

REVIEW

Deaf adults and mental health: A review of recent research on the prevalence and distribution of psychiatric symptoms and disorders in the prelingually deaf adult population

Beate Øhre¹, Stephen von Tetzchner² & Erik Falkum³

1. PhD candidate & Clinical psychologist, National centre for hearing impairment and mental health Clinic for mental health and addiction. Oslo University Hospital

2. Professor Department of psychology, University of Oslo

3. MD, PhD Department of research and development. Clinic for mental health and addiction. Oslo University Hospital & Institute of clinical medicine. University of Oslo

ABSTRACT

Research on the prevalence and distribution of mental disorders in the prelingually deaf population is scarce. In 1999, an extensive literature review was published, containing prevalence studies published prior to 1994. A systematic search was made for research publications about the prevalence and distribution of psychiatric symptoms and disorders published between 1995 and 2011. Eleven studies were found, five with samples from the general population and six with clinical samples. Since 1999, studies of deaf individuals have improved methodically, especially with regard to assessment procedures and instruments. However, selection bias, lack of representative samples, and unmatched comparison samples still preclude firm conclusions on the prevalence and distribution of psychiatric symptoms and disorders in the prelingually deaf population. This means that in order to gain a better understanding of the impact of prelingual deafness on mental health, studies with more representative samples and better matched samples in comparisons are needed.

KEYWORDS

Prelingually deaf adults, mental disorders, psychiatric symptoms, research, assessment

Introduction

Many different factors may contribute to the development of mental disorders. Both biological factors and adverse life conditions may lead to a path of psychopathological development. Mental disorders – as well as a lack of such disorders – are a result of individual vulnerability and resilience, and environmental risk and protection.¹ However, the mechanisms behind many factors are not well understood, and for decades, the overriding research question has been how genetic and other biological factors interact with environmental factors in causing mental disorders.

Correspondence to Beate Øhre
National centre for hearing impairment and
mental health. Clinic for mental health and
addiction. Oslo University Hospital
P.O.Box 4959 Nydalen
0424 Oslo, Norway
Phone +47 22923515 / +47 91640912.
Fax +47 22923477
email: beate.ohre@ous-hf.no

One possible pathogenic influence may come from the impairment of one or several senses.²⁻⁵ It has been assumed that severe prelingual hearing loss may increase the vulnerability of the individual and the probability of developing mental disorders. However, only a limited number of studies have investigated mental health in this group. The focus has been on linguistic and cognitive issues.^{6,7} The result has been incorrect diagnostic inferences, or *diagnostic overshadowing*, and non-optimal mental treatment and health care.^{8,9}

Over the years, studies have demonstrated various distributions of mental disorders in both hearing and deaf client populations.¹⁰⁻¹³ No clear evidence has been presented that psychiatric disorders are more prevalent in people with prelingual deafness than in the general population. Traditionally, deaf people have been excluded from general studies, partly because hearing loss was considered their main problem and partly because the signing population is often difficult to recruit. Prevalence estimates of mental disorders in the deaf population are hard to produce as most countries do not have central registers of the entire deaf population. Neither is it customary to register hearing status when patients are admitted to mental health services. Prevalence rates of mental disorders in deaf people have therefore been estimated from studies of accessible subgroups within the deaf community.

It is also not clear *why* hearing loss may make the individual more vulnerable to psychiatric disorders. It is possible, but not likely, that the lack of the auditory sense itself may influence neurological development in a manner that creates susceptibility to some psychiatric disorders. The aetiology of the hearing loss may play a causal role in the development of a series of other disorders, like visual impairment, autism, learning disorder or attention deficit disorder.^{2,14-16} Psychiatric disorders in deaf individuals may be mediated

by impaired communication and language, impoverished social relations and reduced understanding of social events and processes due to limited shared means of communication.¹⁷⁻¹⁹ The mediating factor may impact on vulnerability and the type of psychiatric disorder that result. This means that some disorders may become more frequent in the deaf population, while others will be equally or even less frequent than in the general population.

