Differences in MMPI-2 personality profiles among filicide and homicide women

Differenze nei profili di personalità valutati con MMPI-2 tra donne figlicide e omicide

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SUMMARY. Introduction. Filicide is an act of terrible violence that generates dismay and astonishment and invites everybody to ask: why? **Aim.** As the transition to motherhood is a critical period for any woman, requiring the activation of deep personality resources, the aim of this study was to deepen our knowledge of the personality profiles of new mothers by comparing a sample of 16 women who had killed their own child ("filicide mothers") with women who had murdered someone outside of their family ("non-family homicide women"). **Method.** All of the women had a similar psychiatric diagnosis, as assessed by the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). All were assessed by the Minnesota Multiphasic Personality Inventory 2 (MMPI-2) 2 to 4 years after the court's judgment. A Kruskal-Wallis test and two-step cluster analysis were performed to determine whether a specific personality profile could distinguish filicide mothers from non-family homicide women. **Results.** Years after the act, few filicide mothers showed symptoms of psychopathology; rather, they appeared functional and untroubled. In contrast, non-family homicide women showed a pathological mean profile. **Conclusions.** The results may indicate conscious attempts made by filicide mothers to avoid negative evaluations, minimize symptoms, and deny psychological suffering. These may indicate personality risk factors that could help clinicians recognize and intervene in cases where a woman presents a severe mental illness before, during, and following the birth of her child.

KEY WORDS. Infanticide, filicide, murder, denial, mental illness.

RIASSUNTO. Introduzione. Il figlicidio è un atto di terribile violenza che genera sgomento e stupore e invita tutti a farsi una domanda: perché? **Scopo.** Poiché la transizione alla maternità è un periodo critico per qualsiasi donna, che richiede l'attivazione di profonde risorse interne di personalità, lo scopo di questo studio è stato di approfondire la comprensione dei profili di personalità di un campione di 16 donne che hanno commesso figlicidio confrontandoli con quelli di un gruppo di madri che hanno ucciso qualcuno al di fuori della loro famiglia ("donne omicide non familiari"). **Metodi.** Tutte le donne in esame avevano una diagnosi psichiatrica simile, posta utilizzando la Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). Tutte sono state valutate tramite il Minnesota Multiphasic Personality Inventory 2 (MMPI-2) da 2 a 4 anni dopo la sentenza del tribunale. Sono stati effettuati un test di Kruskal-Wallis e un'analisi a cluster per determinare se un profilo di personalità specifico potesse distinguere le madri figlicide dalle madri omicide. **Risultati.** Anche anni dopo l'atto, le madri figlicide hanno mostrato scarsi sintomi di psicopatologia; piuttosto, sembravano funzionali e senza problemi. Al contrario, le donne omicide hanno mostrato un profilo psicopatologico elevato. **Conclusioni.** I risultati sembrerebbero indicare la presenza di tentativi coscienti compiuti dalle madri figlicide di evitare emozioni negative, minimizzare i sintomi e negare la sofferenza psicologica. Esaminare lo stato mentale delle madri a rischio di un disturbo mentale prima, durante o dopo il parto, e nello specifico analizzare i loro tratti di personalità, potrebbe aiutare i clinici a individuare specifici modelli di temperamento che possono condurre a comportamenti violenti nei confronti della propria prole.

PAROLE CHIAVE: figlicidio, omicidio, rifiuto, disturbo mentale.

INTRODUCTION

According to the most recent data published by the United Nations Office on Drugs and Crime, the proportion of homicides committed by women is far lower than the proportion committed by men (21.3% vs. 78.7%, respectively). In Italy, this ratio is only slightly different (30% vs. 70%)[1]. Research has shown that homicidal acts committed by women largely result from interpersonal conflicts and tend to be specifically directed at persons with whom they have an intimate or emotional relationship[2].

According to the literature, it is possible to classify a par-

ticular subgroup of women murderers: women who murder their own offspring[3]. Due to the exceptional nature and brutality of this act, the killing of one's own child (known as filicide), has long been the subject of research. Several studies have focused on the psychopathological and social environmental risk factors linked to filicide committed by mothers (henceforth referred to as "filicide mothers"). In particular, psychiatric history (anxiety/mood disorders with a prevalence of psychotic features, psychotic disorders, personality disorders, suicidality, considerable life stress [including a history or present experience of abuse], and prior use of psychiatric services), a peculiar attachment mental representation (insecure, unresolved, and unintegrated hostile/helpless states of mind), and several socioeconomic factors (i.e., economic difficulties, couple conflicts, and lack of prenatal care) have been found to show cumulative interactions in filicide mothers[4-12].

