



Predictive Accuracy Following IVY Consultations

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Date 30 06 23



Abstract

Despite the proliferation of consultation as an approach, there has been little research on the accuracy of group decision-making. Research on human decision-making in groups has demonstrated little evidence of accuracy of prediction and numerous flaws in human judgement. This study focused on the ability to predict future risk behaviour of young people who have been referred to the IVY Project, in order to assess whether the group consultation model was able to produce a reasonable understanding of a young person under discussion. Seven areas of potential risk were explored: violence, sexual violence, suicidality, deliberate self-harm, accidental self-harm, risk of abuse and exploitation, and harm from somatic illness. Predictions of future violence performed within fair levels of prediction (approx 0.7 AUC) and sexual violence functioned to a good level of prediction but there was a low frequency of harmful sexual behaviour in the three months following assessment within this population. The consultation process is able to model future behaviour and provide recommendations on risk management but there may be a tendency for over prediction and amplification of need. The levels of predictive accuracy did not indicate that the model could or should replace individual risk assessment.



Introduction:

The IVY Project

The Interventions for Vulnerable Youth (IVY) project is a Scottish Government funded service formed in 2013 to improve practice when working with young people who are at risk of offending. The IVY project uses a multi-disciplinary approach to provide risk formulation, psychological assessment, and intervention for young people with complex needs and high risk or violent behaviour. The team around the child take part in two-hour-long group consultations with the IVY team, including two professionals from social work or psychology backgrounds, at the initial stage of risk formulation. The approach uses affirmative inquiry (Barret, 1995) as a guiding principle, with variations according to the case in hand.

An evaluation of the service was carried out in 2015, eliciting 68 responses from practitioners involved in the IVY project across social work, residential care, police, education and mental health practitioners (Moodie & Anderson, 2015). Advice and support for practitioners was highlighted as a core aim of the consultation service, and respondents perceived the Risk Analysis Reports to be highly accurate and reported increases in their own understanding. However, this evaluation is limited by the nature of satisfaction-report surveys, which tend to return positive outcomes of supervisory relationships that are likely to decline with repetition and familiarity with the service (Worwood & Fredman, 2018). User satisfaction with services in this context, though important, is not a direct measure of the outcomes of IVY service users, and should not be interpreted as such. There is evidence that recommendations derived from satisfaction reports, which typically assess factors such as communication within a service, can have adverse effects on the welfare of patients and clients (Junewicz & Youngner, 2015).



Group Consultation

Consultation has long been considered an effective approach to mental health intervention, and its application within mental health services for children and young people is increasingly prevalent (Green, Everhart, Gordon & Garcia Gettman, 2006). Consultation involves “a collaborative relationship between a consultant with mental health experience and one or more individuals in a [...] childcare setting” (Green et al., 2006, p. 142) whereby professionals from outside the organisational and line management structure observe the system and contribute their views on what could be done to help or support the service user and improve the functioning of the system. The process is supportive and avoids criticism of practitioners, while reflecting on why and how practice has developed, and how to successfully work with children and young people with mental health challenges. Consultation can be delivered at an individual level, where the consultant or consultation agency works with service providers to develop strategies and techniques to support an individual child, or at program level, where the consultation is focused on the services provided by a care setting, and their operation, training and delivery.

Consultation as an approach in mental health settings has been found to reduce staff burnout in children’s services, and reduce negative incidents and schools exclusions for young people (Green et al, 2006). Additionally, an evaluation of the effectiveness of consultation among offenders with mental health challenges found that it improved outcomes such as reduced self-harm, decreased likelihood of further offending, and increased time spent out of prison (Minoudis, Shaw & Craissati, 2012).

However, there is a body of evidence that highlights the shortcomings of group decision making, for instance that increased confidence in judgement does not always align with increased accuracy (Puncochar & Fox, 2004). Significantly for this research, group consultation can result in groups supporting more polarised, extreme and aberrant judgements with greater confidence in their conclusions (Sunstein & Hastie, 2015). Groups, just like individuals, are subject to influence from variations such as information presentation and systematic or random biases; on top of which, groups are also subject to influence from factors that do not exist for individuals, such as disagreement, or perceived expertise of other members of the group (Sneisek, 1992). In recent popular texts the psychologists Kahneman, Sibony and Sunstein (2021) term these influencing factors ‘Noise’ and ‘Bias’, and analyse how they impact predictive judgements, including



in relation to criminal sentencing. The small size of the IVY project and the breadth of the catchment (all of Scotland) precludes any meaningful analysis of the project as effecting outcomes for the whole population, but it is possible to explore what emerges from consultations and the ability to model the risks held in any one young person. To provide meaningful recommendations for future risk management it is important to be able to correctly frame and predict future outcomes.

