited at predicting violence over a long period, the C items being particularly effective. Grieg's (2014) study has provided a noteworthy introduction to the predictive validity of the FAM, making use of a longitudinal design and exploring the effect of type of violence, time and severity. However, Grieg's (2014) sample of civil psychiatric patients may have impacted on the results as incidents of violence for psychiatric patients would be expected to be lower compared with forensic psychiatric samples, due to the nature of the hospital that they are in (Bowers *et al.*, 2011).

Table 17.
Predictive Validity and ICC outcomes for the FAM and sample characteristics

Study	Sample	Sample Size	Follow-up	Location	Inter-Rater Reliability (ICC)				Predictive Validity for violence (AUC)			
					H	C	R	Total	H	C	R	Total
Stam (2010)	Forensic Psychiatric	42 males 42 females	8.5 Months	Netherlands	.98	.88	.77	.94				
De Vogel and De Vries Robbé (2010)	Forensic Psychiatric	46		Netherlands					.66	.83*	.71	.76*
Greig (2014)	Psychiatric	41	2 years (recorded 6-month intervals)	Canada	.90	.83	.86	.86	.67	.70	.54	.68
				Mean	**.94**	**.86**	**.82**	**.90**	**.67**	**.77**	**.63**	**.72**
Overall		**129 females 42 males**										

Note. For ICC's p<.001 to p<.05 applies.

(Greig (2014) AUC scores taken from Violence between 0-12 months after FAM assessment.)

** = p< .05.*

5.5.3 Incremental Validity

Incremental validity measures ability to measure risk of violence for females over other existing assessments, such as the HCR-20. Greig (2014) intended on exploring the incremental validity of the FAM to the HCR-20, however no significant associations were found between the HCR-20 and FAM items for violence in the first place. Therefore, statistical exploration into the incremental validity was not carried out. Greig's (2010) limited sample size is likely to have also contributed to the lack of significant findings. Thus far, there is no evidence that the FAM has incremental value, but this is because the work has not been done.

5.5.4 Concurrent validity

Concurrent validity assesses awareness comparability to other equivalent risk assessment tools. As the FAM was developed in response to a gender-sensitive risk tool, there is not a specific measure for females to compare the FAM too.

Comparing the FAM to the HCR-20 is a critical developmental step for the progress of the FAM. Both tools have similar characteristics, with regards to items and scoring processes (de Vogel *et al*, 2014), and it should therefore be expected that a level of correlation would exist. Stam (2010) found females scored higher than males for 7 of the 9 additional/ adapted items (H11, H13, H14, H8a1, C6, C7, and R7), however this was only significant for the R scale and total score. Further research is required to understand if the items are specifically linked to females or whether this is an extension of the HCR-20^{V3} as these may be similarly applicable to males. Therefore, research thus far indicates that the FAM is a developing gender-sensitive tool. Future research would benefit from a comparison of the FAM to other assessment measures distinctively assessing female violence.

5.5.5 Content Validity

Content validity refers to the clarity of the items as measures of all aspects of

violence. The FAM focusses on risk factors which have been empirically associated with female violence, such as prostitution (Morgan & Patton, 2002), parenting difficulties (Messer, *et al*, 2004; Van Voorhis, *et al.*, 2010) and pregnancy at a young age (Messer, *et al*, 2004). Research on these factors to understand male violence is generally not explored, such as becoming a father at a young age and how this impacts risk. Further uncertainty would be application to transgender populations. De Vogel, Stam, Bouman, ter Horst & Lancel, 2015) assessed 275 male and female patients to identify characteristics and violence risk factors. They found that females experienced a more complex history of victimisation, and were more often diagnosed with borderline personality disorder, suggesting content validity for some of the additional items on the FAM. This research was restricted to Dutch forensic patients. Future research would benefit from replicating across countries and forensic settings.

5.6 Clinical utility

The clinical utility of the measure depicts the applicability of the tool to be utilised by mental health professionals to predict risk of future violence in females. This includes the application of the tool and the validity of predicting the outcome. The FAM has limited research of its application in a clinical setting. Despite the lack of research, De Vogel and De Vries Robbe (2013) propose that the FAM will be "clinically valuable" for professionals working with females (p. 235, Johnstone & Logan, 2013), but suggest that the similar caution can be taken with the FAM and the HCR-20 when assessing the clinical utility for females, as the same relevant risk factors are utilised on both assessments.

The FAM utilises a SPJ approach to measure violence in forensic settings (Graf & Dittman, 2010). The FAM suggests protective factors to be assessed using the Structured Assessment of Protective Factors (SAPROF, De Vogel, De Ruiter, Bouman & De Vries Robbe, 2011) which also has research to suggest validity when applied to female patients (De Vries Robbe, 2014).

De Vogel and De Vries Robbe (2013) conducted a case study with a 30-year old female who had previous incidents of violence and had been admitted to inpatient psychiatric services. Conceptualisation of future risk management and treatment were formulated using the FAM, and it was concluded that the additional recommendations were best provided by some of the dynamic risk factors of the FAM.

5.6.1 The FAM's additional guidelines

The FAM's additional guidelines were developed from clinicians views and existing research. Some of the additions will be reviewed here, for further details refer to the female additional manual (de Vogel, de Vries Robbe, van Kalmthout, & Place, 2014). For the H factors, the FAM suggests that lower cut off levels for Psychopathy should be considered for females following the research (Logan, 2009; Nicholls, Ogloff, Brink & Spidel, 2005). Further evidence since the publication of the FAM suggests that male and female psychopathy can vary in presentation and traits (Smith, Gacono, & Cunliffe, 2018). Therefore consideration of traits and the link to violence for both males and females would also be important to understanding violence than observing an overall rating.

De Vogel and colleagues note an additional item of 'prostitution' (H11) and argue that both forced and voluntary prostitution can be considered as a risk factor for violence due to the links to vulnerability and anti-social life styles. However, National UK statistics (2014) suggests that 42 per cent of the sex workers are male; therefore the prevalence of the risk appears relevant for both males and females and should be considered for both. Furthermore, 'parenting difficulties' (H12) acknowledges the stress of parenthood, particularly for single mothers. This item, again, could be relevant for males. One point which de Vogel *et al.* (2014) highlighted is that research has identified a link between difficult parenting, frustration and females committing domestic violence (Simmons, Lehmann, & Dia, 2010). Typically domestic violence has been viewed by society as male violence towards females;

therefore it would seem imperative for risk assessors to consider the impact of stressful parenting when assessing males.

Similarly, 'pregnancy at a young age' (H13) can be difficult for the father of the child. De Vogel *et al.,* (2014) acknowledge the biological and limited opportunities for development for females who are pregnant from an early age, and may be a useful consideration when assessing traumatic experiences (H8) for females. Lastly, for the historical subscale the FAM suggests that the additional item 'suicidality/self-harm' (H14) should be considered for females following the evidence suggesting a relationship between suicidal thoughts and criminal behaviour (Benda, 2005; Wilkins & Coid, 1991). However it is not clarified why this is considered as a separate item when the HCR-20^{V3} manual recommends this under the 'major mental disorder' (H6). Similarly to the other FAM recommended guidelines, H14 is another reminder for assessors to be more thoughtful of the impact of suicidality and self-harm and the impact on violence.

For the clinical items, the FAM recommends considerations for 'covert/manipulative behaviours' (C6), which the authors acknowledge does not have any direct empirical evidence for its links to violence, but alludes to findings suggesting that females utilise more indirect forms of violence (Hess & Hagen, 2006). This item does hold a level of face validity, in that manipulative behaviours seem likely to be present in individuals who may engage in violent behaviours. However, research exploring if a direct link exists is required in order to be inclusive as an empirically evidenced risk factor. Similarly to the other risk factors, assessment of 'self-esteem' (C7) as a risk factor solely attributed to females is assumptive that males may not experience this, and therefore requires future exploration.

For the risk management items, the FAM suggests problems with 'child care responsibilities' (R6) and 'intimate relationships' (R7) can contribute to future risk of

violence for females. De Vogel and colleagues suggests that females in a relationship with an antisocial partner are more likely to be victims or may commit violence with their partners. This can be assumptive that females in relationships with anti-social partners do not already hold anti-social views themselves. Furthermore, this additional guideline may be more relevant to the 'personal support' (R3) and 'stress and coping' (R5) items of the HCR-20^{V3} to identify problems with support and effective management.

5.7 Clinical practice issues

Completing the FAM is somewhat similar to completing the HCR-20. The additional items would inevitably require more time to complete the assessment. FAM guidance recommends scoring be informed by multiple sources of information, as well as clinical interview with the client. In some circumstances access to such sources or the patient may be somewhat restricted.

5.8 Considerations from this review

The aim of this critique was to review the current research to assess its reliability and validity for the FAM as a violence risk assessment for females. This additional assessment tool does encompass the SPJ approach, which has been considered as a valid approach to risk assessment. The development of the FAM was justified by a literature review and interview with clinicians, suggesting that not enough is known to have guidelines for assessing risk in females, with very few studies assessing the HCR-20 for females. The limited results for the FAM thus far are supportive of the additional items, however not specifically for females. Therefore, it would have perhaps been more beneficial to develop the research on the utility of the HCR-20^{V3} with female populations prior to developing a tool which asserts to be gender specific.

Furthermore, the FAM claims to be 'gender-sensitive' and more predictive and relevant to female violence. However, as discussed, the items are validated with limited

research and the authors of the FAM do not appear to acknowledge the possibility of risk factors being similarly relevant for male populations. It may be that 'prostitution' appears to be more relevant for females; however prostitution is not exclusively a female behaviour. Therefore, prevalence of this item may be higher for females, but as a consideration for contribution to violence, it may be just as relevant for a male. The HCR-20^{V3} is a tool which provides *guidelines* for risk assessment, and therefore is considered to be a base for thought around violence. Consequently, there is no evidence to suggest that these idiosyncratic factors are not already considered by trained HCR-20^{V3} assessors. Therefore, the concept of a female specific tool and items adding incremental validity to risk assessment seems premature at this stage. However, adding thought to the suggested additional items, if relevant to the individual, may be clinically beneficial for the assessment and formulation of violence.

With regards to the research on the FAM, it has mostly been completed or supervised by the authors of the FAM, at the Van der Hoeven Clinic, Netherlands (De Vogel *et* al., 2014). Of the research, much is unpublished or unavailable at present. Therefore, an understanding of the utility of the FAM in a breadth of samples and populations by independent researchers is yet to be explored.

5.8.1 Future research

Exploration into the current validity and applicability of the HCR-20^{V3} for females in clinical settings would be beneficial to add to the literature and understand if differential trajectories of violence require an individualised approach to risk assessment. The properties of the FAM revealed a good level of inter-rater reliability and predictive validity, and therefore should continue to be examined across genders to assess the appropriateness when considering risk of violence. With regards to the HCR-20v3, future research in this area may

explore adding these considerations to already existing items or considering the incremental validity of the additional items for males and females. Further research would benefit from case control designs to reliably assess its use and added validity to risk assessment and to assess whether having additional FAM items provides greater predictive efficacy for risk of violence, and higher quality formulation and risk management plans than using the HCR-20^{V3} items alone.

5.8.2 Conclusions

In conclusion, limited research and literature provides little justification for developing a female specific tool. The additional and adapted items have revealed varying effectiveness, and have provided a tentative view of the FAM's possible validity across forensic and non-forensic psychiatric settings. Research thus far has involved small sample sizes, much unpublished data, with subsequent comparisons and examination being necessarily limited. While there is mixed literature on applicability of the HCR-20 as a risk assessment tool for females, a more gender responsive approach would be to develop the literature on current female risk assessment.

6 Chapter Six: Conclusion

This thesis investigated the HCR-20 to explore its application for females. This research consisted of chapters examining the existing research on the HCR-20 and its predictive validity for females, then an empirical exploration into the effect of gender on the predicative efficacy of the HCR-20v^3. Understanding the implementation of the HCR-20v^3 as a collaborative clinical assessment was explored on an individual level. Lastly, the properties and application of additional guidelines for females, the FAM, was examined and critiqued.

6.1 Overview of chapters

A systematic approach was adopted to review the published research on the application of the HCR-20 for females in diverse settings, and for various types of violence. Research for the HCR-20 is considered to be empirically sound, and the scale has been translated to 20 different languages, and evaluated across 35 countries (Douglas *et al*., 2013). However, a systematic search revealed only 10 studies exclusively assessing predictive efficacy with female populations. A meta-analysis found a large effect for H items when predicting recidivism, whereas R items suggested a lower effect. For predicting violence, H, C, R and Total items revealed low to moderate effects. Therefore, the current literature is mixed and inconsistent regarding the predictive efficacy of the HCR-20 with females. The systematic overview provided a clearer picture of the current research, and warranted the

need for further exploration for females due to the mixed outcomes. The characteristics of the ten studies represented different sample demographics and measures for outcomes of violence or recidivism, therefore the outcomes thus far are inconsistent and not generalisable. This chapter of the thesis highlighted the need for further research across settings to explore the applicability of the HCR-20 for violence risk prediction for female populations.