Filicide mothers may be further classified according to the age of the child killed: some murder newborns ("neonaticide mothers"); some murder infants between the age of 1 day and 1 year ("infanticide mothers"); and some murder children older than 1 year ("filicide mothers"). Compared to filicide mothers, neonaticide mothers generally use non-weapon methods; they also tend to be younger (<25 years old), unmarried, poorly educated, emotionally immature, and mentally fit at the time of the murder[12-16]. Well-documented clinical case reports of neonaticide mothers describe a common presentation of pregnancy denial associated with dissociative symptoms or psychosis[3,14,17-19]. Denial and dissociation in infanticide and filicide mothers is not as well documented; this probably because, while neonaticide is enacted on impulse, infanticide and filicide are mostly premeditated on the basis of severe psychiatric illness[14]. Some studies, especially those conducted in the 1980s and 1990s, have compared filicide mothers with other homicidal women. These studies have depicted a profile of filicide mothers characterized by younger age, a higher number of children, a diagnosis of severe mental illness and less psychopathy, attempted suicide at the crime scene (in many cases), no prior criminal record, and a lack of sufficient social and emotional resources to cope with extreme stress[20-25]. Although some comparative clues have been identified regarding the sociodemographic aspects of filicide mothers, the literature has failed to supply rich and structured psychological evaluations (psychometric tests) of these women.

The Minnesota Multiphasic Personality Inventory-2[26] is the most frequently used psychological instrument in the personality assessment of adult criminal defendants and it is commonly introduced as evidence in court testimony. The test provides objectively derived, useful descriptions of respondents' personality traits, symptom patterns, and specific clinical problems, which can be used for evaluation and treatment in many forensic areas[27,28]. In the literature, there are a few MMPI and MMPI-2 studies of women charged with murdering their partners or non-family victims. Sutker and colleagues[29], in a study of incarcerated women, compared a group of murderers with a group of women who had committed "non-violent" crimes (relating to abuse of drugs and/or property). Murderers scored lower on the F (Frequency) and Pd (Psychopathic Deviate) scales, and higher on the K (Correction) and MF (Masculinity-Femininity) scales, appearing more defensive, less in touch with the impulse to act, more socially conforming, and more removed from a stereotyped definition of femininity, than non-violent criminals. Kalichman[30] found that incarcerated homicidal women had significantly higher results on the MMPI Pa (Paranoia) and Si (Social Introversion) scales than did groups of incarcerated homicidal men. In order to develop a psychometric profile of homicidal women, McKee et al.[31] collected MMPI-2 profiles (n=73) from two public university affiliated forensic psychiatric hospitals. More specifically, they compared the MMPI-2 clinical and content scales of women who had committed filicide (n=30), women who had killed their partner (mariticide) (n=19), and women who had killed a non-family adult (n=24); importantly, the test had been administered before the court's final judgment. On the basis of their clinical inspection, there were no significant differences between the three groups. However, the filicide women were characterized by a 6-8 two-point code (suggesting that they may manifest psychotic behavior, delusions, hallucinations, and disordered thinking characteristic of severe mental illness); the mariticide women demonstrated a 2-6 two-point code (suggesting that they may be depressed individuals who express anger at themselves and others and demonstrate a chronic pattern of poor interpersonal relationships); and the other homicidal women presented a 4-8 two-point code (suggesting that they may be anti-social persons with histories of criminal behavior, substance abuse, and marginal adjustment to societal norms).

Risk bias on studies with participants who have not yet received the final judgment of the court relates to potential simulation. Malingering mental illness can arise in cases of filicide, as with other types of homicide. A review of Brazilian neonaticide cases over 95 years found an increase in the number of claimed amnesia cases after the enactment of a 1940 statute about infanticide that emphasized the role of mental illness as a mitigating factor[32]. This strongly suggests that many infanticide mothers may simulate an untestable symptom to avoid being held accountable for their actions.

To date, no study has defined the psychological profile of filicide mothers on the basis of an assessment conducted after the court's judgment. A recent study by our research group[33] compared the personality profiles of filicide mothers with a group of 106 psychotic and depressed mothers using the Temperament and Character Inventory[34] and the Big Five Inventory[35], showing a filicide mother personality profile characterized by rigid control of aggressive impulses, avoidance of unconscious fears, and masked feelings of negativity.

