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Review article

Aggression in psychiatry wards: A systematic review

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ABSTRACT

Although fairly frequent in psychiatric in-patient, episodes of aggression/violence are mainly limited to verbal aggression, but the level of general health is significantly lower in nurses who report 'frequent' exposure to violent incidents, and there is disagreement between patients and staff concerning predictors of these episodes. We searched the Pubmed, Embase and PsychInfo databases for English, Italian, French or German language papers published between 1 January 1990 and 31 March 2010 using the key words "aggress*" (aggression or aggressive) "violen*" (violence or violent) and "in-patient" or "psychiatric wards", and the inclusion criterion of an adult population (excluding all studies of selected samples such as a specific psychiatric diagnosis other than psychosis, adolescents or the elderly, men/women only, personality disorders and mental retardation). The variables that were most frequently associated with aggression or violence in the 66 identified studies of unselected psychiatric populations were the existence of previous episodes, the presence of impulsiveness/hostility, a longer period of hospitalisation, non-voluntary admission, and aggressor and victim of the same gender; weaker evidence indicated alcohol/drug misuse, a diagnosis of psychosis, a younger age and the risk of suicide. Alcohol/drug misuse, hostility, paranoid thoughts and acute psychosis were the factors most frequently involved in 12 studies of psychotic patients. Harmony among staff (a good working climate) seems to be more useful in preventing aggression than some of the other strategies used in psychiatric wards, such as the presence of male nurses.

Contents

1. Introduction

1.1. Correlations between psychiatric disorders and aggressiveness

The correlations between psychiatric disorders and violent behaviour have always been a subject of debate, and two questions about which it seems to be particularly difficult to reach agreement

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are whether psychiatric patients more likely to be aggressive, and whether diagnoses predict violent behaviour.

Some authors have claimed that there is a correlation between psychiatric disorders and crime (Penrose, 1939; Gunn and Bonn, 1973), whereas others have found that the prevalence of criminal actions is lower in psychiatric patients than in the general population (Steadman et al., 1974; Hafner and Boker, 1982). However, all of these studies had a number of methodological limitations, including the fact that the samples were selected and not representative of the psychiatric population as a whole (Tardiff, 1998).

Other studies carried out over the last 20 years have gone some way to correcting this bias. The Epidemiology Catchment Area (ECA) study found that the incidence of episodes of violence involving patients with psychiatric disorders (schizophrenia, mania, major depression and bipolar disorder) was five times higher than in the general population (16 times higher in the presence of co-morbid alcohol/substance abuse) (Swanson et al., 1989), and these findings are in line with those of a 30-year longitudinal follow-up study in Sweden (Hodgins et al., 2002). A recent US survey has found that violence is related to psychiatric disorders only in the presence of co-morbid substance use/dependence (Elbogen and Johnson, 2009).

However, although the question of violent behaviour in psychiatric disorders should really be seen in a more general cultural, environmental and social context, it is clear that episodes of violence by patients admitted to psychiatric wards cause serious problems relating to treatment, the other patients, and the staff (Woods and Ashley, 2007).

The psychiatric diagnosis most frequently associated with aggressive behaviour is paranoid schizophrenia (Tardiff, 1998) as patients with paranoid schizophrenia retain sufficient ability to plan and commit acts of violence related to their delusions, whereas the violence of patients with disorganised schizophrenia is not planned and is usually characterized by less serious consequences. Aggressiveness is quite common in anti-social personality disorder (Amore et al., 1998; Dolan and Völlm, 2009; Richard-Devantoy et al., 2009), but only a few studies have investigated the correlation between aggressiveness and borderline personality disorders, which mainly involve violence against objects (Amore et al., 1998), although women involved in violent episodes appear to be more likely to suffer from borderline personality disorder (Sansone and Sansone, 2009). Other psychiatric disorders seem to be less frequently associated with aggressive behaviour.

Episodes of aggression/violence are fairly frequent in psychiatric in-patient wards (James et al., 1990; Miller et al., 1993), but about 75% of them are limited to verbal aggression (Bjørkly, 1999; Jonker et al., 2008) and there is little risk of a serious accident (Cooper and Mendonca, 1991; Bjørkly, 1999; Foster et al., 2007). However, a survey carried out by Wildgoose et al. in Exeter in 2003 found that the level of general health was significantly lower in nurses who report 'frequent' exposure to violent incidents.

2. Rationale and aims

According to Duxbury and Whittington (2005), there is disagreement between patients and staff concerning the predictors of aggression on psychiatric wards: patients perceive environmental conditions and poor communication to be significant precursors of aggressive behaviour, whereas nurses view the patients' mental illnesses as the main reason for aggression even though they recognise the negative impact of an in-patient environment.

Episodes of violence on psychiatric wards have been extensively studied, with one of the main aims being to identify who is more likely to be violent during hospitalisation. Two different methods are currently used. The first is to adopt a clinical approach based on expert opinion concerning patient attitudes and clinical and circumstantial variables; however, it is operator-dependent and influenced by the expert's ability, knowledge and experience (Anderson et al., 2004), looks for explanations of specific behaviours, and considers a patients' behaviour, their reactions to specific circumstances, their insights, and their compliance to drug treatment (Woods and Ashley, 2007). The second makes use of statistics and tries to assess individual variables (mainly based on patient histories) in relation to predetermined variables identified as risk factors. This approach is based on the assumption that a person is part of a population and so, if a factor is frequently associated with aggression in a population, it may also be a risk factor for an individual patient (Doyle and Dolan, 2002).