Currently, the hearing impaired population is changing due to medical advances, including vaccinations, cochlear implants and genetic counselling. This transition adds to the need for reliable research on prevalence rates and possible causes of increased vulnerability.

In 1999, Vernon and Daigle-King²⁰ published a historical overview of studies of inpatient care of mental patients who were deaf, published between 1929 and 1994. The first study reviewed was conducted in Denmark in 1929 (not in Norway as is stated in the article) by Viggo C. Hansen who was a Danish deaf painter (not psychiatrist). His pioneer study was motivated by his concern for his fellow deaf countrymen with mental disorders.²¹

Vernon and Daigle-King²⁰ conclude from the studies they reviewed that the overall prevalence of mental illness is significantly higher in the deaf than in the hearing population, but that the differences were moderate. Moreover, the empirical studies were relatively few, and even though both inpatient and outpatient services for deaf people with mental illness had increased more or less continuously in the United States and Europe since World War II, most of the relevant research was made before 1980. After that, research activity seemed to have decreased.

The present article examines the scientific publications on mental health in deaf adults that have been published since 1994, which is the publication year of the most recent article

cited in Vernon and Daigle-King's review.²⁰ This review thus includes research literature from 1995 to 2011 related to the prevalence of mental disorders and factors associated with such disorders in prelingually deaf adults. The main questions addressed are whether these studies present new evidence concerning the prevalence of psychiatric disorders in the current deaf adult population, whether the distribution of disorders in deaf and hearing populations are the same or different, and what factors that may mediate psychiatric vulnerability in prelingually deaf people.

Method

A systematic literature search was undertaken which included the central databases Cochrane Library, Medline/PubMed, PsycINFO and EMBASE and an Internet search with Google Scholar. In addition, the reference lists of the articles included were scrutinized to identify relevant articles not found in the data bases, and a search was made for publications by the presenters at the 8th European Conference on Mental Health and Deafness in Cambridge in 2010.

In each of the databases, searches were conducted in several categories (clinical studies, clinical trials, systematic reviews and other reviews), applying a variety of key words for hearing impairment and deafness. These key words were combined with key words for mental health, like "mental disorder", "mental distress", "psychiatric disorder" or "psychiatric diagnosis", and with the terms for major diagnoses in the ICD-10²² and DSM-IV.²³ The searches included both MESH terms and text words. Many of the searches yielded zero results.

The inclusion criteria were that articles a) were published in peer reviewed journals, b) were written in English language, c) were published in 1995 or later, d) contained new data, e) studied prelingually deaf adults (above eighteen years of age), and f) investigated topics related to the prevalence

and distribution of psychiatric disorders. Publications that failed to fulfil these criteria were excluded from the review.

Results

Table 1 lists the articles reporting on prevalence or distribution of mental symptoms and disorders in prelingually deaf adult populations. They include relatively small numbers of participants, making a quantitative meta-analysis difficult to attain. Therefore, the present paper is a narrative review. The articles provide new data concerning mental health in various subgroups of the prelingually deaf adult population. Some of the studies pose several other research questions that will not be commented here.

Five of the studies include samples from the general deaf population, whereas the remaining six studies include clinical samples. The five "general" samples comprise students,²⁴ deaf adults,¹⁸ members of clubs for the deaf,¹⁹ a deaf register²⁵ and elderly persons.²⁶ The clinical samples include outpatients,^{27,28} inpatients,^{27,29,30} inpatients in locked units,³¹ and residents of mental health institutions.³²

Symptoms of depression and anxiety in the general adult deaf population

All the studies with samples from the general population focus on the prevalence of depression and anxiety *symptoms*. None of them report on the prevalence of mental *disorders*. The mean ages of the five samples vary greatly, from twenty-six years in a sample of American college undergraduates to seventy-five years in the sample of elderly prelingual deaf individuals in Skåne, Sweden. This is likely to influence prevalence rates.