In light of the above, the main aim of the present study was to investigate the personality of filicide mothers using the MMPI-2. In more detail, we searched for a specific personality profile that could distinguish women filicide mothers from women with a similar psychiatric diagnosis who had killed someone outside their family with whom they did not have emotional involvement ("non-family homicide women"). We wondered whether it would be possible to classify these women murderers according to MMPI-2 personality characteristics, regardless of whether their victim was their own offspring. Considering our previous results[33], we expected to see a filicide mother MMPI-2 profile characterized by an apparent positivity hiding over-controlled negative feelings. Furthermore, we aimed at observing differences in sociodemographic variables and psychiatric history between the two samples.

It is an arduous, and thus noteworthy, task to assess the psychological traits of these women, due to challenges in collecting data with this kind of population. Moreover, filicide is a meaningful topic that has the potential to inform not only future research, but also social and welfare policies. Finally, psychological evaluation following the court's judgment ensures more valid and reliable results, suitable for possible secondary advantages.

MATERIAL AND METHODS

Sample selection

We examined 34 females hospitalized in five forensic psychiatric structures, hospitals (OPG), or residences (REMS) in Italy. All women were diagnosed as having been affected by insanity at the time of the crime and, for this reason, judged as lacking penal responsibility but being a danger to society. The first group (n=16) comprised women under security for having killed their own biological children (filicide mothers); the second group (n=18) consisted of women under security who had killed members outside of their own family (non-family homicide women). The second group was chosen in order to underline features that differentiate filicide mothers from women who have killed a person with whom they are not affectively linked. At the time of the assessment, all women were taking medication according to the latest guidelines. Our data was supplied by clinical documentation and direct interview. The assessment was made after the women had received their sentence, between 2 to 4 years following their act of murder. We collected the sample from 2014 to 2017, and all homicides were committed between 2010 and 2015. Exclusion a priori criteria were: diagnosis of mental retardation, poor knowledge of Italian, or other verbal communication limitations that would compromise the subject's ability to complete the research protocol. Before being enrolled in the study, participants were informed of the nature and objectives of the research and gave their consent to participate in the study. The study was approved by the local ethics committee.

Procedures

All subjects were assessed by a senior professional (N.G. and P.R.) over a period of up to 2 days. Assessments were carried out inside the forensic psychiatric hospital, in a pre-arranged private room. After giving their consent to participate in the study, all subjects completed an autobiographical questionnaire; this was a self-administered personal data sheet that had been created ad hoc to collect information on participants' sociodemographic aspects, details about their pregnancy, and their personal psychiatric history. Subsequently, the women were assessed using the following instruments:

- The *Structured Clinical Interview for DSM-IV Axis I Disorders* (SCID-I)[36] is a semi-structured interview used to support major DSM-IV Axis I diagnosis. The measure is broken down into separate modules corresponding to particular diagnostic categories. In the present study, the SCID-I was administered by a senior psychiatrist.
- The *Minnesota Multiphasic Personality Inventory 2* (MMPI- 2)[37] is a standardized psychometric test of adult personality and psychopathology and the most widely used personality measure in clinical and forensic settings[38]. It consists of 567 items. The most typical use of the MMPI-2 is to evaluate the overall profile configuration of the 10 clinical scales, particularly the combination of the two or three scales with the highest scores (called the "code type"). Three validity scales are also involved in the standard interpretive procedure. Thus, 10 clinical scales and three validity scales are included in graphical presentations of the MMPI profiles. In evaluating the MMPI-2, T-scores are used; these are standardized scores in which the scores of the original norm group (indicating normality) are set to 50 on each scale (M=50, SD=10)[39]. The MMPI-2 clinical scales include: scale 1 (Hs, Hypochondrias); scale 2 (D, Depression); scale 3 (Hy, Hysteria); scale 4 (Pd, Psychopathic Deviate); scale 5 (Mf, Masculine–Feminine Interests); scale 6 (Pa, Paranoia); scale 7 (Pt, Psychasthenia); scale 8 (Sc, Schizophrenia); scale 9 (Ma, Mania); and scale 10 (Si, Social Introversion/Extroversion)[40]. The main validity scales are as follows: L (Lie), F (Infrequency), and K (Correction). The traditional T-score classification is: 45-54 (average), 55-69 (slightly high), 60-64 (moderately high), 65-69 (high), and 70-79 (very high)[26]. The very high cut-off score indicates distinct psychological problems or pathology. In the present study, all participants completed the Italian version of the MMPI-2[41], which has been shown to demonstrate good comparability with the American version[42].