However, current diagnostic instruments are not very accurate or very efficient (Dolan and Doyle, 2000) and, although many reviews have been published concerning the individual (demographic and clinical) and structural characteristics and circumstances involved in episodes of violence, it seemed to us that a more systematic review is necessary.

3. Methods of the review

This review began with a search of the Pubmed, Embase and PsychInfo databases for English, Italian, French or German language papers published between 1 January 1990 and 31 March 2010 using the key words "aggress*" (aggression or aggressive) "violen*" (violence or violent) and "in-patient" or "psychiatric wards".

Inclusion criteria:

- Adult samples representative of the entire population of psychiatric in-patients and
- Papers written in English, French, Italian or German.

Exclusion criteria

- Selected patient samples
  - A specific psychiatric diagnosis other than psychosis
  - Adolescents or the elderly
  - Men/women only
  - Personality disorders and
  - Mental retardation.
- Treatment strategies and
- Studies carried out in non-acute settings.

Studies of psychotic diagnoses were included because psychosis accounts for a large proportion of the in-patient population.

After excluding duplicates, we initially considered 949 studies: eighteen were excluded because they were in languages other than English, Italian, German or French, 163 because they involved special populations (the elderly, children/adolescents, men/women only, or patients with personality disorders or mental retardation), 399 because they did not respond to the objectives of the review, 144 because they concerned treatments and strategies for preventing violence, 67 because they were assessments of test/rating scales, 35 because they had not been carried out in acute psychiatric wards and 14 were not found.

The final analysis was based on 109 studies, 73 of which were included in a table of unselected psychiatric populations and 14 in a table of psychoses; the other 22 were used for epidemiological purposes or as references for the discussion.

4. Results

4.1. Epidemiology of episodes of aggressiveness in psychiatric wards

There is a considerable difference in the prevalence of episodes of aggressiveness, depending on the countries in which the studies were carried out, their different methods and samples, and their different periods of follow-up. A systematic review by Davis (1991) found that episodes are more frequent in the United States than in other countries. Two population-based studies of large Italian and German samples using similar methods (Grassi et al., 2001; Ketelsen et al., 2007) found a similar prevalence of episodes of physical violence (respectively 7.5% and 7.7%), Salamin et al. a prevalence of 9.5% in

Table 1
Aggressiveness in unselected psychiatric patient samples: associated variables.