The HCR-20 v^3 is the most up to date version of the risk assessment tool. Nonetheless, exploration into this tool is still in the early stages. Following the outcome for the systematic review and meta-analysis, the empirical research presented in this thesis sought to explore the effect of gender on predictive efficacy of the HCR-20v^3 to add to the growing literature for the updated tool. This piece of research assessed a psychiatric sample, measuring different types of in-patient violence. Contemporary research suggests that the gender gap for violent incidents is closing and suggests no significant gender differences for in-patient violence (Nicholls, Ogloff, Douglas & Grant, 2004; MoJ, 2015; Sturup, Monohan, & Kristiansson, 2013). When conducting the systematic review, heterogeneity of methodology resulted in difficulties with data extraction and organisation. The empirical research here utilised the RAGEE (Singh *et al,* 2014) guidelines as a means of maintaining a standard of quality and consistency for risk assessment research. The methodology utilised a matched sample, to control for confounding variables. There were no significant differences between male and female incidents of violence, except males had higher rates of sexual aggression. It was found that the HCR-20v^3 is an effective tool for predicting verbal and physical violence in both males and females. This was an important addition to existing research as it replicates the predictive efficacy of the HCR-20v^3, and is in line with previous findings (de Vogel & de Ruiter, 2005; Nicholls, Ogloff & Douglas, 2004). This piece of

research was also important as it contributed to the currently limited data available for females.

The meta-analysis and empirical research in this thesis presented an exploration into the actuarial element of the HCR-20. The HCR-20v^3, and any SPJ tool, encompasses the element of formulation and risk management plans. Research exploring the development and application of formulation for risk of violence is in need of development (Logan, 2014). Empirical research into this area can be methodologically problematic, and would require longitudinal designs with a sound qualitative approach to explore the development and application of formulation to risk management. This thesis sought to address with limited time and resources, and therefore adopted a qualitative approach to collaborative risk assessment by completing a single case study with a female offender. The process of collaborative risk assessment is recommended where practicable (Department of Health, 2007; NICE, 2015), and in the current case revealed some clinical change, and thought around ability to engage with collaborative assessment of violence risk. For this case, the client developed insight into her violent behaviours, and discovered a means of managing them in the short term. This particular case elicited thought around which processes were involved with the behavioural change, and considered the therapeutic relationship, consistency, and the contribution of the process of the HCR-20v^3 clinical interview and collaborative risk management and formulation. Future research would benefit from utilising research methods where results are more generalisable to the population being studied, which explores the qualitative application of collaborative risk assessment.

The final chapter provided a critique on the proposed gender sensitive risk assessment tool, the FAM (de Vogel, de Vries Robber, Kalmthout, Van & Place, 2014). The FAM

provides recommended extensions to the HCR-20 v^3 items, and claims that these considerations are risk factors which have been empirically linked to female risk of violence. This was an area of interest as the current research has revealed mixed outcomes for females. The FAM is still in the early stages of empirical examination. This critique revealed that the FAM can be thought provoking for a HCR-20v^3 assessor when conducting a risk assessment; however this may be just as valid when conducting with males. The additional items or extensions did not reveal empirical evidence to exclusively link the risk factors to females, and the current research is limited, unpublished, and with little compelling evidence that it significantly improves risk estimates over a HCR-20v^3. Further research is required to investigate the additional items and if this tool is a necessary additional when working with females in clinical practice.

6.2 Methodological limitations of this thesis

This thesis has contributed to the field of violence risk assessment of females; however limitations are recognised. Methodological considerations include the limited sample size of the empirical research, and the possibility that some effects may have been attenuated by the restricted data and outcome measures. The follow up period was also necessarily brief and considered to contribute to the limitation of the research. Furthermore, a more detailed data survival analyses to assess the time of incidents from time of risk assessment could have allowed precise predication of violence to inform planning. This would have contributed to the risk management and formulation element of the HCR-20. Unfortunately, due to lesser availability of data and collection methods, this information was not readily available at the time. This does, however, provide areas for research in the future.

Similarly to previous explorations of the HCR-20, this research utilised a researcher scoring the assessments without any prior knowledge of the included participants. Little attention has been paid to this impact of bias on the results and predictive efficacy. De Vogel

and de Ruiter (2006) investigation of this found that risk rating did differ between clinicians and researchers. Therefore, this may have impacted on the outcomes of the empirical study in this thesis. Discussions in the literature have alluded to the idea that researching HCR-20's conducted by clinicians can skew data due to the implementation of risk management plans, where we may expect a reduction in violence, and so the predicted risk may be in-accurate if these interventions are successful (Vojt, Thomson, & Marhsall, 2013). This particular piece of research did not explore the implementation or impact of the assessment, and remains to be an area which needs further exploration (Elbogen, 2002).

It was also noted that the data available for the critique of the FAM was limited. This reduced the applicability of the overall conclusions, as only three studies were included (n = 171). However, this did highlight the requirement for further research into the FAM, and the areas where information is still required.

On reflection, for the individual case study, a more detailed understanding of the differences between a client who was able to engage with the process, compared to the client who had more difficulty may have been more beneficial to gain insight into the process of collaborative risk assessment. The recognition that another client was not able to engage with the process did identify the potential difficulties with experiences of trauma and the potential processes of re-traumatising. This highlights the need to be patient focused and to provide trauma informed care, particularly when assessing and formulating risk.

6.3 Considerations and reflections on this thesis

This thesis initially sought to explore the predictive validity of the HCR-20v^3 tool for the female population. Throughout the chapters it became apparent that the application of the HCR-20v^3 for females is limited empirically. There is limited research for predictive efficacy when applied to females and little has been done to explore the qualitative application of risk assessment, for both males and females.

Violence Risk Assessment for females: The HCR-20

The meta-analysis presented in this thesis revealed the current lack of research exploring predictive efficacy of the HCR-20 exclusively with females, with a limited sample of only 10 studies reporting data for females from 1995 to 2016. The outcomes from the meta-analysis can be interpreted as the HCR-20 generally being a good model for measuring violence for females; however these results can only be generalised tentatively due to the limited data and heterogeneity among the study samples. Further research is required in order to conduct a more robust analysis. Future research would benefit from carefully consideration of the methodology and extraneous variables to promote homogeneity among samples. For example, one theme throughout this thesis discussed the difficulties with defining violence, which differed among the 10 studies included in the meta-analysis and therefore resulted in sub group analysis and reduced data. The differences in violence ranged from in patient incidents to community recidivism. Among the in-patient violence, considerations of violence also varied, which leads to questions of what the HCR-20 is actually aiming to measure when interpretations of violence differ considerably. Therefore, similarly to other chapters this piece of research incites a need for further exploration and understanding of violence, particularly differences in gender. This chapter also resulted in thoughts of future methodological approaches to researching the HCR-20 and perhaps a need to utilise guidelines, such as RAGEE (Singh *et al.*, 2014), to develop conformity for future analysis.

The empirical study in the thesis attempted to add to the limited data on predictive validity of the HCR-20v^3 for females. This study assessed predictive efficacy for the totals of the items, similarly to historical research. However, Hart, Michie, and Cooke (2007) suggested that only the final risk judgement should be considered as a statistic to develop an estimation of predicted violence risk, and even this has its drawbacks. Applying a risk estimate to an individual based on a norm can introduce margins of error. An overall rating of 'high risk of violence' leaves little consideration of the chance that an outcome of 'no

violence' in an individual's future is also possible. A higher risk estimate may falsely categorise an individual, which can impact treatment and care. Singh, Fazel, Gueorguieva and Buchanan (2015) explored rates of violence of patients classified as 'high risk' by structured risk assessment tools. Of the 47 independent studies Singh *et al.* (2015) discovered considerable variation of violence among those who were classified as 'high risk' and suggested caution when utilising structured risk assessment to determine probabilities of future risk, particularly when decision making for future pathways. This approach will also exclude individual characteristics when formulating risk, and can only be applied tentatively. Therefore, the results from the empirical study in this thesis can contribute to understanding the application of the HCR-20v^3 as a risk estimate tool, but shows no understanding of the individual differences between participants, and in turn individual risk management for violence. Currently, little research has formally explored the development and application of formulation and risk management. This is perhaps due to the methodological difficulties of producing an intensive qualitative study and identifying a cohort to assess the application and contribution to risk reduction, particularly with females due to the limited available samples. Therefore, it is suggested that examining the additional foundations of the SPJ model, which extends it value beyond an actuarial measure, the risk scenario and management planning elements would be beneficial for future research (Hart & Logan, 2011; Hart, Douglas & Guy, 2016).

This thesis also introduced the development of a 'gender-sensitive' tool, the FAM. The conclusions from this critique suggested that there is not currently sufficient evidence to validate a need for a separate tool exclusively for females. However, the additional items and guidelines are considered as thought provoking for assessors when conducting a HCR-20v^3, for both males and females. The current 20 items on the HCR-20v^3 are a base point to promote thought into an individual's risk, and the additional items on the FAM are essentially

further idiosyncratic factors to consider. The current research for the tool itself and the additional items is minimal. Therefore, this thesis identified a need for a comprehensive and systematic literature review of current research exploring the nature and causality of female violence in order to clarify if an exclusive risk assessment approach is necessary.

Finally, the individual case study was the most influential and thought provoking chapter. This highlighted the difficulties with collaborative risk assessment, the necessity of a trauma informed approach, and the element of unconscious bias. For this case study, I later reflected on an unconscious decision to report a participant who had been co-operative with the collaborative process, over a participant who was not able to engage in the process. Focusing on the co-operative participant revealed interesting results and observed behavioural changes, however it does not explore when collaborative risk assessment does not work. Research on publication bias have revealed that studies with statistically significant results are more likely to be published, particularly observation studies (Easterbrook, Gopalan, Berlin, and Matthews, 1991). Therefore research emphasising the effectiveness over the difficulties can result in a skewed overall understanding of implementation of violence risk assessment. This chapter also resulted in more thought around the appropriate environment to reduce risk of violence in female samples. Logan and Taylor's (2017) discussion of psychological informed environments in prisons providing the relational and physical security to reduce risk and improve engagement for females with personality disorder became apparent with this particular participant. The typical prison environment was a consistent factor when discussing her difficulties. She expressed a dislike of the lack of staff to talk to, as well as they restrictive practices, all of which would be addressed differently in a PIPE environment. The case study concluded a gap in the literature which requires exploring the HCR-20 v^3 employing a more intensive qualitative approach to

understand the individual application, formulation and implementation for females and their specific needs when assessing and managing risk of violence.

6.4 Concluding remarks

The preceding chapters of this thesis all aimed to present various approaches to assessing violence risk for females. The various methodological approaches between chapters results in a tenuous overall understanding of elements of risk assessment for females. However, it is a means of exploring the fundamentals of the comprehensive HCR-20 assessment and adds to the understanding of its application in a sample which is currently under represented empirically. Theoretically, this thesis is thought provoking for direction of future research and the methodological considerations required for valid and quality results. This work has also revealed a need to understand the clinical implications of completing and implementing the HCR-20v^3 tool, and the clinically need of trauma-informed care. It is recommended that the field of female violence risk assessment continues to be developed to inform clinical practice.

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8 Appendices

Appendix A

Using the HCR-20 for Predicting Violence in Adult Females: A Meta-Analysis



Sapphire-Violet Rossdale, Dr. Ruth Tully and Dr. Vincent Egan
University of Nottingham

University of Nottingham
UK | CHINA | MALAYSIA

Introduction

The Historical Clinical Risk-20 management tool (Webster, Eaves, Douglas & Wintrup, 1995, Webster, Douglas, Eaves & Hart, 1997; HCR-20v3, Douglas, Hart, Webster & Belfrage, 2013) is a recommended assessment in the field for assessing risk of violence. Application of risk assessment for violent individuals enables informed risk management plans and enhances public safety. Such tools were initially designed for evaluating risk for males, and have since been applied to females in practice (McKeown, 2010).

A systematic review exclusively examining the use of the HCR-20 with female populations does not currently exist. Therefore, this review sought to synthesize the effectiveness of the Historical, Clinical, Risk management and Total items for predicating violence and recidivism in adult female populations.

Method

The Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA, Moher *et al*., 2009) guidelines were followed. Two reviewers assessed exclusion criteria and quality assessment, and had excellent degree of reliability (ICC, 0.896, single measure).