Data analysis

Descriptive statistics are reported for sociodemographic variables, present and previous psychiatric diagnoses, and personality profiles. A Kruskal-Wallis test was used to compare filicide mothers with non-family homicide women. Our data met the first three assumptions of this test but not the fourth: dependent variables were measured at the continuous level; independent variables consisted of two independent groups; and there was no relationship between the observations in each group or between the groups, themselves (independence of observations). Because distributions had a different shape, we used the Kruskal-Wallis test to compare mean ranks not the medians.

A two-step cluster analysis was used to define the women's profiles in both categories, in order to verify whether filicide mothers could form a subgroup on the basis of similar personality characteristics. This method uses quick cluster algorithm (pre-clustering) to produce an initial group identification, before running hierarchical cluster models in the second step. The cluster model used the T-scores of the three validity scales (L, F, K) and the 10 clinical scales (HS, D, HY, PD, MF, PA, PT, SC, MA, SI) of the MMPI-2. The number of clusters was set to automatic, in order to achieve natural clustering. All analyses were performed with SPSS for Windows, version 22.0.

RESULTS

Sociodemographic variables

Filicide mothers were aged 32 to 45 years (M=36.7, SD=4.4). The majority had been married or in a stable partnership when the crime occurred (81.3%). The mean number of years in education was 13.31 (SD=3.85): 50% had a primary school diploma, 37.5% had a high school diploma, and 12.5% had a university degree. At the time of the murder, 43.8% of the filicide mothers had been employed, and most had had two or three children (50.1%).

The comparison group of non-family homicide women showed similar demographic characteristics without significant differences in age and education. However, a higher percentage had been unmarried at the time of the murder and more had been unemployed. Five of the homicide women (27.8%) had never been pregnant (Table 1).

Psychiatric profile

Psychiatric diagnoses of the two groups according to the DSM-IV-TR[43] are summarized in Table 2. Filicide mothers and non-family homicide women received similar psychiatric diagnoses: six of the first group (37.5%) received a diagnosis of a psychiatric disorder without psychotic features, compared to six of the homicide group (33.3%). Ten filicide mothers (62.5%) received a diagnosis of a psychiatric disorder with psychotic features, compared to 12 of the non-family homicide women (66.7%). At the time of the clinical evaluation, we found good compensation of psychopathological symptoms in 31 out of the 34 women. Three of the filicide mothers with a psychotic spectrum disorder were still in an acute phase.

Table 1. Sociodemographic variables of the groups.

Variables	Categories	Filicide (*n*=16) *N* (%)	Homicide (*n*=18) *N* (%)
Civil status	Single	0	4 (22.2)
	Married/cohabitant	13 (81.3)	12 (66.7)
	Separated/divorced	2 (12.5)	4 (22.2)
	Widow	1 (6.3)	0
Education	Primary school	2 (12.2)	2 (11.1)
	Secondary school	6 (37.5)	8 (44.4)
	High school diploma	6 (37.5)	7 (38.9)
	University	2 (12.5)	1 (5.6)
Working position	Student	0	0
	Housewife	4 (25)	2 (11.1)
	Unemployed	3 (18.8)	8 (44.4)
	Employee	7 (43.8)	6 (33.3)
	Self-employed	2 (12.5)	2 (11.1)
Number of pregnancies	0	0	5 (27.8)
	1	6 (37.5)	4 (22.2)
	2–3	8 (50.1)	8 (44.4)
	>3	2 (12.5)	1 (5.6)
Age		36.7 (4.4) y Mean (*SD*)	37.8 (4.9) y Mean (*SD*)

Table 2. Psychiatric diagnosis of the groups.

Psychiatric diagnosis	Filicide (*n* = 16) *N* (%)	Homicide (*n* = 18) *N* (%)
Number of psychotic features	**6 (37.5)**	**6 (33.3)**
Post-partum depression	1 (6.2)	0
Post-partum depression with dissociative features	1 (6.2)	0
Bipolar disorder (depressive episode)	2 (12.5)	3 (16.7)
Bipolar disorder (mixed episode) with dissociative features	1 (6.2)	3 (16.7)
Dissociative disorder	1 (6.2)	0
With psychotic features	**10 (62.5)**	**12 (66.7)**
Major depression with psychotic features	2 (12.5)	1 (5.6)
Bipolar disorder (mixed episode) with psychotic features	1 (6.2)	1 (5.6)
Brief psychotic disorder	2 (12.5)	2 (11.1)
Brief psychotic disorder with post-partum onset	1 (6.2)	0
Acute psychotic episode in delusional disorder	1 (6.2)	1 (5.6)
Schizophrenia	2 (12.5)	6 (33.3)
Schizoaffective disorder (depressive episode)	2 (12.5)	1 (5.6)

The SCID-I interview showed the following previous psychiatric diagnoses amongst the 34 women (only Axis I diagnoses that represented the main clinical problems of participants were considered) (Table 3): seven filicide mothers (43.7) versus six non-family homicide women (33.3) suffered from mood and/or anxiety disorders; four of the first group (25%) never reported a psychiatric disorder before the act, while none of the homicide group reported a past without a psychiatric history (for deepen information see Offence analysis of the filicide sample, in Supplemental Material).