Author	Study design	No. of patients	Study Variables	Results
Abderhalden et al. (2007) (Switzerland)	Prospective cohort (3-month follow-up)	2017	Length of stay, ICD-10 psychosis, mood disorder, substance misuse, personality disorder, anxiety disorder, gender, age, voluntary admission	UV: correlation with long hospitalisation, schizophrenia
Amore et al. (2008) (Italy):	Prospective cohort (1-month follow-up)	303	Gender, age, housing status, history of substance abuse, history of aggression, schizophrenia, bipolar disorders, personality disorders, depression	UV: correlation with male gender, substance abuse, positive symptoms of schizophrenia, history of violence, high hostility
Apperson et al. (1993) (USA):	Prospective cohort	32 potentially assaultive at admission *vs.* 32 non-potentially assaultive	History of violence	UV: correlation with history of violence and other predictors
Barlow et al. (2000) (Australia)	Retrospective cohort	1269	Age, mean number of admissions, schizophrenia, other psychotic disorders, bipolar disorder, depression, adjustment disorder, personality disorder, anxiety disorder, cognitive disorder, substance abuse, conduct disorder, self-poisoning, eating disorder,	UV: correlation with bipolar disorder, schizophrenia, age $\leq$32 years, other psychoses, substance abuse; inverse correlation with depression and adjustment disorder
Beauford et al. (1997) (USA)	Prospective cohort (mean follow-up: 16 days)	328	Gender, race, marital status, schizophrenia, bipolar disorder, depression, other psychosis, adjustment disorder, organic psychosis, therapeutic alliance	MV: correlation with poor therapeutic alliance
Biancosino et al. (2009) (Italy)	Multicentre retrospective cohort	1324 pts. (677 men and 647 women)	Gender, age, nationality, marital status, occupation, education, living situation, ICD-10 psychiatric diagnosis, type of admission (voluntary, compulsory, or unknown); patient attitude towards hospitalisation (hostile, unwilling, indifferent, favourable, unknown)	MV: hostile and violent patients were more frequently male ($p=0.018$), younger ($p=0.026$), single ($p=0.003$), unemployed or receiving a disability pension ($p=0.024$), with a secondary school education ($p=0.022$) and a diagnosis of substance/alcohol abuse ($p<0.001$), compulsorily admitted ($p<0.001$), showing hostile attitudes upon admission ($p<0.001$) and no insight ($p<0.001$)
Bjørkly (1999) (Norway)	Prospective cohort (10-year follow-up)	19 referring to security units	Gender	UV: no correlation
Blomhoff et al. (1990) (Norway).	Case–control	25 violent *vs.* 34 non-violent pts.	History of violence, diagnosis (schizophrenia, no psychosis)	UV: correlation with history of violence, schizophrenia
Boggild et al. (2004) (Canada)	Case–control	44 violent *vs.* 61 non-violent pts. (no psychosis)	History of attempted suicide, previous admission to a psychiatric ward, history of violence, being a victim/ perpetrator of sexual abuse, familial history of psychiatric disorder, social environment, social class, housing status, mood disorder, substance misuse, personality disorder	MV: correlation with borderline personality disorder, poor housing status, history of attempted suicide
Bowers et al. (2003) (UK)	Prospective cohort (8 months follow-up)	238 patients	Gender, age, ethnicity, schizophrenia, type of admission	UV: correlation with minority ethnicity, compulsory admission, a diagnosis other than schizophrenia
Bowers et al. (2007) (UK)	Retrospective cohort (mean follow-up: 2.5 years)		Inexperience of medical/nursing staff	UV: no correlation
Bowers et al. (2009) (UK)	Cross-sectional	136 acute psychiatric wards	Race, schizophrenia, patient turnover, alcohol use, substance use, ward doors being locked, and higher staffing numbers (especially qualified nurses)	MV: patient turnover, alcohol use by patients, ward doors being locked, and higher staffing numbers (especially qualified nurses)
Carlile (1993) (Canada)	Prospective cohort (6-month follow-up)	72 pts.	Staff changes, therapy changes, number of visits by relatives, number of control examinations by doctor	UV: inverse correlation with increasing number of control examinations by doctor
Carr et al. (2008) (Australia)	Prospective cohort (12- month follow-up)	3877 pts.	Age, gender, personality disorder, depression, psychosis, bipolar disorder, length of hospitalisation	UV: correlation with younger age, personality disorder, long hospitalisation
Chang and Lee (2004) (Taiwan)	Prospective cohort (mean follow-up: 35 days)	111 pts.	Age, education, age at onset, length of hospitalisation, number of admissions, gender, occupation, marital status, familial history of psychiatric disorders, schizophrenia, bipolar disorder	UV: correlation with long hospitalisation, early age of onset
Chou et al. (2002) (Taiwan)	Prospective cohort (7-month follow-up)	287 pts.	Gender, age, schizophrenia, bipolar disorder, alcohol dependence, depression, non-psychiatric disorder, history of violence, length of hospitalisation, history of smoking, age and experience of staff	UV: correlation with schizophrenia, bipolar disorder, history of violence, long hospitalisation, history of smoking, younger and inexperienced staff
Convit et al. (1990) (USA)	Case–control	313 violent *vs.* 1241 non-violent pts.	Age, gender, psychiatric diagnosis	UV: correlation with male sex, younger age, personality disorders, organic disorders
Cooper and Mendonca (1991) (Canada)	Prospective cohort (27-month follow-up)	–	Schizophrenia, mental retardation, personality disorder	UV: correlation with schizophrenia, mental retardation and personality disorder
Daffern et al. (2003) (Australia)	Prospective cohort (1 year follow-up)	197 incidents (44.7% aggression)	Gender, victim gender, time	UV: no difference between males and females in terms of frequency and type of aggression. Males tended to be aggressive towards males, and females were aggressive towards females