Eligibility Criteria

Characteristic	Description
Population	Adult (18 years and over) female
Exposure	A HCR-20 risk assessment tool completed (any version)
Outcome	Violence (including re-conviction, recidivism, recorded and self-reported)
Study Design	Case control and Cohort (Retrospective & Prospective)

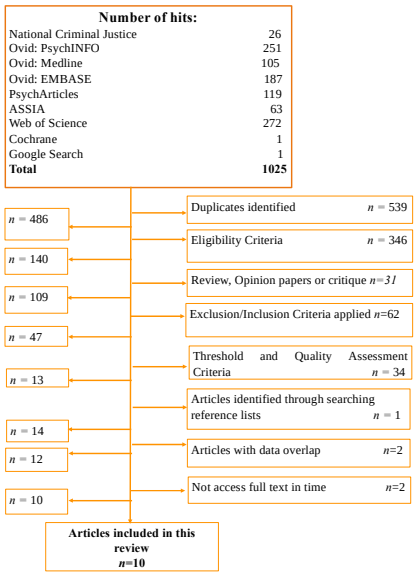


Figure 1. Systematic Review Search strategy

Results

Risk of Bias

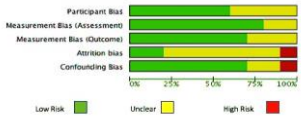


Figure 2. Risk of bias graph for 10 included studies

Meta Analysis

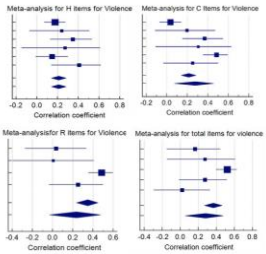
37 effect sizes were computed for violence and recidivism when assessed by the Historical items, Clinical items, Risk Management items and Total items. Eight meta-analysis were conducted, heterogeneity was found for 7 analysis, a Random effects model was applied.

Pooled correlations were calculated using a Fishers Z transformation using the Hedges-Olkin (1985) method. The statistical software calculated the summary correlation coefficient using DerSimonian and Laird's (1986) approach.

Table 1.
Meta-analysis pooled outcomes for H, C, R and total items when predicting risk of violence and recidivism.

Measure	Number of studies included	Total Sample size	Pooled Correlation coefficient	95% CI
Violence				
Historical	6	695	0.211* [1]	0.138 to 0.282
Clinical	6	695	0.277**	0.0735 to 0.458
Risk	4	270	0.237	-0.0339 to 0.475
Total	5	310	0.279	0.0546 to 0.476
Recidivism				
Historical	4	467	0.447*	0.243 to 0.614
Clinical	4	467	0.218**	0.0587 to 0.366
Risk	4	467	0.171	0.0146 to 0.319
Total	4	294	0.253	-0.0899 to 0.542

[1] *Fixed effect model applied.* **p*<.01 ** *p*<.05



- Low to Medium effects were found for H, C, R and Total items when measuring risk of violence.
- Significant effect sizes were found for H and C items.
- C items had a significant and near medium effect size.

Figure 3. Forest plot for H, C, R and Total items when predicting Violence

- H items had the largest pooled effect for prediction of recidivism for females.
- R items were considered the least predictive for females when assessing recidivism.

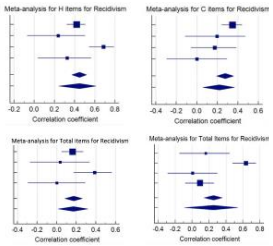


Figure 4. Forest plot for H, C, R and Total items when predicting recidivism

Conclusions

Heterogeneity may be explained by clinical diversity of studies, such as sample size, population characteristics, setting and measurement of outcomes. The HCR-20 can be considered as a useful tool to apply to females. Future research would benefit from further exploration into the application with female sub-groups. Research may also benefit from a uniform approach to assessing violence, such as following the HCR-20 definition of violence.

Future Directions

- Future studies are encouraged to utilise statistical analysis to explore time related predications (E.g. Survival analysis, regression analysis).
- Methodology of some included studies in this meta-analysis revealed high risk of bias. Future research is encouraged to report more systematically.

Selected References

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Appendix B
Search Terms

Ovid: PsychInfo
(historic* adj2 clinic* adj2 risk*).mp.
HCR* OR Historical Clinical Risk*
(HCR-20* OR HCR20* OR 'HCR 20*').mp.
Valid* OR Statistical Valid* OR Predict* Efficacy OR Predict*
AUC* OR Area adj2 Under adj2 Curve*.mp
offen* OR reoffen* OR re-offen* OR arrest* OR rearrest*OR re-arrest* OR convict* OR reconvict* OR re-convict* OR recidiv*
Exp Anger/ OR exp Aggressive Behavi*r/ OR exp Violence/ OR exp Risk Factors/ OR exp Aggressiveness/
Exp Violence/
Exp Dangerousness/
1 OR 2 OR 3
4 OR 5
6 OR 7 OR 8 OR 9
10 AND 11 AND 12
limit 13 to yr= "1995 -current"

Ovid: Medline
(historic* adj2 clinic* adj2 risk*).mp.
HCR* OR Historical Clinical Risk*
(HCR-20* OR HCR20* OR "HCR 20*").mp.
Valid* OR Statistical Valid* OR Predict* Efficacy OR Predict*
AUC* OR Area adj2 Under adj2 Curve*.mp
offen* OR reoffen* OR re-offen* OR arrest* OR rearrest*OR re-arrest* OR convict* OR reconvict* OR re-convict* OR recidiv*
Anger OR Aggressive Behavi*r OR Violence OR Risk Factors OR Aggressiveness
Exp Violence/
Exp Dangerousness/
1 OR 2 OR 3
4 OR 5
6 OR 7 OR 8 OR 9
10 AND 11 AND 12
limit 13 to yr= "1995 -current"

Ovid: EMBASE
(historic* adj2 clinic* adj2 risk*).mp.
HCR* OR Historical Clinical Risk*
(HCR-20* OR HCR20* OR "HCR 20*").mp.
Valid* OR Statistical Valid* OR Predict* Efficacy OR Predict*
AUC* OR Area adj2 Under adj2 Curve*.mp
offen* OR reoffen* OR re-offen* OR arrest* OR rearrest*OR re-arrest* OR convict* OR reconvict* OR re-convict* OR recidiv*
Anger OR Aggressive Behavi*r OR Violence OR Risk Factors OR Aggressiveness
Exp Violence/
Exp Dangerousness/

1 OR 2 OR 3
4 OR 5
6 OR 7 OR 8 OR 9
10 AND 11 AND 12
limit 13 to yr= "1995 -current"

Cochrane Library
HCR* or Historical Clinical Risk*
Effectiveness or "Area Under The Curve" or AUC or Accuracy or Validity or Predict*
Violen* or Aggress* or Reoffen* or Re-offen* or Recidivism or Dangerousness or Reconvict* Or Re-Convict*
#1 and #2 and #3 (limited from 1995 – 2016 in Cochrane Central Register of Controlled Trials)

HCR or Historical Clinical Risk* in Title, Abstract, Keywords and Effectiveness or "Area Under The Curve" or AUC or Accuracy or Validity or Predict* in Title, Abstract, Keywords and Violen* or Aggress* or Reoffen* or Re-offen* or Recidivism or Dangerousness or Reconvict* Or Re-Convict* in Title, Abstract, Keywords (Word variations have been searched)*

Applied Social Sciences Index & Abstracts (ASSIA)
(HCR* OR Historical Clinical Risk*) AND ((Effectiveness or "Area Under The Curve" or muc) OR (Accuracy or Validity or Predict*)) AND ((Violen* or Aggress* or Reoffen* or Re-offen*) OR (Recidivism or Dangerousness or Reconvict* Or Re-Convict*))
Show applied limiters
Limited by:

Date: From 01 January 1995 to 21 September 2016

Web of Science
#1= *TS=(HCR* OR Historical Clinical Risk*)*
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=1995-2016

#2 = TS=(Effectiveness or "Area Under The Curve" or AUC or Accuracy or Validity or Predict*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=1995-2016

#3 = TS=(Violen* or Aggress* or Reoffen* or Re-offen* or Recidivism or Dangerousness or Reconvict* Or Re-Convict*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=1995-2016

#4 = #3 AND #2 AND #1
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=1995-2016

National Criminal Justice Reference Service Abstracts
(HCR* OR Historical Clinical Risk*) AND ((Effectiveness OR "Area Under The Curve" OR muc) OR (Accuracy OR Validity OR Predict*)) AND ((Violen* OR Aggress* OR Reoffen* OR Re-offen*) OR (Recidivism OR Dangerousness OR Reconvict* OR Re-Convict*)) AND pd(19950101-20160921)
Limited by:

Date: From 01 January 1995 to 21 September 2016

PsychArticles
(historic* adj2 clinic* adj2 risk*).mp.
HCR* OR Historical Clinical Risk*
(HCR-20* OR HCR20* OR 'HCR 20*').mp.
Valid* OR Statistical Valid* OR Predict* Efficacy OR Predict*
AUC* OR Area adj2 Under adj2 Curve*.mp
offen* OR reoffen* OR re-offen* OR arrest* OR rearrest*OR re-arrest* OR convict* OR reconvict* OR re-convict* OR recidiv*
Anger OR Aggressive Behavi*r OR Violence OR Risk Factors OR Aggressiveness
Violence.mp
Dangerousness.mp
1 OR 2 OR 3
4 OR 5
6 OR 7 OR 8 OR 9
10 AND 11 AND 12
limit 13 to yr= "1995 -current"

Appendix C
Exclusion Criteria

Reviewer			
Author and date			
Include?	**YES**	**NO**	**UNCLEAR**
Inclusion Criteria	**Met?**		**Comments**
Population: • Females aged 18 and over	Yes/No/Unclear		
Exposure: • HCR-20 Risk Assessment tool applied (any version)	Yes/No/Unclear		
Outcome:			**How measured?**
• Re-conviction/Recidivism	Yes/No/Unclear		
• Re-arrest	Yes/No/Unclear		
• Violence/aggression	Yes/No/Unclear		
• Other			**Describe?**
Study Type			
• **Case Control**	Yes/No/Unclear		
• **Cohort (*Retrospective or Prospective)***	Yes/No/Unclear		
• **RCT**	Yes/No/Unclear		

Appendix D

Relevant studies excluded based on exclusion/inclusion criteria and threshold and quality assessment

Study	**Reason for exclusion**
Arbach-Lucioni *et al* (2011)	Minimum threshold criteria – Did not report female population separately
A-Zanganeh (2009)	Population
Barber-Rioja *et al* (2012)	Outcome
Belfrage (1998)	Population
Belfrage, Fransson & Strand (2000)	Minimum threshold criteria – Did not report female population separately
Bjorkly, Eidhammer & Selmer (2014)	Statistical Analysis
Chaplin *et al* (2015)	Minimum threshold criteria - Statistical Analysis of validity
Chu, Daffern & Ogloff (2013)	Unable to divide Male/Female data
Claix & Pham (2004)	Population
Coid *et al* (2015)	Minimum threshold criteria – Did not report female population separately
Coid, Yang, Illrich, Zhang, Sizmur, Farrington & Rogers (2011)	Population
Daffern & Howells (2007)	Minimum threshold criteria – Did not report female population separately
de Borba Telles *et al* (2009)	Statistical Analysis
Dernevik (1998)	Population
Dernevik, Grann & Johansson (2002)	Minimum threshold criteria – Did not report female population separately
Dietiker, Dittman and Graf (2007)	Aims
Dolan & Blatterner (2010)	Minimum threshold criteria – Did not report female population separately
Dolan & Khawaja (2004)	Population
Douglas & Belfrage (2014)	Statistical Analysis
Douglas, Ogloff, Nicholls & Grant (1999)	Minimum threshold criteria – Did not report female population separately
Douglas, Ogloff & Hart (2003)	Minimum threshold criteria – Did not report female population separately
Douglas & Webster (1999)	Population
Douglas, Yeomans & Boer (2005)	Population
Dowsett (2005)	Minimum threshold criteria - Statistical Analysis of validity
Doyle, Carter, Shaw & Dolan (2012)	Measure
Doyle, Power, Coid, Kallis, Ullrich & Shaw (2014)	Minimum threshold criteria – Did not report female population separately
Fitzgerald *et al* (2013)	Minimum threshold criteria – Did not report female population separately
Folino (2015)	Population