Table 1

Studies investigating the prevalence of psychiatric symptoms and disorders in prelingually deaf adults, with descriptions of participants, diagnostic methods and key findings.

Author & Year & Country	Topic / issue	Participants	Mean age (SD) Range	Method / Assessment instruments	Key findings
Appleford 2003 UK (1.4.1997-31.3.1998)	Mental disorders and clinical activity	Deaf outpatients N=238 Deaf inpatients N=67 (hearing outpatients N=544 Hearing inpatients N=77)	18 <	ICD-10 Diagnostic criteria Retrospective	The results showed that among the deaf outpatients more patients suffered from schizophrenia and related disorders ($P<0.15$) and neurotic stress-related and somatoform disorders ($P<0.001$), and fewer patients from bipolar affective disorder and unipolar depression than the hearing patients in the comparison group
Black & Glickman 2006 USA (1999-2004)	Demographics, diagnoses & clinical data	Deaf inpatients N=64 (and two groups of hearing patients; N= 64 and N=180)	-	DSM-IV-TR, Axes I & II Language rating scale Retrospective	PTSD was the most common diagnosis in the deaf patients. Deaf patients are more likely than hearing patients in the same hospital to be diagnosed with a mood, anxiety, personality or developmental disorder and less likely to be diagnosed with a psychotic or substance abuse disorder. 75% diagnosed with language dysfluency.
De Bruin & de Graaf 2004/2005 The Netherlands (1987-1999)	Demographic, deafness-related and diagnostic characteristics	Deaf and hearing impaired outpatients at PsyDoN, N=214 prelingually deaf N=148 postlingually deaf N=3, hard of hearing N=28)	Range: 22-65	Standard assessment interview (Adams, 1988; De Bruin et al, 1989). Retrospective	54% of the prelingual females and 68% of the males were diagnosed with mental health disorders, 76% of the prelingual females and 84% of the males had psychosocial problems. The authors conclude that demographic and deafness related characteristics in combination showed little connection to the severity of the mental health problems.
De Graaf & Bijl 2002 The Netherlands	Determinants of Mental Distress	Persons with prelingual hearing loss N= 308 (Persons with postlingual hearing loss N=211)	18 <	General Health Questionnaire, GHQ-12 and Symptom Checklist 8, SCL-8D	Mental distress: Preling. Deaf Men: 27.1% Women 32.4% General population: Men: 22.0% Women: 26.6% Risk-factors: Comm.probls., low self-esteem and poor acceptance of hearing loss
Fellinger et al 2005 Austria	Mental distress	233 deaf members of clubs for the deaf	43.3 (14.4)	WHOQOL-BREF; 26 items, GHQ-12 and 5 symptom scales from the BSI. Computerised package in Austrian sign language	GHQ-12: 70.3% deaf males and 84% females score above the cut-off for mental distress compared to 15% for hearing males and 17.5% for females. GHQ-12 and BSI show much higher levels of emotional distress among the deaf. No significant difference found in social relationships.
Haskins 2004 UK (1.7.2000-20.6.2001)	Psychiatric diagnoses and co morbidity	Deaf psychiatric inpatients N= 43; 37 deaf, 5 hard of hearing, 1 deaf-blind	-	Review of patients' records and charts Retrospective	63% of the patients had a diagnosis of schizophrenia, schizoaffective disorder, bipolar disorder or major depression. 58% of the sample had a psychotic disorder. 26% of the patients had a dual diagnosis of major mental illness and substance abuse.