Daffern et al. (2006) (Australia)	Prospective cohort (6-month follow-up)	–	Staff gender	UV: inverse correlation with male staff
Daffern et al. (2007) (Australia)	Prospective cohort (1 year follow-up)	232 pts.	Psychosis, age, gender, substance use, impulsiveness	105 aggressive UV: non-psychotic, female gender, older age
Doyle and Dolan (2006) (UK)	Prospective cohort (12-week follow-up)	94 pts. (5 violent, 89 non-violent pts.) Aged 18–65 years	Age, gender, length of hospitalisation, schizophrenia	MV: no correlation
Eaton et al. (2000) (UK)	Prospective cohort (1-month follow-up)	52 pts.	Demographic, historical and clinical variables	UV: no correlation
Ehmann et al. (2001) (Canada)	Prospective cohort (2-month follow-up)	78 pts.	Gender, age, diagnosis, substance/alcohol abuse	UV: correlation with female gender, non-paranoid schizophrenia, alcohol abuse
El-Badri and Mellsop (2006) (New Zealand)	Prospective cohort (9 months follow-up)	535 pts.	Age, gender, ethnicity, marital status, schizophrenia, bipolar disorder, alcohol/drug misuse, depression, personality disorders	15% aggressive UV: male gender, Maori ethnicity, personality disorders
Fairlie and Brown (1994), (UK)	Retrospective cohort (6 months follow-up)	565 places for in-patient	Time frame	UV: afternoon
Ferguson et al. (2005) (USA)	Prospective cohort (3-year follow-up)	212 pts.	Age, gender, race, depression, bipolar disorder, substance abuse, post-traumatic stress disorder, impulse control disorder	UV: correlation with impulsiveness; inverse correlation with depression
Flannery et al. (2007) (USA)	Prospective cohort (15 years' of recruitment)	2103 pts.	Gender of patients and staff	UV: correlation with same gender of aggressor and victim (males *vs.* males, females *vs.* females)
Fujii et al. (2005) (USA)	Case–control	51 Asians, 46 Europeans, 38 Hawaiians pts.	Age, gender, education, non-affective psychosis, affective psychosis, race, impulsiveness, relational stability	UV: correlation with younger age for Europeans and Hawaiians, impulsiveness for Asians, relational instability for Hawaiians
Gibbons et al. (1997) (Ireland)	Prospective cohort (3-month follow-up)	44 pts.	Age, gender, marital status, dementia, organic disorder, depression	UV: correlation with dementia
Goldberg et al. (2007) (USA)	Prospective cohort (2-week follow-up	76 pts.	Gender, housing status, admission status, age, education, psychosis, depression, substance use, narcissism	MV: narcissism, psychosis, fewer depressive symptoms, and significantly fewer years of formal education
Grainger and Whiteford (1993), (Australia)	Prospective cohort (3 years follow-up)	650 incidents	Staff	UV: student nurses more assaulted
Grassi et al. (2001) (Italy)	Prospective cohort (5-year follow-up)	1534 pts.	Gender, age, education, marital status, occupation, housing status, schizophrenia, acute psychosis, bipolar depression, bipolar mania, depression, personality disorders, substance abuse, mental retardation, length of hospitalisation, history of violence, previous admission	UV: correlation with schizophrenia, history of violence, previous admission
Grassi et al. (2006) (Italy)	Case–control	65 Patients with persistent violent behaviour *vs.* 95 patients with a single episode of violent behaviour	Gender, age, marital status, education, psychosis, mood disorder, personality disorders, length of stay, involuntary admission, history of violence, treatment response, number of admissions, age at onset	MV: repeaters more previous admissions, high length of stay, history of violence, ward overcrowded UV: repeaters more previous admissions, high length of stay, history of violence, ward overcrowded, worse response to treatment
Grube et al. (2008) (Germany)	Prospective cohort (3 months follow-up)	317 pts.	Gender, age, organic disorder, lifetime aggression, self-harm, lack of suicide attempts, sexual/physical abuse, involuntary admission, busy/noisy ward, medication, substance abuse, depression, personality disorder, psychosis, CPK level	UV: correlation with high CPK level, lifetime aggression, lack of suicide attempts, involuntary admission
Hamadeh et al. (2003) (Bahrain)	Retrospective cohort (7 year follow-up)	111 injuries	Gender, age, race (Bahrain vs. Bahrain), staff nurses, period of day	UV: male/female 2.28 (1.05–4.95), ·40/>40 years 0.96 (0.86–1.08), non-Bahraini/Bahraini 4.92 (1.99–12.15), staff nurse/other nurses 1.79 (0.81–3.95), evening/morning 2.29 (1.05–5.01)
Hillbrand (1995) (USA)	Prospective cohort (3-year follow-up)	307 pts.	Suicide ideation, attempted suicide, age, gender, number of psychotropic drugs, length of hospitalisation, schizophrenia, mood disorder, personality disorder, substance abuse	UV: correlation with suicidal ideation, attempted suicide
Hoptman et al. (1999) (USA)	Case–control	66 violent *vs.* 100 non-violent pts.	Race, gender, age, education, criminal record, schizophrenia, substance misuse, other psychosis, affective disorder, personality disorder, sexual abuse	UV: correlation with sexual abuse, younger age
James et al. (1990) (UK)	Prospective cohort (15-year follow-up)	280 pts.	Age, gender, race, schizophrenia, mania, depression, personality disorder, alcohol/substance abuse, organic disorder, legal status, temporary staff	UV: correlation with temporary staff, younger age; inverse correlation with depression

(*continued on next page*)

Table 1 (*continued*)