MMPI-2

The MMPI-2 mean profile of the filicide mothers fell within the normal T-score range of 35-65 (Figure 1). In particular, the MMPI-2 clinical scales showed a normal profile in 7 subjects (43.7%) (see supplemental material). In these subjects, no score exceeded the normal T-score of 65. Six subjects (37.5%) showed a normal profile except for the presence of an isolated elevation of the Pa scale (three patients), MF scale (one patient), Si scale (one patient), or Ma scale (one patient). Three subjects (18.7%) demonstrated abnormal profiles: the first showed a 5-8 two-code profile with elevated Pd, Pa, and Ma scales; the second showed a 6-8 two-code profile with elevated Hs, D, Hy, Pd, and Pt scales; the last showed a 6-8 two-code profile. Concerning the validity

Table 3. Previous psychiatric disorders of the groups.

Variables	Categories	Filicide (*n*=16) *N* (%)	Homicide (*n*=18) *N* (%)
Previous psychiatric disorder	Mood disorder/anxiety	6 (37.5)	0
	Mood disorder with psychotic features	1 (6.2)	6 (33.3)
	Psychosis	1 (6.2)	8 (44.4)
	Personality disorder with addiction	1 (6.2)	3 (16.7)
	Personality disorder	1 (6.2)	1 (5.6)
	DCA	1 (6.2)	0
	Substance abuse	1 (6.2)	0
	No	4 (25)	0

scales, it is interesting to observe a recurrent pattern of distribution in the sample: in nine of the normal profiles (56.2%), there was a V-like configuration of the validity scales, with a low F score and high L and K scores (except for one subject, who had a lower K score). The medium values of the L scale were moderately high, indicating the women's tendency to present a virtuous and forcefully positive image of themselves[28].

Table 4 shows the difference between non-family homicide women and filicide mothers in the T-scores of the MMPI-2 validity and clinical scales. Some clinical MMPI-2 scales demonstrated significant differences between groups: D (H[1]=12.05, *p*=.001); Hy (H[1]=7.75, *p*=.005); Mf (H[1]=9.61, *p*=.002); and Si (H[1]=11.58, *p*=.001). Generally, non-family homicide women had significantly higher scores on the D, Hy, Mf, and Si scales compared to filicide mothers.

The two-step cluster analysis of the 34 women revealed two clusters with significant differences in mean score profiles on all analyzed scales except for Pa (H[1]=3.33, *p*=.068) (Table 5). The women-I cluster (*n*=23) had slightly high

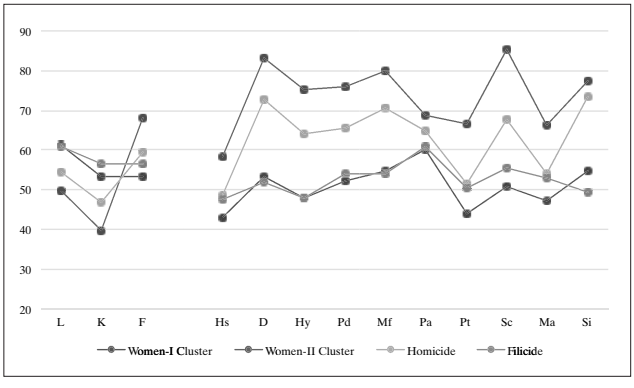

Figure 1 MMPI-2 mean profiles divided by clusters (women-I cluster, *n*=23; women-II cluster, *n*=11) and sample groups (non-family homicide women, *n*=18; filicide mothers, *n*=16).

Table 4. T-Point scores for the validity and clinical scales of the MMPI-2 across groups.