Folino, Almiron & Ricci (2007)	Outcome
Fujii, Tokioka, Lichton & Hishinuma (2005)	Minimum threshold criteria – Did not report female population separately
Gray *et al* (2003)	Minimum threshold criteria – Did not report female population separately
Gray, Fitzgerald, Culloch & Snowden (2007)	Minimum threshold criteria – Did not report female population separately
Gray, Taylor & Snowden (2008)	Population
Green, Carroll & Brett (2010)	Outcome
Green, Belfi, Griswold, Schreiber, Prentky & Kunz (2014)	Outcome
Grevatt, Thomas-Peter & Hughes (2004)	Population
Grimbos, Penney, Fernane, Prosser, Ray & Simpson (2016)	Statistical Analysis
Gunenc, O'Shea & Dickens (2015)	Minimum threshold criteria – Did not report female population separately
Guy, Douglas & Hendry (2010)	Aim
Guy, Kusaj, Packer & Douglas (2014)	Minimum threshold criteria – Did not report female population separately
Haggard, Gumpert & Grann (2001)	Statistical Analysis
Ho *et al* (2013)	Minimum threshold criteria – Did not report female population separately
Ho, Thomson & Darjee (2009)	Minimum threshold criteria – Did not report female population separately
Hogan & Oliver (2016)	Minimum threshold criteria – Did not report female population separately
Howe, Rosenfield, Foellmi, Stern & Rotter (2016)	Statistical Analysis
Ivgi *et al* (2015)	Population
Jung, ledi & Daniels (2013)	Outcome
Koetter *et al* (2014)	statistical Analysis
Kroner & Mills (2001)	Population
Langton, Hogue, Daffern, Mannion & Howells (2009)	Population
Lindsay *et al* (2008)	Population
Liu, Yang, Ramsay, Li & Coid (2011)	Population
Long, Dolley & Hollin (2011)	Measure
LV, Han & Wang (2013)	Population
Martinaki *et al* (2013)	Minimum threshold criteria – Did not report female population separately
Mills & Kroner (2006)	Population
Mills, Kroner & Hemmati (2007)	Population
Morrissey, Beeley & Milton (2014)	Outcome/Statistical Measure
Muddle, Nijman, Hulst & den Bout (2011)	Minimum threshold criteria – Did not

	report female population separately
McNeil, Gregory, Lam & Blinder (2003)	Minimum threshold criteria – Did not report female population separately
Michel *et al* (2013)	Population
Muller-Isberner, Webster & Gretenkord (2007)	Outcome
Murray, Charles, Cooke & Thomson (2014)	Outcome
Neves *et al* (2011)	Minimum threshold criteria – Did not report female population separately
Nilsson *et al* (2011)	Minimum threshold criteria – Did not report female population separately
Olsson *et al* (2013)	Statistical Analysis
O'Shea & Dickens (2015)	Duplicate Data
O'Shea, Picchioni, Mason, Sugarman & Dickens (2014)	Duplicate Data and Outcome (SH)
O'Shea, Picchioni, McCarthy, Mason & Dickens (2015)	Minimum threshold criteria – Did not report female population separately
O'Shea, Thaker, Picchioni, Mason, Knight & Dickens (2015)	Duplicate Data and Outcome (Sexual Violence)
Perdersen, Ramussen & Elsass (2012)	Population
Penney, McMaster & Wilkie (2014)	Statistical Analysis
Pham, Ducro, Margham & Reveillere (2005)	Statistical Analysis
Polvi (2001)	Measure
Reimann & Nussbaum (2011)	Outcome
Reynolds & Miles (2009)	Outcome
Rossegger, Urbaniok, Elbert, Fries & Endrass (2010)	Population
Sada, Robles-Garcia, Martinez-Lopez, Hernandez-Ramirez, Tovilla-Zarate, Lopez-Munguia et al (2016)	Population
Selenius, Hellstorm & Belfrage (2011)	statistical Analysis
Sheldon & Gallagher (2010)	Outcome
Smith *et al* (2014)	Population
Snowden, Gray & Taylor (2010)	Minimum threshold criteria – Did not report female population separately
Stadtland & Nedopil (2005)	Population
Starup *et al* (2016)	Minimum threshold criteria – Did not report female population separately
Strand & Belfrage (2001)	Minimum threshold criteria - Statistical Analysis of validity
Strand, Belfrage, Fransson & Levander (1999)	Population
Stribling (2004)	Aim
Strub, Douglas & Nicholls (2014)	Minimum threshold criteria – Did not

	report female population separately
Telles *et al* (2012)	Population
Vitacco, Erickson, Kurus & Apple (2012)	Aims
Vitacco, Tabernik, Zavodny, Bailey & Waggoner (2016)	Outcome
Vogel, de Ruiter, Hildebrand, Bos & de Ven (2004)	Duplicate Data
de Vogel & de Ruiter (2006)	Population
Vogel, van den Broek & Vries Robber (2014)	Population/Methodology
Vojt, Thomson & Marshall (2013)	Population
Walters, Kroner, Dematteo & Lockhair (2014)	Aims
Warren *et al* (2005)	Statistical Analysis

Appendix E

Cohort Quality Assessment

Adapted from Critical Appraisal Skills Programme (CASP, 2004)

Questions	Outcome	Score/Comments
Objectives		
Does a Cohort design address the objectives of the study?	Yes/Unclear/No	
Selection Bias		
Were the participants recruited in an acceptable way? (I.e. selected using random, systematic or interval sampling)	Yes/Unclear/No	
Were participants representative of the defined population?	Yes/Unclear/No	
Was there a power calculation?	Yes/Unclear/No	
Was there a sufficient number of participants selected? (i.e. reached recommended power)	Yes/Unclear/No	
Measurement Bias		
Was the HCR-20 clearly defined?	Yes/Unclear/No	
Was the HCR-20 accurately measured (following the HCR-20 manual)?	Yes/Unclear/No	
Was the assessor/assessors trained/experienced to carry out the HCR-20?	Yes/Unclear/No	
Was the HCR-20 completed with relevant information from a variety of sources? (E.g. Clinical interview and file search)	Yes/Unclear/No	
Were the outcome measures clearly defined (Violence/recidivism/aggression etc.)?	Yes/Unclear/No	
Was the same procedure used to collect outcome measure across populations?	Yes/Unclear/No	
Was the risk assessor blind to the outcome (Violence/recidivism/aggression etc.)?	Yes/Unclear/No	
Was inter-rater reliability assessed?	Yes/Unclear/No	
Was the inter-rater reliability acceptable? (>0.8)	Yes/Unclear/No	

Was the follow up time acceptable? (Minimum 3 months based on excellent findings for HCR-20 over short period Gray *et al*, 2003)	Yes/Unclear/No	
Were any confounding variables acknowledged?	Yes/Unclear/No	**List any acknowledged confounding variables**
Attrition		
Was the attrition rate reported?	Yes/Unclear/No	
What was the Attrition rate? Was it >20%, Fewtrell *et al*, 2008)		(%)
For those who not included in the follow up, was an explanation provided?	Yes/Unclear/No	
Data and Results		
Are the results reported?	Yes/Unclear/No	**What was used (AUC/Regression etc.)?**
Was predictive validity clearly reported?	Yes/Unclear/No	
Are the results reliable?	Yes/Unclear/No	**Any significant flaws to suggest it is unreliable?**
Is the sample generalizable to the target population (adult females)?	Yes/Unclear/No	**Anything sufficiently different to cause concern?**
Were the implications of this study supported by other evidence?	Yes/Unclear/No	
Were any further analysis used?	Yes/Unclear/No	
Quality Score		

Studies were scored as follows in relation to each question:

0=condition not met.

1=condition partially met.

2=condition fully met.

U=unclear/insufficient information provided.

Scores were summed in order to obtain an overall quality rating, with higher scores indicating better quality studies.

Appendix F
Case control quality assessment

Adapted from Critical Appraisal Skills Programme (CASP, 2004)

Questions	Outcome	Score/Comments
Objectives		
Does a case control address the objectives of the study?	Yes/Unclear/No	
Selection Bias		
Were the participants recruited in an acceptable way? (I.e. selected using random, systematic or interval sampling)	Yes/Unclear/No	
Were the case participants defined precisely?	Yes/Unclear/No	
Were the control participants defined precisely?	Yes/Unclear/No	
Were the case participants special in any way?	Yes/Unclear/No	
Were the case and controls demographics defined?	Yes/Unclear/No	
Were the case and controls matched?	Yes/Unclear/No	**If no, were they comparable?**
How were the case and controls matched? (E.g. Risk level, diagnosis, age etc.)		**How?**
Were the participants (case and controls) randomly selected from the population?	Yes/Unclear/No	**How?**
Were the case and control participant's representative of the defined population?	Yes/Unclear/No	
Was there a power calculation?	Yes/Unclear/No	
Was there a sufficient number of participants selected? (i.e. reached recommended power)	Yes/Unclear/No	
Measurement Bias		
Was the HCR-20 clearly defined?	Yes/Unclear/No	
Was the HCR-20 accurately measured (following the HCR-20 manual)?	Yes/Unclear/No	
Was the assessor/assessor's trained/experienced to carry out	Yes/Unclear/No	

the HCR-20 assessment?		
Was the HCR-20 completed with relevant information from a variety of sources? (E.g. Clinical interview and file search)	Yes/Unclear/No	
Were the outcome measures clearly defined (Violence/aggression/recidivism etc.)?	Yes/Unclear/No	
Was the same procedure used to collect outcome measures for the case and control participants?	Yes/Unclear/No	
Was the risk assessor blind to the outcome (Violence/recidivism/aggression etc.)?	Yes/Unclear/No	
Was inter-rater reliability assessed?	Yes/Unclear/No	
Was the inter-rater reliability acceptable? (>0.8)	Yes/Unclear/No	
Was the follow up time acceptable? (Minimum 3 months)	Yes/Unclear/No	
Were any confounding variables acknowledged?	Yes/Unclear/No	**List any acknowledged confounding variables**
Were any confounding variables not acknowledged?	Yes/Unclear/No	**List any unacknowledged confounding variables**
Attrition		
Was the attrition rate reported?	Yes/Unclear/No	
What was the Attrition rate? (Was it >20%, Fewtrell *et al*, 2008)		(%)
For those who not included in the follow up, was an explanation provided?	Yes/Unclear/No	
Data and Results		
Are the results reported?	Yes/Unclear/No	**What was used (AUC/Regression etc.)?**
Was predictive validity clearly reported?	Yes/Unclear/No	
Are the results reliable?	Yes/Unclear/No	**Any significant flaws to suggest it is unreliable?**
Is the sample generalizable to the target population (adult females)?	Yes/Unclear/No	**Anything sufficiently different to cause concern?**

Were the implications of this study supported by other evidence?	Yes/Unclear/No	
Were any further analysis used?	Yes/Unclear/No	Were any further analysis used?
Quality Score		

Studies were scored as follows in relation to each question:

0=condition not met.

1=condition partially met.

2=condition fully met.

U=unclear/insufficient information provided.

Scores were summed in order to obtain an overall quality rating, with higher scores indicating better quality studies.

Appendix G
Pre-defined data extraction form

Reference: (Name of Authors and Date)		
Date form completed:		
Notes: (For own use)		
Question	**Notes**	**Location and format in document (Page No., table/text etc.)**
Aim of study		
Study design		
Version of HCR20 (1, 2, 3, or not reported)		
Ethical Consent?	Yes/No/Unclear	
Participant characteristics (sub groups)?		
Sample size?		
Method of Recruitment		
Inclusion/Exclusion criteria for study?		
Geographic Location		
Age (Mean/SD)		
Ethnicity (%)		
Diagnosis		
Setting (Community/In-patient etc.)		
Risk group, if applicable (High, Medium, Low secure)		
Any other Demographic details?		
Results		
Outcome measure(s)? (E.g. Violence, recidivism Etc.)		
Outcome rate: (E.g. No/% offending, No/%Violence etc.)		
Length of follow up?		
Statistical Analysis used? AUC ROC? Sensitivity? Specificity?		

Statistical Outcome? (E.g. AUC outcomes) H C R Total Final Risk Judgements		
Any additional predicative validity outcomes? (E.g. Individual items)		
Any additional statistics/outcomes?		
Inter-Rater Reliability outcome? (Kappa/ICC/%)		

Appendix H
Data from Meta-Analysis for H, C, R and Total items when measuring violence (MedCalc)

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	H_Correlation_Coefficient

Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%) Fixed	Weight (%) Random
Garcia et al (2011)	350	0.176	0.0723 to 0.276			51.26	51.26
de Vogel & de Ruiter (2005)	42	0.238	-0.0707 to 0.506			5.76	5.76
Nicholls et al (2004)	75	0.346	0.129 to 0.531			10.64	10.64
Green et al (2016)	24	0.273	-0.147 to 0.609			3.10	3.10
O'Shea et al (2014)	156	0.148	-0.00926 to 0.298			22.60	22.60
Strub et al (2016)	48	0.406	0.138 to 0.619			6.65	6.65
Total (fixed effects)	695	0.211	0.138 to 0.282	5.581	<0.001	100.00	100.00
Total (random effects)	695	0.211	0.138 to 0.282	5.581	<0.001	100.00	100.00

Test for heterogeneity

Q	4.8959
DF	5
Significance level	P = 0.4287
I^2 (inconsistency)	0.00%
95% CI for I^2	0.00 to 74.83

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	C_Correlation_Coefficient

Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%) Fixed	Weight (%) Random
Garcia et al (2011)	350	0.0350	-0.0701 to 0.139			51.26	20.96
de Vogel & de Ruiter (2005)	42	0.197	-0.114 to 0.472			5.76	14.83
Nicholls et al (2004)	75	0.367	0.152 to 0.548			10.64	17.47
Green et al (2016)	24	0.306	-0.111 to 0.632			3.10	11.57
O'Shea et al (2014)	156	0.483	0.353 to 0.595			22.60	19.66
Strub et al (2016)	48	0.252	-0.0344 to 0.500			6.65	15.51
Total (fixed effects)	695	0.213	0.140 to 0.284	5.632	<0.001	100.00	100.00
Total (random effects)	695	0.277	0.0735 to 0.458	2.646	0.008	100.00	100.00