Author	Study design	No. of patients	Study Variables	Results
Ketelsen et al. (2007) (Germany)	Prospective cohort (1-year follow-up)	2210 pts.	Age, country, marital status, housing status, occupation, brain disorder, schizophrenia, mood disorder, anxiety disorder, personality disorder, age at onset, criminal record	MV: correlation with brain disorder, schizophrenia, poor housing status
Kho et al. (1998) (UK)	Prospective cohort (6 months follow-up)	360 pts.	Gender, age, ethnicity, diagnosis (schizophrenia, depression, mania and substance misuse), size of wards	UV: only verbal aggression related to female gender; larger wards related to self-aggression
Krakowski and Czobor (2004) (USA)	Prospective cohort	212 pts. No mental retardation, age 18–55	Schizophrenia, schizo-affective disorder, bipolar disorder, depression, gender, race, history of substance abuse, history of brain injury, length of hospitalisation, lack of energy, delusions, hostility	UV: no differences between genders. Correlation with positive psychotic symptoms
Lam et al. (2000) (New Zealand)	Case–control	76 aggressive *vs.* 314 non-aggressive pts.	Gender, age, race, schizophrenia, mania, history of recent violence, history of alcohol/substance abuse, thoughts of violence on admission, drug compliance	MV: correlation with violence thoughts on admission, poor drug compliance
LePage et al. (2005) (USA)	Case–control	Not specified	Mental retardation	UV: correlation with mental retardation
Linaker and Busch-Iversen (1995) (Norway)	Case–control	48 violent the previous 24 h vs. 93 non-violent pts.	Confusion, irritability, fear	UV: correlation with confusion, irritability, physical, verbal and objective fear
Lincoln et al. (2006) (Germany)	Prospective cohort	50 pts. from forensic hospital and 29 from general psychiatric hospital	Diagnosis, age, history	Forensic patients presented high risk of violence unrelated to clinical variables
Linhorst and Scott (2004) (USA)	Case–control	853 pts.	Type of hospital (forensic/non-forensic), marital status, age, gender, length of hospitalisation, number of admissions	UV: correlation with number of admissions; inverse correlation with older age
Manfredini et al. (2001) (Italy)	Prospective cohort (5 year follow-up)	119 pts.	Time frame	UV: early afternoon
McDermott et al. (2008) (USA)	Prospective cohort (3-year follow-up)	154 pts.	Age, gender, substance abuse, borderline/anti-social personality disorder, schizophrenia, schizo-affective disorder, mood disorder, rage	UV: against staff: correlation with rage and affective disregulation; against other patients: correlation with psychopathology
McNiel et al. (2000) (USA)	Prospective cohort (6-month follow-up)	103 pts.	Command hallucinations, substance abuse, age, gender, social desire	MV: correlation with command hallucinations
Miller et al. (1993) (Australia)	Case–control	260 aggressive *vs.* 136 non-aggressive pts.	Age, gender, length of hospitalisation, organic disorder, bipolar disorder, personality disorder	UV: correlation with personality disorders, bipolar disorder, long hospitalisation; inverse correlation with organic disorder
Ng et al. (2001) (New Zealand)	Prospective cohort (12-month follow-up)	268 pts.	Age, gender, schizophrenia, schizoaffective disorder, bipolar disorder, depression, adjustment disorder, number of admissions, staff/patient ratio	UV: no correlation
Nicholls et al. (2009) (Canada)	Case–control	527 pts.	Gender	UV: no correlation
Nijman and Rector (1999) (Belgium)	Prospective cohort (10.5 month follow-up)	352 pts.	Overcrowding	UV: aggression correlated to overcrowding
Omérov et al. (2002) (Sweden):	Prospective cohort (3-year follow-up)	–	Age, gender, staff gender, depression, schizophrenia, bipolar disorder, brain damage, dementia	UV: correlation with schizophrenia, same gender of aggressor and victim (male *vs.* male, female *vs.* female)
Owen et al. (1998) (Australia)	Prospective cohort (7-month follow-up)	855 pts.	Voluntary admission, cognitive disorder, use of coercive measures, changes in female staff, changes in male staff, previous admission, substance abuse, organic disorder, staff age <30, % of nurses among staff	UV: correlation with increasing number of staff members, non-voluntary admission, use of restraint
Palmstierna and Wistedt (1990) (Sweden):	Prospective cohort (8–28 days' follow-up)	105 pts.	Alcohol/substance abuse, history of violence	MV: correlation with alcohol/substance abuse,

Price et al. (2004) (USA)	Retrospective cohort (7.5-year follow-up)	806 pts.	Race	UV: no correlation
Quanbeck et al. (2007) (USA)	Retrospective cohort (1-year follow-up)	88 chronically violent pts. (≥3 episodes in 1 year)	Psychosis, mania, dementia, medical condition, anti-social/borderline personality disorder, type of episode (impulsive, psychotic and organised)	UV: correlation with impulsiveness, diagnosis of psychosis
Raja et al. (1997) (Italy)	Case–control	313 pts.	Age, education, social class, akinesia, akathisia, schizophrenia, schizo-affective disorder, depression, personality disorder, alcohol/drug intoxication, dementia, mental retardation	UV: correlation with younger age, excitement, psychosis, akathisia, mental retardation, personality disorders
Raja and Azzoni (2005) (Italy)	Retrospective cohort (6-year follow-up)	2395 pts.	Age, gender, marital status, suicidal risk, schizophrenia, schizoaffective disorder, depression, bipolar depression, mania, personality disorder, alcohol/substance dependence, dementia, mental retardation, late dyskinesia	UV: correlation with younger age, suicidal risk, schizophrenia, single status, mania, personality disorders, alcohol/drugs dependance; inverse correlation with depression
Rüesch et al. (2003) (Switzerland)	Prospective	388 aggressiveepisodes in 5251 admissions	Age, gender, ICD-10 psychiatric diagnosis, mean number of admissions, occupation, living situation, diagnosis, severity of illness	UV: correlation with male gender, young age, unemployment, length of stay, disease severity (not diagnosis)
Salamin et al. (2010) (Switzerland)	Prospective cohort (2 years follow-up)	1655 pts.	Gender, age, number of hospitalisations, length of stay, diagnosis *vs.* neurosis	UV: male gender ($p<0.01$), younger age ($p<0.01$), length of stay ($p<0.01$), personality disorders ($p<0.01$), psychotic disorders ($p<0.01$), mood disorders ($p<0.05$)
Saverimuttu and Lowe (2000) (UK)	Prospective cohort (15-month follow-up)	170 pts.	Age, gender, race, psychosis, personality disorder	UV: correlation with schizophrenia
Serper et al. (2008) (USA)	Prospective cohort	85 pts.	Executive functioning	Psychiatric in-patients' executive function impairment significantly predicted the formation of psychiatric symptoms, which in turn significantly contributed to the manifestation of aggressive behaviour
Serper et al. (2005) (USA)	Prospective cohort (2 years' recruitment)	118 pts.	Age, gender, diagnosis (schizophrenia and substance abuse), housing status, cognitive disorder	UV: correlation with female gender, substance abuse, cognitive disorder
Sheridan et al. (1990), (USA)	Retrospective cohort	73 restraint events	Cause of aggressiveness, circumstances	UV: correlation with circumstances
Soliman and Reza (2001) (UK):	Case–control	49 violent *vs.* 474 non-violent pts.	Schizophrenia, depression, schizoaffective disorder, bipolar disorder, substance misuse, alcohol misuse, personality disorder, voluntary admission, history of violence, history of attempted suicide	UV: correlation with number of drug changes, history of violence, anti-social/borderline personality disorder, long hospitalisation, non-voluntary admission, substance abuse
Sullivan and Yuan (1995) (USA)	Case–control	533 pts.	Age, gender, race, ethnicity, occupation, staff gender	UV: correlation with same gender of aggressor and victim
Swett and Mills (1997) (USA):	Case–control	47 aggressive *vs.* 288 non-aggressive pts.	Psychiatric diagnosis, demographic variables	UV: correlation with psychiatric diagnosis, some demographic variables
Tam et al. (1996) (Canada):	Prospective cohort (1-year follow-up)	397 pts.	Schizophrenia, depression, bipolar disorder	UV: correlation with schizophrenia
Vitacco et al. (2009) (USA)	Case–control	Instrumental aggressors ($n=11$), reactive aggressors ($n=33$), no physical aggression ($n=108$).	Age, ethnicity, BPRS Affect, BPRS Positive, BPRS Negative, BPRS Resistance, BPRS Activation, PCL Interpersonal, PCL Affective, PCL Lifestyle, PCL Anti-social	Personality features of psychopathy (Interpersonal ($p<0.001$) and Affective ($p=0.02$) features) were significantly higher in patients who engaged in instrumental aggression, anti-social tendencies were lower in the no-aggression group than in the instrumental aggressors ($p=0.02$)
Winstanley and Whittington (2002) (UK)	Prospective cohort	48 staff members	Gender, occupation, circumstances	UV: correlation with female gender, age ≥70