Methodology

This study aimed to determine the efficacy of group consultation in predicting future risk of dysfunctional behaviour amongst individuals who are part of the IVY project. The seven common behavioural outcomes that are categorised as dysfunctional behaviour by Child and Adolescent Mental Health Services (CAHMS) used in this study were: violence and aggression, sexual violence, suicidal behaviour or ideation, deliberation self-harm, accidental self-harm, issues of abuse or exploitation, or harm from somatic illness.

IVY clinicians rated the likelihood of each occurring in the three-month period following consultation as either high, medium, or low. A score of either medium or high was interpreted as a prediction that the behaviour would occur. Referrers to the service were then contacted at the end of the three-month period to report whether these behaviours could be considered present. Data was recorded as a binary either present or absent. The short length of observation is used due to the rapidly changing circumstances of the young people involved in the service. It is recognised that this may limit the validity of data for behaviours that are less frequent and less easily detected such as harmful sexual behaviour.

Of 48 cases considered, 40 provided meaningful data on the outcomes. In the remaining 8 cases, the referrer either could not be contacted, or they had lost contact with the young person due to relocation or reassignment from the case. Statistical analysis was completed using Receiver Operator Characteristics using the Web Based ROC Calculator (Eng 2022).



Results

1. Violence and Aggression

The results relating to violence indicate that the consultation process is able to determine risk of future violence within three months of consultation. Prediction in this area is just below the good range of prediction, at AUC: 0.697, but this could be fitted to AUC 0.724. Sensitivity is high (95.7%), with only one occurrence of violence missed, tending towards overprediction (specificity 29.4%), with 12 false positives recorded across the 40 cases.

There were few cases in the sample for whom violence was not a feature of past behaviour; the behavioural stability of violence and aggression compared to other behaviours appears to mean the behaviour is more likely to occur in the short follow-up interval of this study (Olweus, 1979). This was also the behaviour that most frequently had higher ratings, with the mode rating for violence and aggression being moderate risk. There may be incidents of under-reporting or of concealment, as all cases in the sample were living in the community.

2. Sexual Violence

Sexual violence was a far less frequently occurring behaviour and was only reported in one of the 40 cases, which made construction of ROC difficult. Nonetheless, empiric AUC performs at 0.846, with sensitivity of 100% and specificity at 71.8%. No positive cases were missed, but 11 negative cases were predicted. This fits with the hypothesis that low frequency of behaviour would make this hard to predict, with a tendency towards overprediction.

3. Suicidal Behaviour or Ideation

Serious suicidal behaviour occurred infrequently, in only five of the 40 cases. It was accurately predicted in the sample with a positive AUC of 0.886, and similarly positive sensitivity of 80% and specificity of 97.1%. In one of these cases, the behaviour was given as a false negative, and had not been detected from past behaviour discussed in consultation. In line with recommendations of Rice and Harris (2005), evidence is presented numerically rather than through categorisation, with moderate risk ratings being taken as a positive rating. However, when looking at the categorisation, there was a lack of confidence in the ratings for this behaviour. All risk ratings were given as low



or moderate, and no cases were given a rating of high risk. It is not possible to draw distinctions or links between suicidal behaviours and completed suicide (see O'Connor, Rasmussen and Haton, 2009).

4. Deliberate Self-harm

This behaviour occurred slightly more frequently within the sample, and demonstrates positive aspects of the model of consultation. The AUC statistic for deliberate self-harm was 0.765, indicating the prediction was within good range, but with modest sensitivity, at 66.7%, and specificity at 88.2%.

5. Accidental self-harm

Accidental self-harm relates to harm or injury through misadventure such as climbing on buildings. A poor level of prediction was found, with AUC of 0.611, sensitivity of 60%, and specificity of 54.3%.

6. Risk of Abuse and Exploitation

Risk of abuse or exploitation relates to periods of absconding or being collected by services from situations of peril. For this behaviour, predictions performed at the edge of good range, with reasonable AUC of 0.69 that could be structured to fit ROC 0.712, sensitivity of 66.7% and specificity of 64.5%.