Test for heterogeneity

Q	28.5487
DF	5
Significance level	P < 0.0001
I^2 (inconsistency)	82.49%
95% CI for I^2	62.94 to 91.72

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	R_Correlation_Coefficient

Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%) Fixed	Weight (%) Random
de Vogel & de Ruiter (2005)	42	0.0350	-0.272 to 0.335			15.12	24.17
Green et al (2016)	24	0.00700	-0.398 to 0.409			8.14	19.04
O'Shea et al (2014)	156	0.483	0.353 to 0.595			59.30	31.56
Strub et al (2016)	48	0.252	-0.0344 to 0.500			17.44	25.23
Total (fixed effects)	270	0.348	0.237 to 0.451	5.840	<0.001	100.00	100.00
Total (random effects)	270	0.237	-0.0339 to 0.475	1.718	0.086	100.00	100.00

Test for heterogeneity

Q	11.4909
DF	3
Significance level	P = 0.0093
I^2 (inconsistency)	73.89%
95% CI for I^2	26.94 to 90.67

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	Total_Correlation_Coefficient

Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%) Fixed	Weight (%) Random
de Vogel & de Ruiter (2005)	42	0.162	-0.149 to 0.444			13.22	19.39
Green et al (2016)	24	0.273	-0.147 to 0.609			7.12	14.86
O'Shea et al (2014)	156	0.520	0.396 to 0.626			51.86	26.38
Strub et al (2016)	48	0.273	-0.0125 to 0.517			15.25	20.35
Viljeon et al (2015)	40	0.0210	-0.292 to 0.330			12.54	19.02
Total (fixed effects)	310	0.368	0.265 to 0.462	6.631	<0.001	100.00	100.00
Total (random effects)	310	0.279	0.0546 to 0.476	2.422	0.015	100.00	100.00

Test for heterogeneity

Q	13.1752
DF	4
Significance level	P = 0.0105
I^2 (inconsistency)	69.64%
95% CI for I^2	22.34 to 88.13

Appendix I
Data from Meta-Analysis for H, C, R and Total items when measuring recidivism (MedCalc)

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	H_Correlation_Coefficient

Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%)	
						Fixed	Random
Cold et al (2009)	305	0.419	0.322 to 0.507			66.37	31.61
de Vogel & de Ruiter (2005)	42	0.238	-0.0707 to 0.506			8.57	21.11
Nicholls et al (2016)	75	0.687	0.545 to 0.791			15.82	25.58
Schaap et al (2009)	45	0.326	0.0360 to 0.566			9.23	21.70
Total (fixed effects)	467	0.448	0.371 to 0.518	10.273	<0.001	100.00	100.00
Total (random effects)	467	0.447	0.243 to 0.614	4.040	<0.001	100.00	100.00

Test for heterogeneity

Q	12.8097
DF	3
Significance level	P = 0.0051
I^2 (inconsistency)	76.58%
95% CI for I^2	35.89 to 91.44

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	C_Correlation_Coefficient

Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%)	
						Fixed	Random
Cold et al (2009)	305	0.346	0.243 to 0.441			66.37	39.74
de Vogel & de Ruiter (2005)	42	0.197	-0.114 to 0.472			8.57	17.37
Nicholls et al (2016)	75	0.174	-0.0551 to 0.386			15.82	24.68
Schaap et al (2009)	45	0.000	-0.294 to 0.294			9.23	18.21
Total (fixed effects)	467	0.277	0.190 to 0.360	6.070	<0.001	100.00	100.00
Total (random effects)	467	0.218	0.0587 to 0.366	2.669	0.008	100.00	100.00

Test for heterogeneity

Q	6.3078
DF	3
Significance level	P = 0.0976
I^2 (inconsistency)	52.44%
95% CI for I^2	0.00 to 84.28

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	R_Correlation_Coefficient

Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%)	
						Fixed	Random
Cold et al (2009)	305	0.162	0.0510 to 0.270			66.37	40.76
de Vogel & de Ruiter (2005)	42	0.0360	-0.272 to 0.335			8.57	16.95
Nicholls et al (2016)	75	0.386	0.174 to 0.564			15.82	24.48
Schaap et al (2009)	45	0.000	-0.294 to 0.294			9.23	17.81
Total (fixed effects)	467	0.174	0.0841 to 0.262	3.758	<0.001	100.00	100.00
Total (random effects)	467	0.171	0.0146 to 0.319	2.142	0.032	100.00	100.00

Test for heterogeneity

Q	5.9697
DF	3
Significance level	P = 0.1131
I^2 (inconsistency)	49.75%
95% CI for I^2	0.00 to 83.37

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	Total_Correlation_Coefficient

Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%)	
						Fixed	Random
de Vogel & de Ruiter (2005)	42	0.162	-0.149 to 0.444			13.83	23.46
Nicholls et al (2016)	75	0.636	0.478 to 0.754			25.53	25.70
Schaap et al (2009)	45	0.00700	-0.287 to 0.300			14.89	23.78
Warren et al (2005)	132	0.0923	-0.0798 to 0.259			45.74	27.05
Total (fixed effects)	294	0.252	0.140 to 0.358	4.329	<0.001	100.00	100.00
Total (random effects)	294	0.253	-0.0899 to 0.542	1.453	0.146	100.00	100.00

Test for heterogeneity

Q	24.0284
DF	3
Significance level	P < 0.0001
I^2 (inconsistency)	87.51%
95% CI for I^2	70.25 to 94.76

Appendix J
RAGEE Checklist



Section	Item	Description	Page	NR	N/A
ABSTRACT	1	Include a structured abstract describing the study	✓		
	2	Identify the article as a risk assessment study in which predictive validity is measured	✓		
	3	Identify the risk assessment instrument(s) whose predictive validity is measured	✓		
	4	State the nature of the principal outcome (e.g., violence, sexual violence, criminal offending, institutional misconduct)	✓		
INTRODUCTION	5	Provide the rationale and a summary of the scientific/theoretical background for the study	✓		
	6	State the research questions and/or study aims	✓		
METHODS					
Participants	7	Report the sample size	✓		
	8	Report the sex/gender composition of the sample	✓		
	9	Report the average age at assessment (with dispersion parameter)	✓		
	10	Report the index offense composition of the sample			✓
	11	Report the characteristics of groups that underwent subgroup analysis	✓		
Instrument Design	12	Report the acronym(s) and full name(s) of the instrument(s) under investigation with appropriate reference to source document	✓		
	13	Report the number of items on the instrument(s) under investigation	✓		
	14	Report the approach by which the assessment information from the instrument(s) under investigation is organized into an overall evaluation of risk	✓		
	15	Report the population for which the instrument(s) under investigation was intended to be used	✓		
	16	Report the outcome(s) that the instrument(s) under investigation was intended to assess	✓		
	17	Report the length of follow-up for which manual-recommended probability estimates of risk were derived for the instrument(s) under investigation	✓		
	18	Report the cut-off score(s) and/or risk categories that the instrument(s) under investigation was designed to use to classify risk level	✓		
Instrument Administration	19	Report whether risk assessments were conducted in the context of research or practice	✓		
	20	Identify when risk assessments occurred (e.g., pre-admission, admission, release, post-release)	✓		
	21	Report the number of assessors in the study as well as their training in the administration of the instrument(s) under investigation	✓		
	22	Identify the source(s) of information used to administer the instrument(s) under investigation	✓		
	23	Describe any modifications made to the instrument(s) under investigation			✓
Study Design	24	Report the geographical location and clinical setting in which risk was assessed	✓		
	25	Describe the method(s) used to recruit participants	✓		
	26	Identify the temporal design of the study (prospective or quasi-prospective)	✓		
	27	Identify the setting in which participants were followed to ascertain whether the outcome(s) of interest had occurred	✓		

	28	Report the average length of follow-up and time at risk (with dispersion parameter, if not fixed), including a description of periods subtracted from follow-up time (e.g., incarceration and/or hospitalization)	✓		
Predicted Outcome	29	Specify the event(s) coded as meeting outcome criteria (e.g., assault, rape, homicide)	✓		
	30	Identify the type (e.g., arrest, charge, conviction, incarceration) and source (e.g., criminal records, self-report, collateral) of information used to detect outcome occurrence	✓		
Statistical Analysis	31	Describe the statistical methods used to conduct all analyses, and report the purpose of each analysis	✓		
	32	Report whether risk scores and/or risk categories of the instrument(s) under investigation were used as an independent variable in analyses	✓		
	33	Identify the statistical significance level used	✓		
	34	Describe any subgroup analyses planned *a priori*			✓
	35	Report inter-rater reliability for administration of the instrument(s) under investigation (if conducted). If inter-rater reliability was not assessed, clarify why not	✓		
	36	Include at least one discrimination performance indicator when measuring predictive validity	✓		
RESULTS					
Participant Outcomes	37	Report the rate of attrition	✓		
	38	Report the outcome occurrence rate for the entire sample as well as for relevant subgroups	✓		
Predictive Validity	39	Report predictive validity performance indicators for each outcome of interest as specified in the Methods with associated dispersion parameters	✓		
	40	Report the number of participants with each risk score and/or in each risk category and how many went on to engage in the outcome(s) of interest	✓		
	41	Report the results of subgroup analyses planned *a priori* as specified in the Methods			✓
	42	Describe and report the findings of any *post hoc* analyses conducted			✓
DISCUSSION	43	Provide a summary of the principal findings, including a discussion of their relevance in the context of the current literature	✓		
	44	Discuss limitations of the study design	✓		
	45	Discuss the generalizability of study findings	✓		
	46	Discuss future research directions based on study findings	✓		
DISCLOSURES	47	Report any commercial interests and/or source(s) of funding as well as their role(s) in the conduct of the study			✓
	48	Report whether an author or translator of the risk assessment instrument(s) under investigation was also a study author	✓		
	49	Report whether the study presented in the article has been published in an alternative form (e.g., government report)			✓
	50	Report whether the sample or a portion thereof has been studied in other publications			✓

NOTE. NR = not reported but applicable to study; N/A = not applicable to study.

Appendix K
Data agreement

Data Ownership Agreement

July 2017

This is an agreement between the University of Nottingham and CAS Behavioural Health to establish data ownership and the right to use of data generated by the research activities of the research project:

Predictive Validity of the HCR-20 Version 3 for inpatient violence in psychiatric setting: The Effect of Gender

Terms and Conditions for use of CAS Behavioural Health Data
A. This Agreement sets out the framework for the sharing of Data by CAS Behavioural Health.
B. This Agreement defines the principles and procedures that the parties shall adhere to and the responsibilities each party owes in respect of the other.
C. This Agreement sets out that various principles and procedures for managing CAS Behavioural Health data.

It is understood that the University of Nottingham researcher, supervisors and CAS Behavioural Health are subjected to this agreement.

The agreement is based on the following principles:

- Research datasets belong to institutions not individuals as it is only institutions that can ensure long term security for data.
- Data generated by collaborating institutions belong to those institutions providing the data. In this case the data is owned by the CAS Behavioural Health;
- Researcher generating research data has a right to recognition for their work;
- Researcher generating research data is able to request access and have use of data for the purposes of publishing the findings of this project;
- The co-ordinating institution (CAS Behavioural Health) will have acknowledgement for any published research;
- Researcher and/or University of Nottingham are able to request data for examination purposes, if required;
- Researcher is limited to data access for the purpose of supervision/ examination and is not to use for further analysis without permission from CAS Behavioural Health and involvement of CAS Behavioural Health R&D in any future analysis of that data

- Data ownership and intellectual property should be managed in a way to balance the interests of individual researcher, their institutions, the donors and society as a whole.

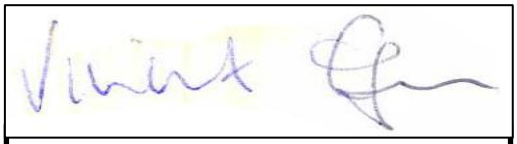
In practice, these principles will be implemented as follows:

1. A protocol will be produced to the Research and Development team defining the methodology of the project, and handling of data.
2. Ethical approval will be confirmed from both institutions.
3. The Researcher from the University of Nottingham and Supervisor from the CAS Behavioural Health are responsible for co-ordination of all data management, sharing and accessibility activities. Both will maintain databases of all data collected by the project and make the information accessible, according to the points below.
4. The researcher and CAS Behavioural Health supervisor shall take responsibility for ensuring that all Data (including data in any electronic format) is stored securely. Both shall take appropriate measures to ensure the security of such data and guard against unauthorised access thereto or disclosure thereof or loss or destruction.
5. Each partner in this research project agrees to supply all primary data and associated metadata collected as part of the project, to the co-ordinating institution for examination purposes, if required.
6. The coordinating institution will provide instructions and support on the practical aspects of this process.
7. The co-ordinating institution will make the data available 24 months post generation if requested, for examination purposes.
8. Before the primary data is made published, project researcher will have a reasonable period of time in which to use the data for the agreed purposes.
9. The co-ordinating institution will safeguard the data and ensure that the researcher that have a right to access the data can do so both before and after the public release date.
10. The institutions have signed below to acknowledge that this Agreement shall apply to the above-mentioned project.