UV: univariate analysis; MV: multivariate analysis.

Switzerland, and Australian and New Zealand studies (Gale et al., 2002; El-Badri and Mellsop, 2006; Carr et al., 2008) report prevalences of 11.3%, 12% and 15%. In Bahrain (Hamadeh et al., 2003) the average assault rate (4.4%) seems to be much lower than that reported in Western countries, although Biancosino et al. (2009) found a low physical assault rate (3%) in an Italian multicentre study.

The victims were mainly members of the nursing staff (Aquilina, 1991; Bjørkly, 1999; Celik et al., 2007; Foster et al., 2007), followed by other patients. Studies of in-patients who have been hospitalised for a long time show that the prevalence of episodes of aggression is not affected by gender. The rates among adolescents are similar to those among adults (Garrison et al., 1990).

Some studies have highlighted an increase in the number of episodes of aggression over the last few decades (Rosenbaum, 1991; Shah et al., 1991; Shah, 1993) which, in addition to differences in study methodologies, may be explained by an increased awareness and perception of violence among staff, changes in staff attitudes, changes in psychiatric practices, and the greater incidence of violence in the society as a whole (Shah, 1993). However, other surveys have not revealed a similar trend (Flannery et al., 1996).

4.2. Demographic and clinical variables associated with aggression in psychiatric wards

According to a review by Aquilina (1991), episodes of violence in psychiatric wards are more frequent among young patients with schizophrenia, patients with neurological problems, and in crowded settings; the victims are usually members of the nursing staff, and the consequences are rarely serious.

Davis (1991) found that the presence of a psychotic disorder, severe symptoms, a young age, substance abuse, and a history of violent episodes increase the risk of violence and aggression, although circumstances (overcrowding, provocations, and inexperienced or intolerant staff) and structural variables (changes in mental health strategies and fewer resources) are also involved.

Other recently published reviews have used various methods and selection criteria. Flannery et al. (2001) confirmed that a diagnosis of psychosis, and a history of violent episodes and drug misuse are major risk factors although, as pointed out by the same author in 1999, risk factors change over time: violent patients are now less frequently diagnosed as having “chronic psychosis” and much more frequently as

Table 2
Summary of investigated variables.

Factor	Multivariate analysis (no. of studies)	Multivariate (no. of studies with positive findings)	Univariate analysis (no. of studies)	Univariate (no. of studies with positive findings)
Age	6	1 young	34	11 young, 2 old
Gender	6	1 male	36	5 male, 3 females
Race/nationality	4	–	12	1 strangers, 1 maori, 1 minority
marital status	5	1 single	7	1 single
Occupation	2	1 unemployed	5	1 unemployed
Housing status	3	2 poor	4	–
Education	3	1 secondary, 1 low	6	–
Social class	1	–	1	–
Psychiatric disorder	–	–	3	–
Disease severity	–	–	1	1
Familial history of psych. disorders	1	–	1	–
Alcohol/drug misuse	5	3	19	5
Depression	3	1 inverse	17	4 inverse
Bipolar disorder	3	–	16	3
Any mood disorder	2	–	5	1
Schizophrenia	6	1	22	10, 2 reverse
Schizoaffective disorder	1	–	7	2
Other psychosis	2	–	2	1
Any psychosis	2	1	7	4
Organic psychosis	2	–	–	–
Adjustment disorder	2	–	2	1 inverse
Personality disorder	2	1	16	6
Anxiety disorder	2	–	3	–
Cognitive disorder	–	–	9	5
Non-psychiatric disorder	1	1	8	
Age at onset	1	–	2	Early
Length of hospitalisation	2	1 long	11	7 long
Type of admission	4	2 non-voluntary	6	4 non-voluntary
Total number of admissions	2	1	9	4
Length of illness	1	–	1	1 long
History of violence	4	1	6	6
Hostility/impulsiveness	–	–	6	4
Narcissism	1	1	–	–
Suicidal risk	1	1	5	2, 1 reverse
Sexual/physical abuse	1	–	3	1
Staff experience	–	–	5	3 poor
Staff gender	–	–	5	1 female, 4 same gender
Number of staff	1	1 high	–	–
Use of coercive measures	1	1	1	1
Therapeutic alliance	1	1 inverse	1	1 inverse
Criminal record	1	–	2	–
Patient attitude towards admission	1	1 negative	–	–
Period of the day	–	–	3	1 evening, 2 afternoon
Size of wards (crowding)	1	1	4	2
Executive functioning	–	–	1	1
CPK level			1	1 high
Response to treatment	1	–	1	1 poor