Continue Table 1

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Kvam et al 2006 Norway	Anxiety and depression	Deaf adults N=431 (hearing adults N= 42.815)	50.8% 45 years and older (49.1% > 45 years and older)	3 questions from the Symptom Checklist -5 (SCL-5)	Even when controlled for gender and age, the risk of an individual experiencing mental distress was more than doubled for the deaf sample. There were significantly more symptoms of anxiety and depression in the deaf group than in the hearing.
Landsberger & Diaz 2010 USA (1998-2008)	Diagnostic and clinical features	Deaf inpatients in locked psychiatric units N=30 (Hearing N=60)	Deaf : 36.0 Hearing 36.9	Review of archival data Retrospective	The results showed striking discrepancies between the hearing and the deaf patients in the disorders impulse control disorder, pervasive developmental disorder and substance use disorder.
Leigh & Anthony-Tolbert 2001 USA	Depression	Deaf college under graduates N=53	26.3 (6.8) 18-42	The Beck Depression Inventory –II (BDI-II)	26% of the participants reported having been seriously depressed, 30% had previously been in therapy, 11% of the participants were currently in therapy, 11% had used antidepressants and 2% reported currently being on antidepressants
McClelland et al 2001 UK	Mental health of deaf residents in hostels and psychiatric wards	Deaf adult Mental health service residents N= 372 (361) In-depth study: 160	34.6 (12.6) 16-65	Survey of residents	The residents were under-diagnosed and had a high level of functional impairment. 1/3 was judged to have moderate or severe problems of risk to themselves or others. There was a high level of psychiatric illness and lack of contact with psychiatric services in spite of the residents' obvious and significant mental health problems. In the in-depth study 54% received psychiatric diagnoses, of these 49% were diagnosed with schizophrenia.
Werngren-Elgström et al 2003 Sweden	Depression and insomnia	Elderly prelingually deaf persons N=45 (Elderly hearing people (I)N=233 rehab. (II)N=133)	75 65-92 (I) 78 65-95 (II) 79 75-84)	Geriatric Depression Scale (GDS) 15 item version and Livingston's Sleep Scale	Mild depressive symptoms: Deaf:31% Hearing 9-19% Insomnia: Deaf: 73% Hearing: 30-50% Subjective wellbeing was higher among the deaf than in the hearing samples. One deaf participant was excluded.

De Graaf and Bijl¹⁸ conducted a study on the determinants of mental distress in adults with severe auditory impairment. Deaf and severely hard of hearing adults aged eighteen years and older were interviewed. Of this sample three hundred and eight persons lost their hearing before the age of three years. The study also included two hundred and eleven persons who became hearing impaired after the age of three years, but this is not the group in focus in this review. The participants were recruited from a variety of subgroups of the general deaf population. All participants were interviewed in their preferred language and mode of communication. A written questionnaire had been completed by the participants before the interview and another written questionnaire was used in the interview to support understanding. The interview included an extensive number of background variables (demographic, related to hearing loss, communication, self esteem, identity, social, vocational and other) in addition to two formal assessment instruments; the General Health Questionnaire (GHQ-12),³³ and the eight item version Symptom Checklist-8D (SCL-8D)³⁴ was applied to assess degrees of anxiety and depression. GHQ-12 was scored according to the key recommended by Goldberg³³ (item score 0-0-1-1, sum score range 0-12). A GHQ12- score of 2 was used as cutoff value.³⁵ The SCL-8D items were scored on a scale from 1 to 5 (1=not bothered at all, 5=extremely bothered, sum score range 8-40). Of the prelingually deaf and severely hearing impaired participants 30.2 percent had a total GHQ12 sum score of 2 or more. The mean score was 1.5 (SD 2.4). The threshold value for SCL-8D was set to 13. Of the prelingually deaf and severely hearing impaired participants 29.2 percent had a total score of 13 or higher, the mean score was 12.0 (SD 4.6), i.e. GHQ12 and SCL-8 identified about the same share of the population as clinical cases. At the bivariate level, the presence of an additional impairment or a serious illness was significantly associated with the SCL-8 score. In addition, those who reported high

levels of communication problems, low self-esteem and low acceptance of their hearing loss were more likely to report mental distress. In a multiple logistic regression analysis, only self-esteem and gender proved to be significantly associated with distress, females scoring higher than males. The results from this study were compared to the results of a psychiatric epidemiologic study in the general Dutch population.³⁶ The proportion of males who had GHQ scores of 2 or higher was 27.7 percent in the prelingually deaf sample, compared to twenty-two percent in the general population sample. Among females 32.4 percent of the prelingually deaf and 26.6 percent in the general population sample had a score of 2 or higher.