Signed on behalf of the University of Nottingham;



Researcher – Sapphire-Violet Rossdale, University of Nottingham



Co-ordinating Supervisor – Dr Vincent Egan, University of Nottingham

Signed on behalf of the CAS Behavioural Health;



Consultant Neuropsychiatrist and R&D Lead, Dr Srinivas Lanka

Appendix L

University of Nottingham Ethical approval

Direct line/e-mail
+44 (0) 115 8232561
Louise.Sabir@nottingham.ac.uk 4th October 2016

Sapphire-Violet Rossdale
Forensic Psychology Doctoral Training Student c/o Dr Shihning Chou
Yang Fujia Building Jubilee Campus Wollaton Road Nottingham
NG8 1BB

Dear Sapphire-Violet,

Ethics Reference No: DFPT3092016 – **please always quote**	
Study Title: Service Evaluation: Predictive Validity of the HCR-20 Version 3 for incidents of inpatient violence in Psychiatric Patients: The Effect of Gender. **Short Title:** Validity of HCR-20	
Chief Investigator/Supervisor: Dr Ruth Tully, Consultant Forensic Psychologist & Assistant Professor, Centre for Forensic and Family Psychology, Division of Psychiatry and Applied Psychology	
Lead Investigators/student: Sapphire-Violet Rossdale, Forensic Psychology Doctoral Training student.	
Type of Study: secondary data analysis, Service evaluation. Student project	
Proposed Start Date: 12/10/2016	**Proposed End Date:** 30/062017 8mths
No of Subjects: n/a dataset analysis	**Age:** n/a
School: Medicine	

Thank you for submitting the above application which has been reviewed by the Committee and the following documents were received:

Short Title: Validity of HCR-20

- Cambian Research And Development Approval Form dated 13/09/2016
- E-mails of support/Permission: Dr Srinivas Lanka, Consultant Neuropsychiatrist, Specialist Mental Health Services, The Cambian Group dated 08/09/2016

This is a service evaluation using secondary data analysis and does not require full research ethics committee review because it is using anonymised data and permission has been granted by the Cambian Group. This student project has been given a favourable opinion.

A favourable opinion is given on the understanding that the conditions set out below are followed:

1. You must follow the protocol agreed and inform the Committee of any major changes using a notification of amendment form (please request a form).

2. This study is approved for the period of active recruitment requested. The Committee

also provides a further 5 year approval for any necessary work to be performed on the study which may arise in the process of publication and peer review.

1. An End of Project Progress Report is completed and returned when the study has finished (Please request a form).

Yours sincerely



Professor Ravi Mahajan
Chair, Faculty of Medicine & Health Sciences Research Ethics Committee

Appendix M
START incident log

Name:	Date of Birth:	Date of incident:	Time of incident:	IR1 number if applicable:

Verbal Aggression	Physical Aggression Against Objects	Physical Aggression Other People	Self-Harm
☐ 1. Makes loud noises, shouts angrily. ☐ 2. Yells mild personal insults (e.g. "you're stupid). ☐ 3. Curses viciously, uses foul language in anger, makes moderate threats to others/self. ☐ 4. Makes clear threats of violence towards others (e.g. "I'm going to kill you") or request help to control self.	☐ 1. Slams door, scatters clothing, makes a mess. ☐ 2. Throws objects down, kicks furniture without breaking it, marks the wall. ☐ 3. Breaks objects, smashes windows. ☐ 4. Sets fires, throws objects dangerously.	☐ 1. Makes threatening gesture, swings at people, grabs at clothes. ☐ 2. Strikes, kicks, pushes, or pulls hair (without injury to them). ☐ 3. Causes mild-moderate physical injury (e.g. bruises, sprain, welts). ☐ 4. Causes severe physical injury (e.g. broken bones, deep lacerations, internal injury).	☐ 1. Picks/scratches skin, hits self, pulls hair (with no minor injury only). ☐ 2. Bangs head, hits fist into objects, throws self onto floor or into objects (hurts self without serious injury). ☐ 3. Small cuts or bruises, minor burns. ☐ 4. Mutilates self, makes deep cuts, bits that bleed, internal injury, fracture, loss of consciousness, loss of teeth.
Suicide	**Unauthorised Leave**	**Substance Use**	**Self-Neglect**
☐ 1. Occasional feelings of being tired or living or better off dead. Abstract and general thoughts. Occasional suicide ideation, denies intent or plans. ☐ 2. Reports persistent suicide ideation resulting in distress, denies plans (e.g. thoughts about a method). ☐ 3. Reports frequent and persistent suicide ideation and intent. Voices concrete plans or makes low lethality suicidal gestures or attempts OR impulsive suicide attempt using low-lethality means (superficial cutting) or with high likelihood of rescue (e.g. in plain view, during scheduled checks). ☐ 4. Describes specific, detailed plan and intent. Searches for appropriate means and time OR potentially serious attempt using lethal means. Plan reflects low likelihood of resuscitation or discovery, readily available means.	☐ 1. Returns late from unescorted day or weekend leave without prior notification or adequate explanation. ☐ 2. Returns, or is returned, from unescorted day/weekend leave 24 hours or later. ☐ 3. Absconds from escorted leave/day/weekend leave. ☐ 4. Escapes from hospital and is returned by Police, or is not returned.	☐ 1. Occasional user of mild (alcohol/marijuana) without physical, behavioural, emotional, relationship, occupational, or educational impairment. ☐ 2. Occasional substance use leading to mild physical, behavioural, emotional, relationship, occupational, or educational impairment. ☐ 3. Frequent substance use leading to significant physical, behavioural, emotional, relationship, occupational, or educational impairment. ☐ 4. Regular, compulsive use leading to severe physical, behavioural, emotional, relationship, occupational, or educational impairment.	☐ 1. Needs occasional prompting, no serious implications respond to direction. ☐ 2. Needs more persistent prompting, moderate implications, does not respond consistently to direction. ☐ 3. Demonstrates unsafe behaviour likely to cause serious (but not life threatening implications, does not respond to direction) ☐ 4. Demonstrates life-threatening behaviour (e.g. hunger strikes, not seeking emergency medical treatment).
Being Victimised	**Sexually Inappropriate**	**Stalking**	**Other (please detail below)**
☐ 1. Results in mild emotional/financial injury, property damage, fear or intimidation. ☐ 2. Results in moderate/severe emotional injury, fear/intimidation, financial injury, but without physical injury. ☐ 3. Results in mild-moderate physical injury (e.g. bruises, sprain, welts). ☐ 4. Results in severe physical injury (e.g. broken bones, deep lacerations, internal injury).	☐ 1. Sexually threatening, inappropriate or suggestive statements/behaviours. ☐ 2. Exposes genitals to others, masturbates in public or is voyeuristic. ☐ 3. Sexually touches or fondles others non-consensually. ☐ 4. Has coercive sexual activities (rape with/without penetration, oral, genital, or anal), with/without physical beating.	☐ 1. Non-contact (e.g. talking about, loitering near, or following victim) ☐ 2. Contact (e.g. phoning, sending notes, talking to victim in person) ☐ 3. Aggressive, threatening contact (e.g. threats to damage property, threats to self, threats to harm the target, verbal abuse) ☐ 4. Violent contact (e.g. physical aggression, destruction to property). Stalking involves supervision violations.	

Appendix N
HCR-20v3 scoring sheet

HCR-20V3 Rating Sheet for Version 3 of the HCR-20

Kevin S. Douglas, Stephen D. Hart, Christopher D. Webster, & Henrik Belfrage

Name	Record Number
DOB	Gender
Nature/Purpose of Evaluation	

HCR-20V3 Items		Presence				Relevance			
		Omit	N	P	Y	Omit	L	M	H
Historical Scale (History of problems with...)									
H1.	Violence	☐	☐	☐	☐	☐	☐	☐	☐
	a. As a Child (12 and under)	☐	☐	☐	☐	☐	☐	☐	☐
	b. As an Adolescent (13–17)	☐	☐	☐	☐	☐	☐	☐	☐
	c. As an Adult (18 and over)	☐	☐	☐	☐	☐	☐	☐	☐
H2.	Other Antisocial Behavior	☐	☐	☐	☐	☐	☐	☐	☐
	a. As a Child (12 and under)	☐	☐	☐	☐	☐	☐	☐	☐
	b. As an Adolescent (13–17)	☐	☐	☐	☐	☐	☐	☐	☐
	c. As an Adult (18 and over)	☐	☐	☐	☐	☐	☐	☐	☐
H3.	Relationships	☐	☐	☐	☐	☐	☐	☐	☐
	a. Intimate	☐	☐	☐	☐	☐	☐	☐	☐
	b. Non-intimate	☐	☐	☐	☐	☐	☐	☐	☐
H4.	Employment	☐	☐	☐	☐	☐	☐	☐	☐
H5.	Substance Use	☐	☐	☐	☐	☐	☐	☐	☐
H6.	Major Mental Disorder	☐	☐	☐	☐	☐	☐	☐	☐
	a. Psychotic Disorders	☐	☐	☐	☐	☐	☐	☐	☐
	b. Major Mood Disorders	☐	☐	☐	☐	☐	☐	☐	☐
	c. Other Major Mental Disorders	☐	☐	☐	☐	☐	☐	☐	☐
H7.	Personality Disorder	☐	☐	☐	☐	☐	☐	☐	☐
	a. Antisocial, Psychopathic, and Dissocial	☐	☐	☐	☐	☐	☐	☐	☐
	b. Other	☐	☐	☐	☐	☐	☐	☐	☐
H8.	Traumatic Experiences	☐	☐	☐	☐	☐	☐	☐	☐
	a. Victimization/Trauma	☐	☐	☐	☐	☐	☐	☐	☐
	b. Adverse Childrearing Experiences	☐	☐	☐	☐	☐	☐	☐	☐
H9.	Violent Attitudes	☐	☐	☐	☐	☐	☐	☐	☐
H10.	Treatment or Supervision Response	☐	☐	☐	☐	☐	☐	☐	☐
OC-H	Other Considerations	☐	☐	☐	☐	☐	☐	☐	☐

Violence Risk Assessment for females: The HCR-20

HCR-20^{V3} Items		Presence				Relevance			
		Omit	N	P	Y	Omit	L	M	H
Clinical Scale (Recent problems with...)		Rating Period: _____							
C1.	Insight	☐	☐	☐	☐	☐	☐	☐	☐
	a. Mental Disorder	☐	☐	☐	☐	☐	☐	☐	☐
	b. Violence Risk	☐	☐	☐	☐	☐	☐	☐	☐
	c. Need for Treatment	☐	☐	☐	☐	☐	☐	☐	☐
C2.	Violent Ideation or Intent	☐	☐	☐	☐	☐	☐	☐	☐
C3.	Symptoms of Major Mental Disorder	☐	☐	☐	☐	☐	☐	☐	☐
	a. Psychotic Disorders	☐	☐	☐	☐	☐	☐	☐	☐
	b. Major Mood Disorders	☐	☐	☐	☐	☐	☐	☐	☐
	c. Other Major Mental Disorders	☐	☐	☐	☐	☐	☐	☐	☐
C4.	Instability	☐	☐	☐	☐	☐	☐	☐	☐
	a. Affective	☐	☐	☐	☐	☐	☐	☐	☐
	b. Behavioral	☐	☐	☐	☐	☐	☐	☐	☐
	c. Cognitive	☐	☐	☐	☐	☐	☐	☐	☐
C5.	Treatment or Supervision Response	☐	☐	☐	☐	☐	☐	☐	☐
	a. Compliance	☐	☐	☐	☐	☐	☐	☐	☐
	b. Responsiveness	☐	☐	☐	☐	☐	☐	☐	☐
OC-C	Other Considerations	☐	☐	☐	☐	☐	☐	☐	☐
Risk Management Scale (Future problems with...)		Rating Period: _____				Context: ☐In ☐Out			
R1.	Professional Services and Plans	☐	☐	☐	☐	☐	☐	☐	☐
R2.	Living Situation	☐	☐	☐	☐	☐	☐	☐	☐
R3.	Personal Support	☐	☐	☐	☐	☐	☐	☐	☐
R4.	Treatment or Supervision Response	☐	☐	☐	☐	☐	☐	☐	☐
	a. Compliance	☐	☐	☐	☐	☐	☐	☐	☐
	b. Responsiveness	☐	☐	☐	☐	☐	☐	☐	☐
R5.	Stress or Coping	☐	☐	☐	☐	☐	☐	☐	☐
OC-R	Other Considerations	☐	☐	☐	☐	☐	☐	☐	☐