having personality disorder, and there is no clear gender difference. Steinert (2002) claimed that a positive history of violent episodes is the strongest predictor minimising the role of sex, age, diagnosis and alcohol abuse and that the role of environmental factors has often been underestimated. Dunn et al. (2007) has pointed out the importance of good nursing staff training and attitudes in preventing episodes of aggression in psychiatric wards and, in line with Steinert (2002); Woods and Ashley (2007) have concluded that demographic variables are self-contradictory and less reliable than clinical diagnoses (schizophrenia, mania and some organic syndromes) as predictors of violent episodes.

Table 1 shows the papers satisfying our inclusion/exclusion criteria in unselected psychiatric populations, and the results of the review are summarised in Table 2. The variables that most frequently correlated with episodes of aggression were past episodes of violence/aggression, the presence of impulsiveness/hostility, longer hospitalisation, non-voluntary admission, and the same gender of aggressor and victim. Alcohol/drug misuse, a younger age and suicidal risk also increase the risk of aggression, but the evidence is weaker. "Aggressive" patients are more likely to have a diagnosis of "schizophrenia" (or more generally psychosis) or "personality disorders"; a diagnosis of bipolar disorder is significantly less frequent, perhaps because the patients are in a depressive phase and depression is known to be a slightly protective factor.

In samples of patients with psychosis (Table 3), the factors most frequently related to aggressive/violent behaviour were alcohol/substance misuse, hostility and paranoid thoughts, and acute psychosis (Walsh et al., 2004).

Table 3
Aggressiveness in in-patients with psychosis: associated variables.

Author	Design	No. of patients	Studied variables	Results
Arango et al. (1999) (Spain)	Prospective cohort (about 1-month follow-up)	63 pts. with schizophrenia	Age, gender, marital status, occupation, social class, education, age at onset, history of violence, length of hospitalisation, attempted suicide, number of admissions	Correlation with clinical variables (age at onset, number of admissions, history of suicide attempts)
Berman et al. (2010) (USA)	Prospective cohort (6 months follow-up)	40 patients experiencing hallucinations	Omnipotent hallucinations	UV: 34% of omnipotent voices predict aggression MV: 21% of omnipotent voices predict aggression
Cheung et al. (1997) (Australia)	Prospective cohort (8-week follow-up)	31 violent *vs.* 31 non-violent pts. with schizophrenia	Emotions, voice tones, content, insight, command voices, delusion content	Correlation with negative emotions, voice tone and content, poor insight
Flannery et al. (1998) (USA)	Case–control	737 violent vs. 110 non-violent pts with schizophrenia	Age, disorganised behaviour, social role, psychotic symptoms, social interest, co-morbid depression	MV: correlation with less depression, and less disorganised behaviour UV: correlation with less depression, less social role, less psychotic symptoms, more social interest and less disorganised behaviour
Foley et al. (2005) (Ireland)	Prospective cohort	157 pts. aged 16–65, first psychotic episode	Gender, alcohol abuse, drug abuse, occupation, lack of insight, activation, psychopathology scores, admission status, voluntary admission	Correlation with substance abuse, high psychopathology scores
Joyal et al. (2008) (Canada)	Prospective cohort (6-month follow-up)	106 pts. aged ≥18 with schizophrenia or schizo-affective disorder)	Mental retardation, age, education, length of hospitalisation	Inverse correlation with mental retardation
Krakowski and Czobor (2004) (USA)	Prospective cohort (6-week follow-up)	96 violent *vs.* 81 non-violent pts. with schizophrenia/ schizoaffective disorder, aged 18–55	Race, substance abuse, history of head trauma, age at onset, depression, anergia, severity of psychotic symptoms, thought disorder, hostility, paranoia, irritability	Correlation with severity of psychotic symptoms, neurological impairment, hostility, paranoia, irritability
McNiel and Binder (1994) (USA)	Brief-term prospective cohort	330 pts. with schizophrenia	Paranoia, agitation/excitement, thought disorder,	Correlation with paranoia, suspiciousness, agitation/excitement, thought disorder
Nolan et al. (2005) (USA)	Case–control	88 violent pts with schizophrenia vs. 69 non-violent	Positive and negative syndrome scale (PANSS) excitement, cognitive and depression/anxiety components.	Mean total PANSS scores were not different. Positive subscale scores were significantly higher in aggressive subjects
Oulis et al. (1996) (Greece)	Prospective cohort (5-day follow-up)	136 pts. with psychosis	History of violence, motor excitement, agitation, poor tolerance to frustration, difficulty in delaying gratification, depression/ feelings of rage, hostility, affective liability, anti-social behaviour	Correlation with history of violence, motor excitement, agitation, poor tolerance to frustration, difficulty in delaying gratification, depression/feelings of rage, hostility, affective liability, anti-social behaviour
Ruzić et al. (2008) (Croatia)	Retrospective cohort	99 psychotic pts.	Eysenck personality dimensions (neuroticism, extraversion, psychoticism and lying), family functioning, quality of life	UV: people with higher level of psychoticism, lower quality of life and poorer family functioning are more likely to express aggressiveness also during treatment. Psychoticism and negative family functioning were the most important predictors of aggressiveness
Steinert et al. (1999) (Germany)	Retrospective cohort (4 years' enrolment)	471 pts. aged ≥18 with schizophrenia/ schizoaffective disorder	Age, gender, schizophrenia or schizoaffective disorder, alcohol/ substance misuse, marital status, social class, occupation, number of admissions	Correlation with male gender, number of hospitalisations, alcohol abuse
Vevera et al. (2005) (Cech Republic)	Case–control	404 pts. With schizophrenia	Gender, substance abuse.	Correlation with male gender, substance abuse in females
Walsh et al. (2004) (UK)	Prospective cohort (2 years' enrolment)	271 pts. With schizophrenia, aged 18–65	Age, gender, type of school attended, history of violence, race, marital status, social class, housing status, occupation, alcohol abuse	Correlation with history of violence, attendance at school for the handicapped, alcohol abuse