MMPI-2 scales	Homicide (*N*=18) *M* (DS)	Filicide (*N*=16) *M* (DS)	*H*-statistic	*p* value
L	54.50 (11.41)	60.94 (8.91)	3.07	.080
K	46.72 (12.07)	56.69 (12.44)	1.59	.207
F	59.50 (12.47)	56.69 (15.52)	.718	.397
Hs	48.50 (14.39)	47.56 (8.29)	.011	.917
D	72.89 (20.90)**	51.75 (7.66)**	12.05	.001
Hy	64.22 (21.57)*	48 (10.13)*	7.75	.005
Pd	65.44 (20.25)	54 (9.04)	2.29	.131
Mf	70.61 (19.21)*	53.94 (10.37)*	9.61	.002
Pa	64.78 (9.84)	61 (13.39)	.527	.468
Pt	51.67 (22.57)	50.63 (9.61)	1.50	.220
Sc	67.83 (21.09)	55.63 (13.77)	2.78	.097
Ma	54.17 (22.61)	52.88 (12.29)	.606	.436
Si	73.61 (18.89)**	49.25 (9.61)**	11.58	.001

**p=<.01; **p=<.001.*

scores on the L and Pa scales and slightly lower scores on the Hs and Pt scales; all other scales were in the average range. The women-II cluster (*n*=11) showed a more problematic profile, as was clear from the configuration of the validity

Table 5. T-Point scores for the validity and clinical scales of the MMPI-2 for the women-I and women-II clusters.

MMPI-2 scale	Women-I cluster (*n*=23) *M* (SD)	Women-II cluster (*n*=11) *M* (SD)	*H*-statistic	*p* value
L	61.26 (9.84)*	49.73 (7.99)*	7.04	.007
K	53.17 (11.35)*	39.82 (8.9)*	9.15	.002
F	53.43 (10.86)*	68.09 (14.59)*	7.96	.005
Hs	43.09 (5.82)**	58.45 (14.34)**	12.07	.001
D	53.22 (7.89)**	83.27 (20)**	16.28	<.001
Hy	48.13 (8.08)**	74.27 (22.7)**	11.27	.001
Pd	52.43 (6.82)**	76 (20.37)**	13.03	<.001
Mf	54.61 (7.43)**	79.82 (20.72)**	11.19	.001
Pa	60.22 (10.77)	68.82 (11.64)	3.33	.068
Pt	43.83 (16.3)**	66.55 (6.07)**	17.65	<.001
Sc	51 (10.75)**	85.25 (6.2)**	21.72	<.001
Ma	47.39 (11.83)*	66.45 (22.78)*	7.07	.008
Si	54.78 (17.55)*	77.55 (13.6)*	9.59	.002

**p=<.01; **p=<.001.*

scales (with a high F score, normal L score, and slightly low K score). Furthermore, with respect to the clinical scales, they had very high scores on Sc, D, Mf, Si, Pd, and Hy; high scores on Pt, Ma, and Pa; and a slightly high score on Hs.

The distribution of non-family homicide women was equal in both clusters (*n*=9 in the women-I cluster; *n*=9 in the women-II cluster). In contrast, the percentage of filicide mothers was higher in the women-I cluster (*n*=14) compared to the women-II cluster (*n*= 2) (Figure 2). As shown in Figure 1, a similar MMPI-2 mean profile was shown by the filicide mothers and the women-I cluster, and the non-family homicide women and the women-II cluster.

DISCUSSION

The main aim of the present study was to assess the MMPI-2 personality profiles of filicide mothers hospitalized in a forensic psychiatric hospital and to compare them with those of a sample of hospitalized non-family homicide women, in order to evaluate patterns. Previous research[31] has shown the pre-trial psychological frame of filicide women, highlighting a profile characterized by a marked tendency to develop psychotic-like symptoms (a 6-8 code profile), relative to other female murderers. However, we hypothesized that these previous results, which stemmed from forensic expert analysis, could hide the real, authentic personality characteristics of these women. As shown in previous data published by our research group[33], authentic personality characteristics may only be uncovered by post-trial analysis. Assessments made prior to a final court judgment may be compromised by bias, given that subjects may simulate personality characteristics in order to obtain certain advantages, such as a discounted penalty due to mental illness. Our results support this hypothesis: at least 24 months after committing murder, most of the filicide women showed no symptoms of psychopathology. Rather, they appeared functional and untroubled with no elevated MMPI-2 clinical scales. The non-family homicide women, however, showed a mean profile characterized by high levels of: a) dysphoria, distress, pessimism, low morale, inhibition, intropunitiveness, physical discomfort, vegetative symptoms, problems in thinking, and social vulnerability (Scale D); b) a tendency to develop physical symptoms under stress, to experience pain, and to deny social friction or discord with others (Scale Hy); c) alienation, social disinhibition, and a tendency to come into conflict with family, authorities, and others through rebellion, exploitation, misconduct, poorly developed conscience, and a lack of internalized moral standards (Scale Pd); d) odd thinking, feelings of unreality, alien impulses, and motor and sensory impairment (Scale Sc); and e) social introversion, shyness, social anxiety, social timidity and awkwardness, and social avoidance (Scale Si)[37,44]. The results of the cluster analysis showed further differences between the filicide mothers and the non-family homicide women for some personality characteristics, separating the sample into two distinct groups with significant MMPI-2 differences. Women in cluster I, characterized by slightly high scores on the L and Pa scales and slightly low scores on the Hs and Pt scales, belonged mostly to the filicide mothers group; women in cluster II, however, characterized by a more problematic profile, belonged mostly to the non-family homicide women group.