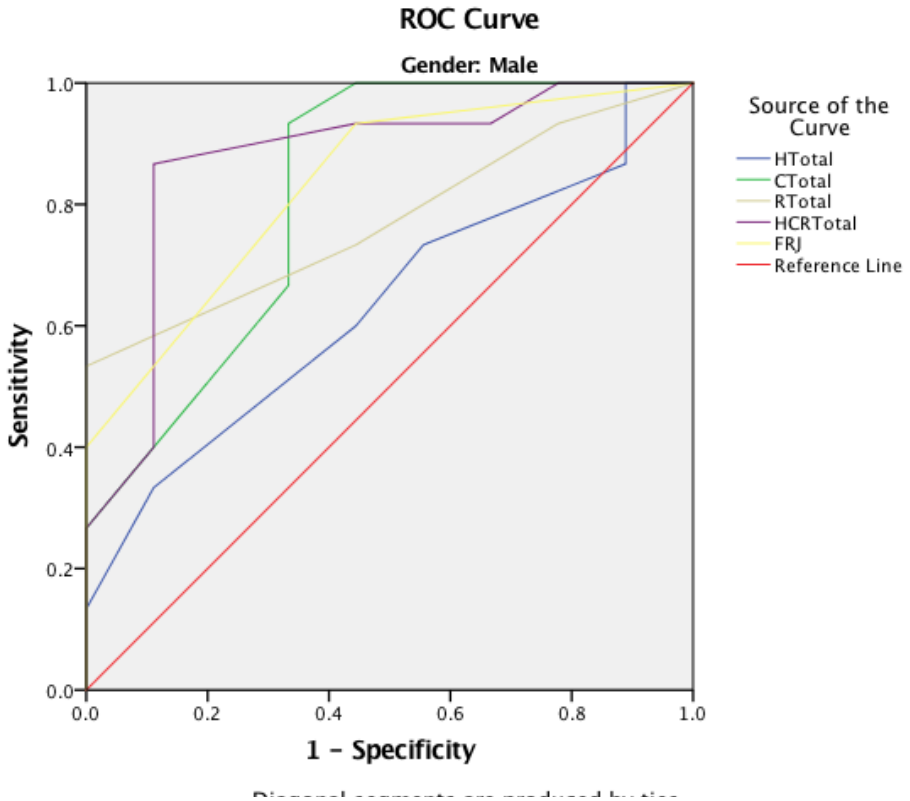
Future Violence/ Case Prioritization	Serious Physical Harm	Imminent Violence	Recommended Reassessment Date
☐Low ☐Moderate ☐High	☐Low ☐Moderate ☐High	☐Low ☐Moderate ☐High	YY/MM/DD: _____

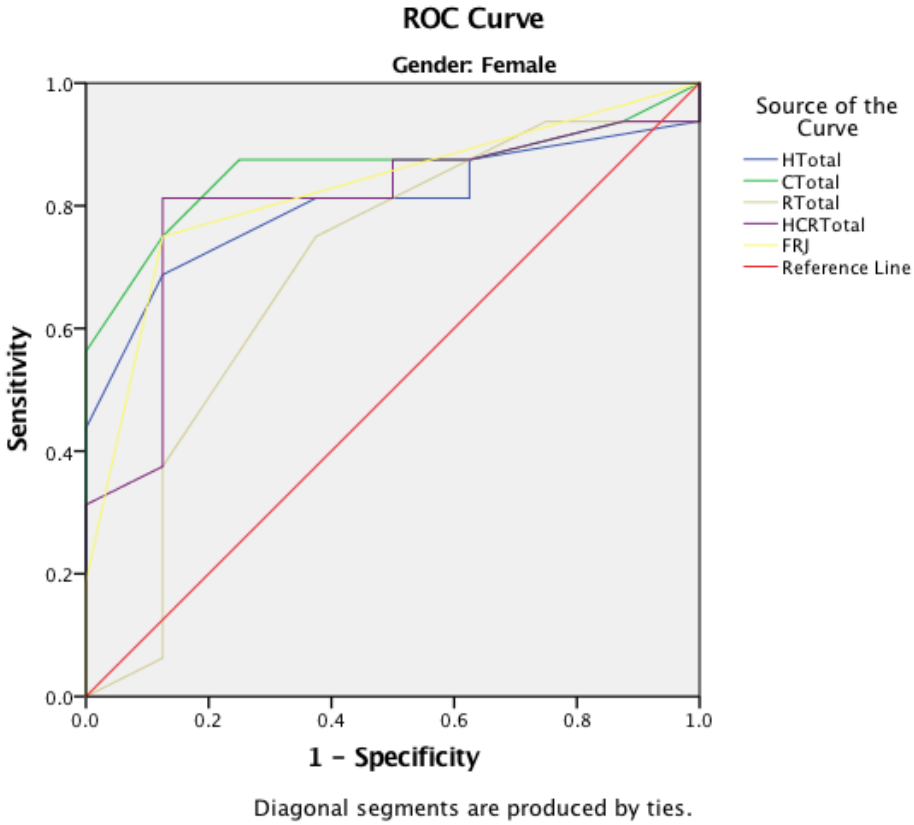
Evaluator	Signature	Date

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Appendix O

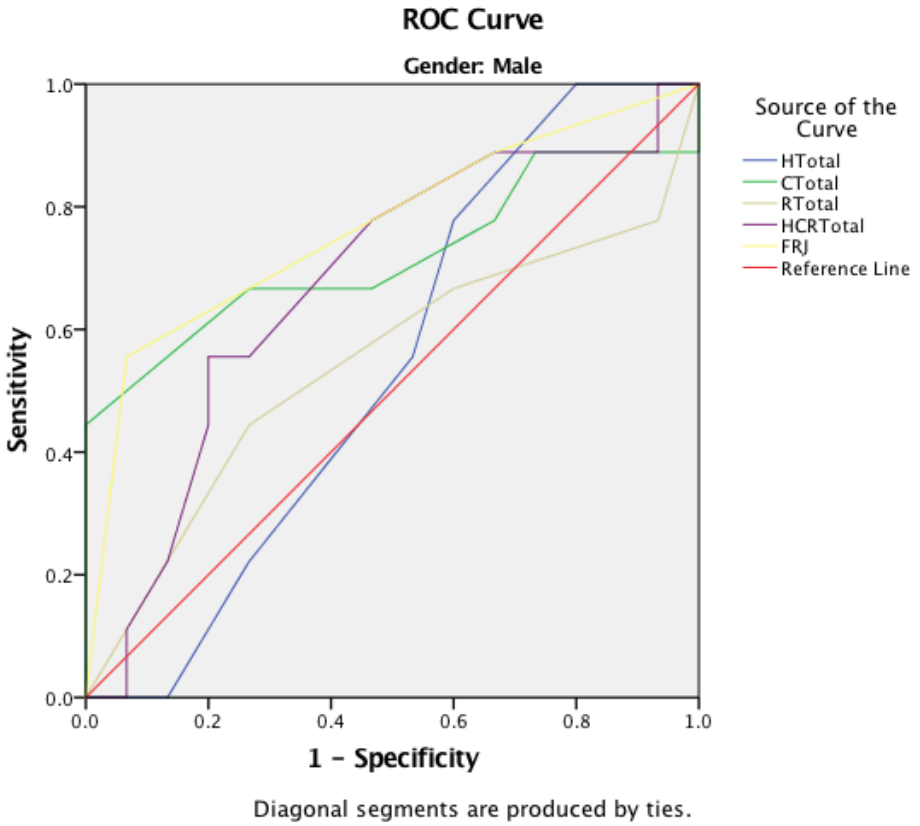
ROC Curve for verbal violence for H, C, R, Total, and FRJ for males and females

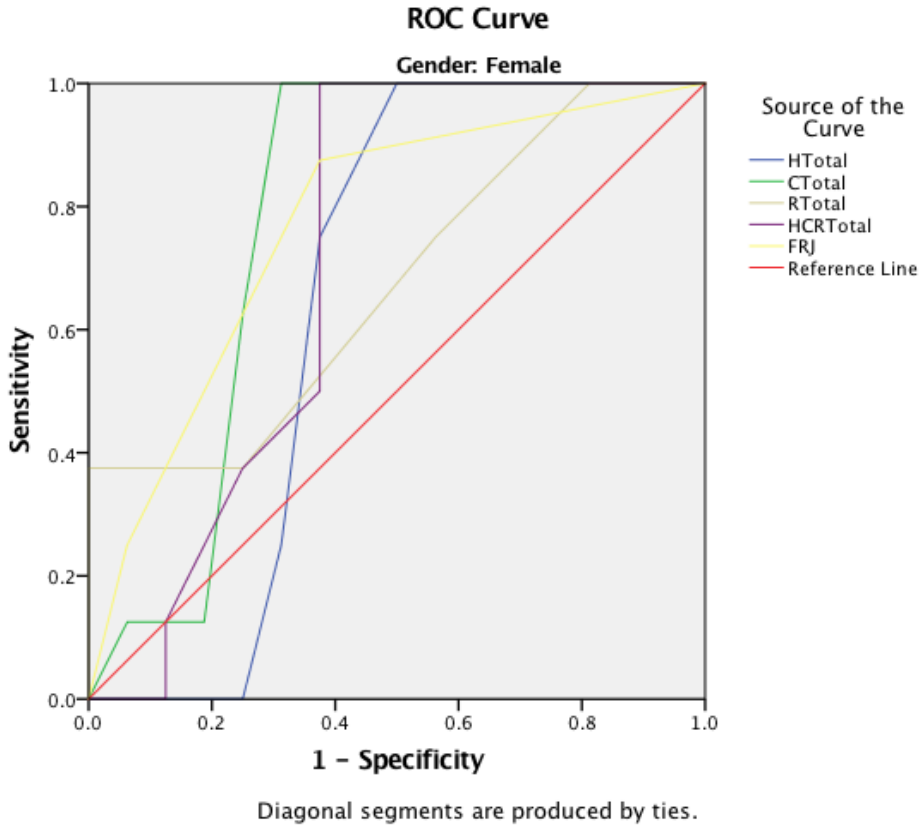




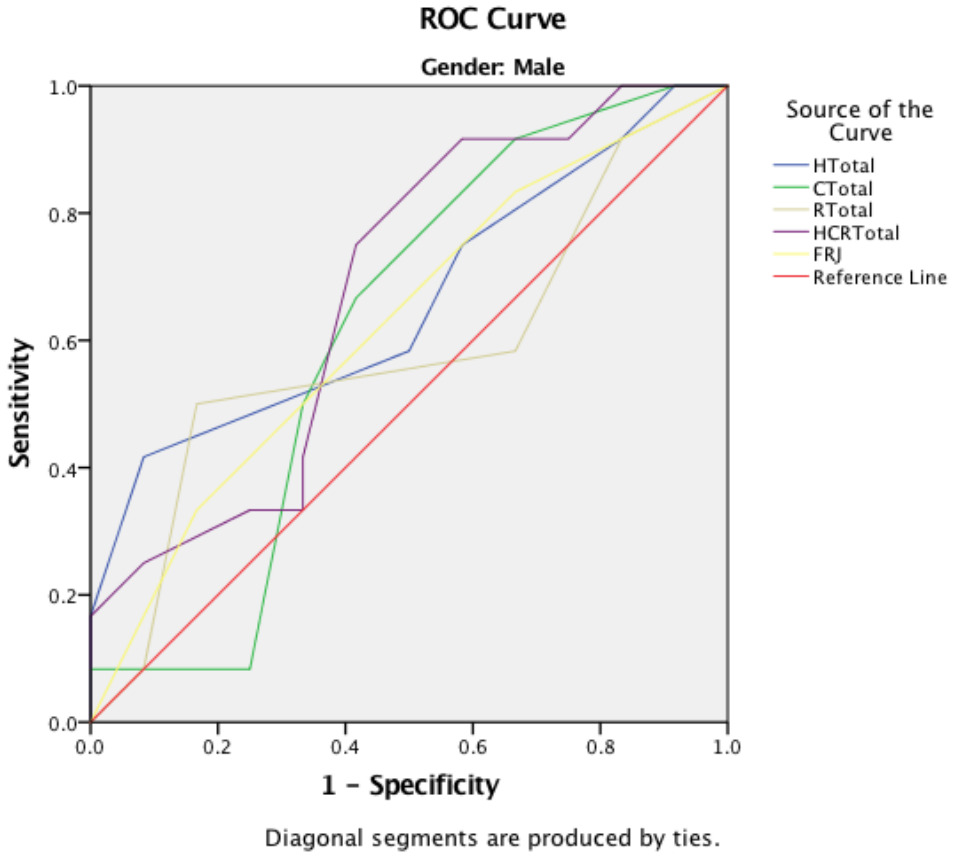
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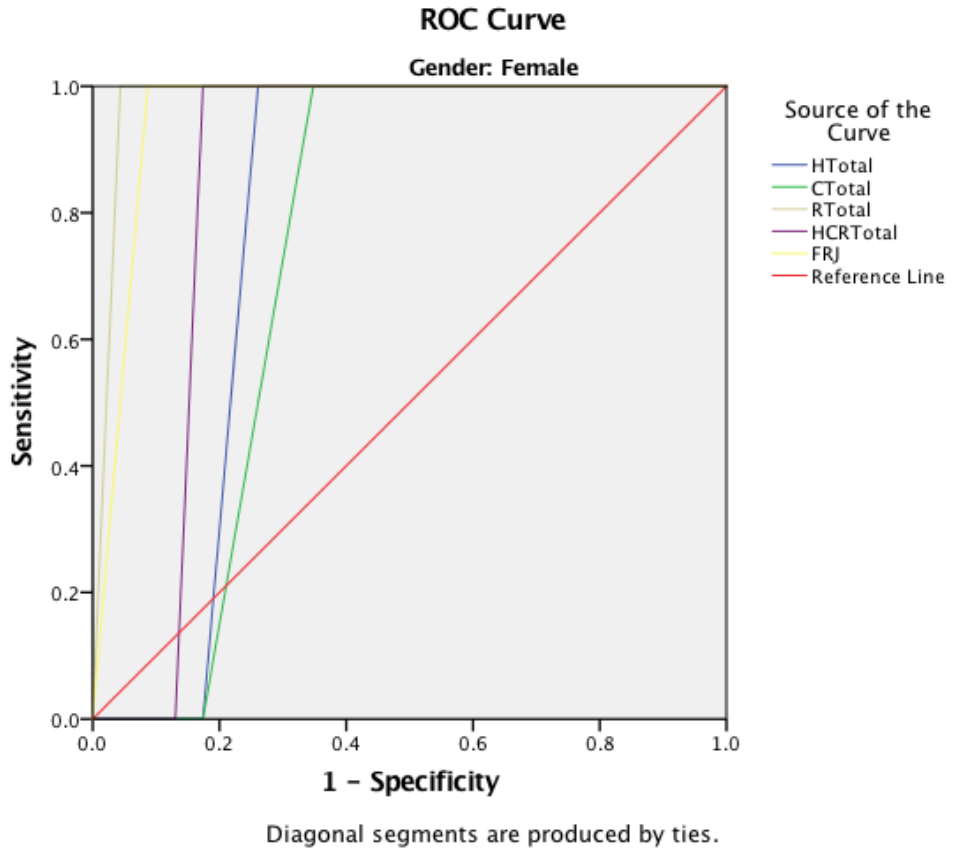
ROC Curve for physical violence for H, C, R, Total, and FRJ for males and females