5. Discussion

Despite the abundance of published reports, the papers are often difficult to compare because of differences in study samples, aims and methodologies.

As far as aggressiveness is concerned, the published data agree on some risk factors. A previous episode of aggression and a longer length of stay in an in-patient clinic are the most consistent "predictors": the first suggests that keeping careful records increases awareness of risk and improves risk assessments which may then in turn prevent further violence; in the case of the second, it needs to be understood whether the episode of aggression is a consequence of the admission or *vice versa*. In addition, length of stay is aspecific as it could reflect the severity of the clinical picture or simply mean that the patient has had more time to show aggression. In terms of gender, there is not a large difference but aggression seems to be directed towards others of the same sex.

According to Duxbury and Whittington (2005), patients and nurses disagree about the reason for aggressive/violent behaviour. They investigated the causes of violence using the "Management of Aggression and Violence Attitude Scale", and found that patients saw environmental conditions and poor communication as significant precursors, whereas nurses considered the patients' mental illnesses to be the main reason, although they also recognised the negative impact of an in-patient environment. It was clear that both sets of respondents were dissatisfied with the restrictive and under-resourced provisions that lead to interpersonal tensions, which suggests that harmony among staff may be more useful in preventing aggression than some of the other strategies used in psychiatric wards such as the presence of male nurses. In psychotic patients, positive psychotic symptoms (especially delusions and threatening hallucinations) can directly influence an aggressive behaviour. Although they are not very frequent, they deserve attention because of the potential for successful pharmacologic treatment (Nolan et al., 2003).

A recent review by Hamrin et al. (2009) has shown that violence arises from the complex interactions of the patients, staff and culture of a specific unit. In-patient psychiatric staff can decrease the potential for violence by using therapeutic relationship strategies such as practising good communication, advocating for clients, being available, having strong clinical assessment skills, providing patient education, and collaborating with patients in treatment planning. Melle et al. (1996) found that increased individualised support from staff leads patients with schizophrenia to perceive a low level of aggression, and a structured assessments of the short-term risk of violence in acute psychiatric wards by Aberhalden et al. (2008) and Bowers et al. (2006) found that nurses' training reduces severe events of patient aggression (adjusted risk reductions of respectively 41% and 53%). By contrast, Sjöström et al. (2001) found no statistically significant reduction in the number of aggressive patients or in the number of staff members on sick leave after a training course but they found a reduction on the perceived aggressive incidents.

Cultural improvements include providing meaningful patient activities and appropriate levels of stimulation, as has also been confirmed by Cowin et al. (2003). Bowers et al. (2002) found that is possible to distinguish two independently varying emphases of ward security policies: the first aims at preventing harm to patients by means of door security, the banning of items, and restrictions on in-patients; the second aims at reducing risks to staff by using patient searches, security guards and sophisticated alarm systems. There is some preliminary evidence that these security policies are differentially associated with levels of absconding and violent incidents, and so further research to guide practice is urgently required.

These data were confirmed by a comparative survey of German, British and Swiss psychiatric wards carried out by Lepping et al. (2009). This found that British ward managers were the most satisfied with risk management and the current practices used to deal with violence, whereas German managers were most likely to have specific documentation for coercive measures, and the Swiss wards were most likely to use non-specific bedrooms for seclusion and to carry alarm devices. British wards were far more likely to have protocols and training for the treatment and management of violence, followed by Switzerland and Germany, and British ward managers saw violence and aggression as a much smaller problem on their wards than Swiss and German ward managers. This was associated with the availability of control and restraint teams, regular training, clear protocols and (to a lesser extent) risk assessments, but not staffing levels.

There is a particular need for an appropriate number of nurses, a non-overcrowded setting, and nurses' training: in other words, the importance of context (and a "good ward climate") in dealing with aggressiveness.

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