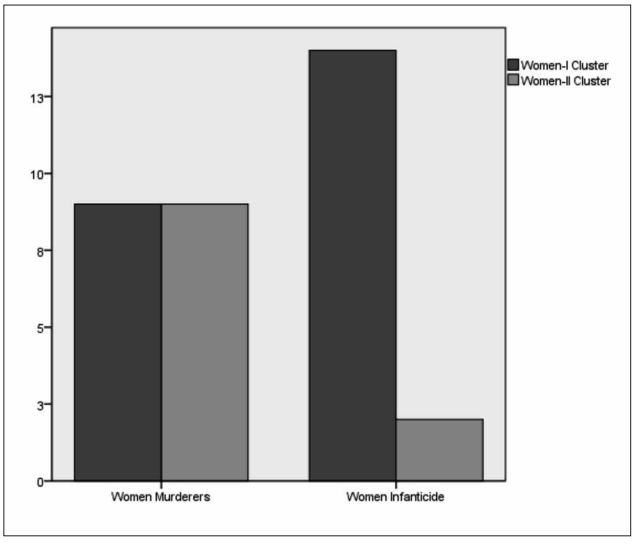

Figure 2. Number of subjects from each sample group included in each cluster group.

Although both groups had received similar diagnoses (of a psychotic, affective, and/or dissociative disorder), and were under stable pharmacological treatment, the filicide mothers showed very different personality characteristics. In the filicide mother sample, the mean L score was at about the 85th percentile and the mean K score was at about the 73rd percentile (relative to the non-family homicide women score, which ranked at about the 34th percentile); this result may generate new hypotheses. The L and K scales assess naive attempts to place oneself in a morally and culturally favourable light by denying moral imperfections, as well as the tendency to control and limit disclosures of distress, discomfort, and problems relating to others. Both are measures of "exaggeration of virtue"[45] and symptoms of underreporting[46]. Therefore, in our filicide mothers group, the scores of these two scales (relative to the other group) may indicate their conscious attempts to avoid negative evaluations and their tendency to minimize symptoms and deny psychological suffering; this may be associated with a considerable lack of insight and the probable presence of primitive defence mechanisms such as denial[44]. In this respect, it is interesting to note that the perpetrators of infanticide often used language in a manner that deflected responsibility and distanced them from the event. Stanton and Simpson[47] noted that, during their interviews with women who had committed filicide, the women made statements such as "When my baby died" rather than "When I killed my baby." A similar manner of using language to diffuse personal responsibility is presented in many articles on infanticide[14].

CONCLUSIONS

"Maternal filicide is more likely to evoke horror and judgement than empathy"[47]. The results of this study may lead to the hypothesis that women who commit filicide try to minimize their symptoms and deny psychological suffering, perhaps in an attempt to mask themselves from the horror of

their memories. Females who commit other kinds of homicides, who are diagnosed with similar psychiatric disorders and hospitalized in the same kinds of forensic structures, appear more openly suffering, more disturbed, and more socially isolated than filicide mothers. These differences may lead to the theory that the unconscious defence mechanisms of denial and repression that are present in filicide mothers prior to their act of murder could be lessened by stressors and life events (e.g., the transitional phases of pregnancy), leading to a loss of rigid control on aggressive impulses. Therefore, the results of this study may point to some specific personality risk factors that could help clinicians recognize and intervene in cases where a woman presents severe mental illness before, during, and following the birth of her child.

In conclusion, we suggest that examining the mental state and personality traits of mothers with a psychiatric diagnosis, in the post-partum period and later, could be very relevant. Indeed, for some specific personality profiles, the experience of severe psychopathology or other sources of personal distress may lead to impulsive violent behaviors[48-50].

LIMITATIONS

The main limitation of the present study is the small sample size of the filicide mother group. Further, the results showed a very large standard deviation range, particularly for the non-family homicide women group; thus, the clinical utility of the statistical mean differences that were found between women should be taken with caution. Furthermore, it must be considered that, even though a "defensive configuration" is not common in inmates who are not awaiting sentence[47], the hypothesis that the implementation of social desirability (detected by this profile) may have a secondary advantage in increasing one's potential for obtaining alternative custodial measures should be taken into account.