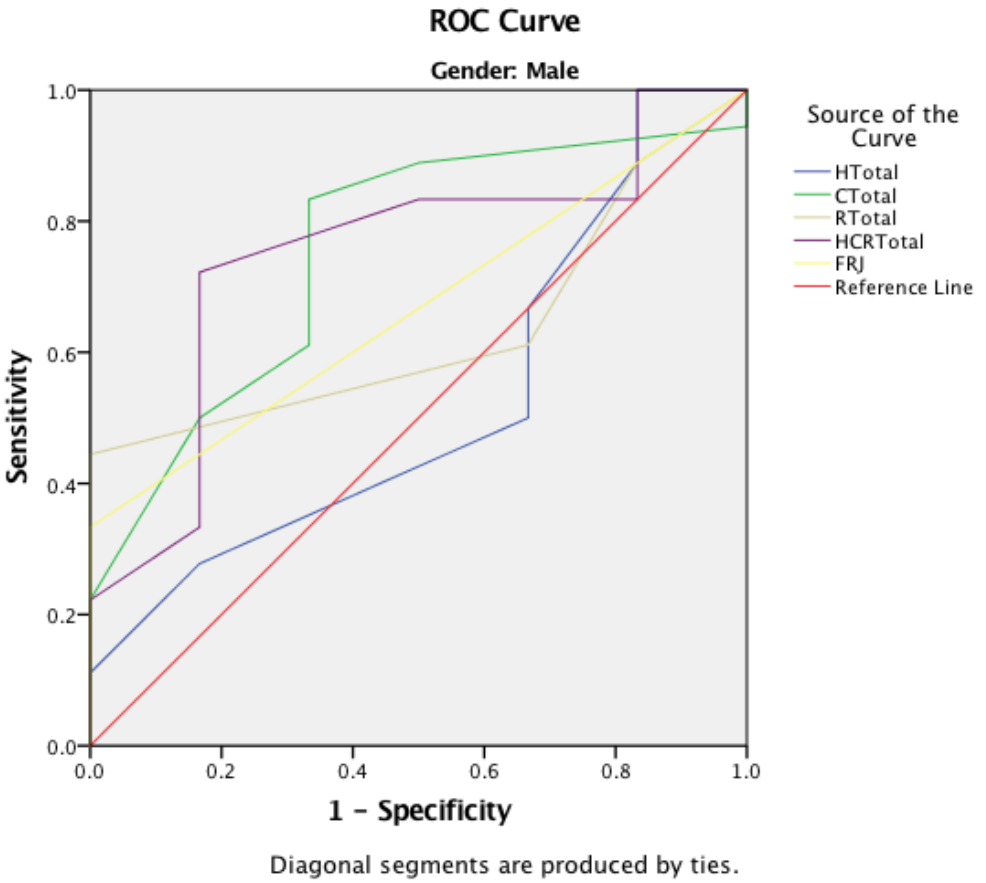


ROC Curve for sexual violence for H, C, R, Total, and FRJ for males and females

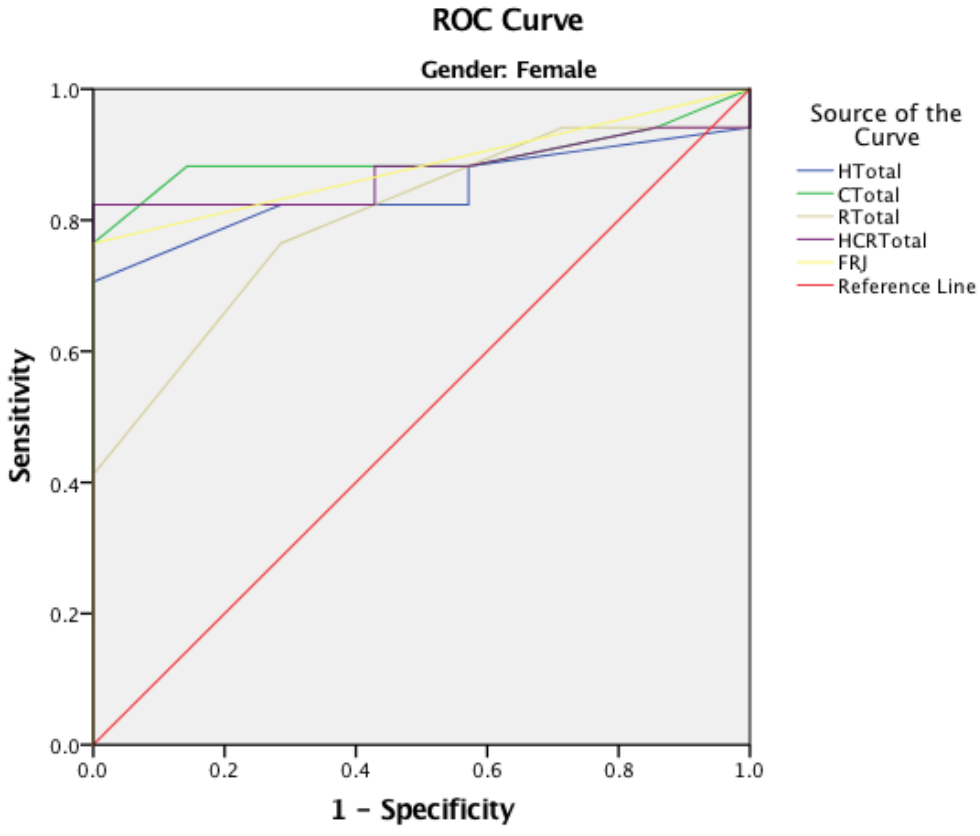




ROC Curve for all violence for H, C, R, Total, and FRJ for males and females



Diagonal segments are produced by ties.



Diagonal segments are produced by ties.

Appendix P



THE UNIVERSITY OF NOTTINGHAM

DOCTORATE IN FORENSIC PSYCHOLOGY (D.FOREN.PSYCH)

CLIENT CONSENT TO COURSE WORK ASSIGNMENTS

I understand that *, hereafter referred to as 'the trainee' would like my permission to use information about me to complete a course work assignment (oral case presentation and/or written case report).

I understand that the work will not contain any information that would reveal my personal identity i.e. my name or address; rather I will be referred to via a pseudonym or case number.

The work may be discussed in the trainee's supervision and personal development group or looked at by other trainees to help their learning.

I understand that the work will be checked by the trainee's supervisor and The University of Nottingham to see that my anonymity and confidentiality have been safeguarded.

I understand that course work assignments (and material relating to these) are kept in securely locked premises and are not available for public access.

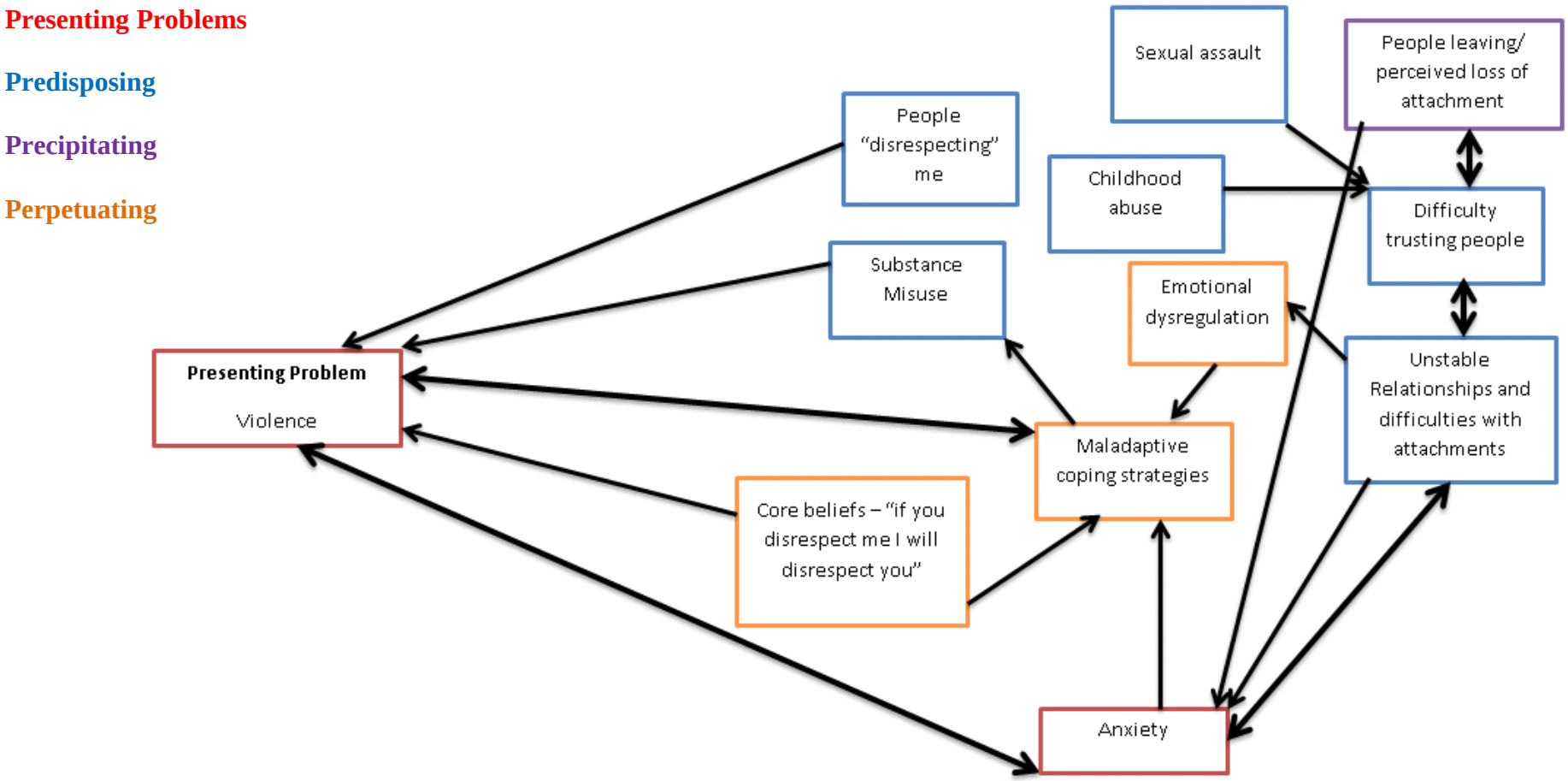
I understand that I do not have to allow information about me to be used in this way. I can change my mind and refuse my consent at any stage and this will have no effect on the treatment offered to me.

Name of Client:

Client's signature:

Date:

Appendix Q


Presenting Problems
Predisposing
Precipitating
Perpetuating
Sexual assault
People leaving/ perceived loss of attachment
People "disrespecting" me
Childhood abuse
Difficulty trusting people
Substance Misuse
Emotional dysregulation
Presenting Problem
Violence
Unstable Relationships and difficulties with attachments
Maladaptive coping strategies
Core beliefs – "if you disrespect me I will disrespect you"
Anxiety