7. Risk from Somatic Illness

This behaviour was not calculable as it was only found in one of the 40 cases referred to the project.



Table with Summary Statistics from Received Operator Characteristics Assessment

Risk Area	Mode (Range: High to Low)	Area Under the Curve (AUC)	Sensitivity	Specificity	Occurrence of Behaviour within Sample	Accuracy	Positive Cases Missed	Negative Cases Missed
Violence	Moderate	0.697%	95.7%	29.4%	23/40	67.5% 27/40	1	12
Sexual violence	Low	0.846	100%	71.8%	1/40	72.5% 29/40	0	11
Serious Suicidal Behaviour	Low	0.886	80%	97.1%	5/40	95% 38/40	1	1
Deliberate Self-Harm	Low	0.765	66.7%	88.2%	6/40	85% 34/40	2	4
Accidental Self-Harm	Low	0.611	60%	54.3%	4/40	55% 22/40	2	16
Deliberate Self-Harm	Low	0.69	66.7%	64.5%	9/40	65% 26/40	3	11



Discussion

This is the first attempt known to the researchers to assess the accuracy of consultation as a means of augmenting mental health service delivery. Despite the increasing use of consultation as an approach in this field, there are often few measurable outcomes assessed in the process (Wordwood & Fredman, 2018).

Interpreting the results

The results here provide preliminary support for the ability of the IVY project team to make somewhat accurate predictions about the future behaviour of young people in their service. This would indicate that consultation, as a central feature of the processes within IVY, can provide a reasonably accurate picture of the young person and generate useful advice on potential risk, helping to effectively reduce risk.

The data from this study indicates that there is a tendency to over-predict risk, which supports an established pattern of conservative bias in risk assessment amongst groups working with offenders (Cohen, Lowenkamp, Bechtel & Flores, 2020). This may in some cases generate advice and interventions that could lead to increased risk, where overly restrictive care processes or interventions lead to negative outcomes for young people (Bynoe, Collin and Clarke, 2021).

The data would not suggest that consultation could or should replace direct assessment of young people. In line with this, further assessments are undertaken through the IVY service when there are pertinent issues to address or continue working on in relation to the young person under discussion.

Limitations

The sample size and length of observation period were necessarily limited. Most consultations that took place over the year were included in this study, and the focus was on the immediate behavioural risks of young people. Reporting behaviour over six months may increase predictive accuracy, and replicating the research in other sites to determine whether these findings can reliably be reproduced in other populations of vulnerable young people with high risk behaviour would contribute to more robust evidence on the efficacy of consultation as an approach.



The willingness of practitioners to take on the voluntary and additional process of consultation reflects a dedication to the care of the young person in this service, and there may be an element of self-selection within the study population.

Conclusions

There are numerous benefits to consultation as an approach for organisations, professionals, and service users. Organisations benefit from the resource of skilled professionals, and can use consultation to increase the efficiency of their models and services, leading to financial benefits as well as improved services and delivery. Service users benefit from more efficient and better models (such as care plans), informed by professionals from a range of backgrounds. There are many advantages of wrap-around support and the opportunity (and willingness) for a young person to access support from a range of sources, including reduced risk-taking behaviour and increased life chances (see Silver & Eddy, 2006; MacQueen & McVie, 2013; Youth Justice Board 2010; McAra & McVie, 2017).

Research into decision-making in risk assessment and the flaws in human decision-making consistently cautions against moving away from the point of direct observation and assessment, and highlights the limitations of group decision making in risk assessments (Harris, Rice, Quinsey & Cormier, 2015). This is reflected in the processes of the IVY service, which makes use of further assessment and intervention to support young people. Services should nonetheless keep in mind the benefits of the consultation process that are not discussed here, relating to positive risk-taking. Consultation as a means of empowering professionals to support positive risk-taking in young people would align with recommendations against overly restrictive care plans in support of desistance.

The results concur with an established pattern in offender management of over-estimation of risk, and conservative bias in risk assessment (Cohen, Lowenkamp, Bechtel and Flores, 2020). Practitioners would be minded by the relative costs of underestimating and overestimation of risk particularly in community settings. Expert consultation drawing should be able to increase the efficiency of services and model the use of resources in the ways that are useful to achieving the best results. This research also helps refine decision making and audit in the service to further improve efficiency.



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