Finally, the interpretation of our general results should be read with extreme caution. In fact, among the filicide mothers, 25% had had no history of psychiatric illness prior to committing the act, compared to none of the homicide group. Furthermore, some of the filicide mothers had committed the murder within the child's first year of age. The acute features of the episode and the absence of a chronicity context could partly explain the lower levels of psychopathology in the filicide mothers. Moreover, the post-partum filicidal mother sample may have had a more complete response to psychotropic medication, compared to the non-family homicide women. All of these points should be considered when thinking about the possible interpretations of the test results. Data collection on larger samples and use of a specific personality test (e.g., one optimized for studying unconscious defence mechanisms) could help to consolidate the formulated hypotheses.

Conflict of interests: the authors have no conflict of interests to declare.

SUPPLEMENTAL MATERIAL

Offence analysis of the filicide sample

Offence analysis of the filicide sample is summarized in Table 6. Among the 16 filicide mothers who were hospitalized in forensic psychiatric hospitals in Italy, 8 had committed infanticide (children aged <12 months), 5 had committed filicide (children aged 13 months to 16 years), and 3 had committed both infanticide and filicide at the same time. In most cases, the child killed was male. Stabbing was the most common method of filicide (43.7%). Choking occurred in 3 cases (18.7%), drowning in 4 cases (25%), and poisoning and burning each occurred in one case (6.2%). Eight (50%) of the filicide mothers attempted suicide following the death of their child and one killed her partner. In no cases had family members or close friends reported concerns related to the mothers' risk to kill.

Table 6 (supplemental material). Offence analysis of the filicide sample (n= 16) and MMPI-2 summarized profiles.

Case	Forensic diagnosis	Previous psychiatric disorders	Killing method	Sex and age of victims	Suicide attempt	MMPI-2
1	Post-partum depression	No	Choking	F, 5 months	No	NP V-conf
2	Brief psychotic disorder with post-partum onset	Mood/anxiety disorder	Choking	M, 3 years (1st); M, 21 days (2nd)	Yes	NP V-conf
3	Major depression with psychotic features	Psychotic disorder	Stabbing	F, 16 years	No	NP with Pa V-conf with K
4	Brief psychotic disorder	No	?	M, 3 years (1st); M, 3 months (2nd)	No	NP V-conf
5	Schizophrenia	Schizophrenia	Drowning	F, 12 months	Yes	AP '5-8'+ Pd, Pa, Ma
6	Depressive episode in schizoaffective disorder	Borderline personality disorder with addiction	Burning	F, 8 months	No	NP with Pa
7	Mixed episode with dissociative features in bipolar disorder	No	Drowning	M, 35 days	No	NP V-conf
8	Depressive episode in bipolar disorder	Mood/anxiety disorder	Choking	M, 4 years	Yes	NP V-conf
9	Post-partum depression with dissociative features	Mood/anxiety disorder	Drowning	M, 5 months	No	NP V-conf
10	Paranoid schizophrenia	Mood/anxiety disorder	Stabbing	M, 1 year	Yes	NP with Pa
11	Depressive episode in schizoaffective disorder	Mood/anxiety disorder	Stabbing	M, 13 years	No	AP '6-8'+ Hs, D, Hy, Pd, Pt
12	Mixed episode with psychotic features in bipolar disorder	Mood/anxiety disorder	Stabbing	M, 1 month	Yes	NP with Pa V-conf
13	Depressive episode in bipolar disorder	Mood/anxiety disorder with psychotic features	Poisoning, drowning	F, 3 months (1st); M, 5 year (2nd)	Yes	NP with Si
14	Delusional disorder	No	Stabbing	F, 2 years (1st); F, 10 years (2nd); F, 13 years (3rd)	Yes	AP '6-8'
15	Dissociative disorder	Eating disorder and histrionic Personality disorder	Stabbing	M, 1 year	Yes	NP V-conf
16	Major depression with psychotic features	Borderline personality disorder	Stabbing	M, 2 years	No	NP with Ma

Legend: NP=normal profile; AP=abnormal profile; V-conf=V-like configuration of the validity scales; Pa=MMPI-2 Paranoia clinical scale; K=MMPI-2 Correction validity scale; Ma=MMPI-2 Mania clinical scale; Hs=MMPI-2 Hypochondriasis clinical scale; D=MMPI-2 Depression clinical scale; Hy=MMPI-2 Hysteria clinical scale; Si=MMPI-2 Social Introversion clinical scale; F=female; M=male.

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