Fellinger and associates¹⁹ examined one hundred and thirty one male and one hundred and two female members of the Association for the Deaf in Upper Austria (from a membership of five hundred and two, and two hundred associated members), and the assessments were made during ordinary meetings in this association. The participants were using sign language and individual self-assessment was made with a computerised sign language version of an assessment package including the 12-item General Health Questionnaire (GHQ-12)³³ and five symptom scales from the Brief Symptom Inventory (BSI).³⁷ When compared with samples from previously published prevalence studies of hearing individuals, the deaf sample scored significantly higher on depressive symptoms (0.87) than the hearing comparison sample (0.28). The deaf females scored higher (0.92) than the males (0.82) but the difference was not significant. A similar difference was found between females (0.33) and males (0.24) in the hearing sample. Fellinger and associates also found that the deaf participants had significantly higher anxiety scores than the hearing comparison sample (0.98 vs 0.34). The deaf women scored higher than the men (1.14 vs 0.85), and a similar gender difference

was observed in the hearing sample (0.39 vs 0.29).

Kvam and associates²⁵ made a postal survey of symptoms of depression and anxiety in members of a voluntary register of “people who consider themselves deaf”, and compared their scores with a large community sample of people without hearing loss. Four hundred and thirty-one members of the Deaf register responded to the survey (46%), whereas the hearing comparison sample consisted of fifty-one thousand nine hundred and seventy-five people (response rate 64 %). The survey included three items from the Symptom Checklist 5 (SCL-5),³⁸ asking about feeling fearful as an indication of anxiety, and feeling hopeless about the future and feeling blue as indicators of depression. Twenty deaf participants received a video version with signing upon request. Each of these questions was scored on a four-point scale (1= Not at all, 2= A little, 3= Quite a bit and 4= Extremely bothered). The deaf sample reported significantly more symptoms of depression and anxiety. Twenty-one percent of the deaf and four percent of the hearing samples reported feeling “quite a bit” or “extremely” hopeless about the future, whereas twenty percent of the deaf and four percent of the hearing samples reported feeling blue “quite a bit” or “extremely”. Ten percent of the deaf and one percent of the hearing sample reported feeling fearful “quite a bit” or “extremely”. In both the deaf and the hearing sample, the female respondents felt significantly more fearful than the males (0.78 and 0.66 in the deaf and 0.43 vs 0.31 in the hearing sample). The hearing females also scored significantly higher on feeling hopeless about the future and feeling blue, while the gender difference on the depression indicators in the deaf sample did not reach significance. In both samples, younger respondents had significantly higher scores on depression symptoms than the older ones. The depressive symptom scores remained higher in the deaf than in the hearing sample when gender and

age were controlled. Although the Deaf register includes individuals who consider themselves deaf and use sign language, it is not clear how many of the individuals in the deaf sample who were prelingually deaf, but it is reported that the participants who became deaf before the age of four scored significantly higher on depressive symptoms than participants with onset of hearing loss after this age.

Werngren-Elgström and associates²⁶ investigated depressive symptoms in nineteen male and twenty-six female members from a population of one hundred and nine prelingually deaf individuals above the age of sixty-five in Skåne, Sweden, and compared this sample to two samples of elderly hearing individuals above the age of sixty-five in the same geographical area; one hundred and thirty-three persons who had been referred to an occupational therapist and/or to a physiotherapist and two hundred and thirty-three persons who had participated in previous studies. Depression was assessed with the 15-item version of the Geriatric Depression Scale³⁹ and the assessment interviews were carried out by the same signing professional. In the deaf sample, fifty-one percent had symptoms of depression, but this prevalence was not very different from the hearing samples.

Finally, Leigh and Anthony-Tolbert²⁴ examined twenty male and thirty-three female deaf college undergraduate students with the Beck Depression Inventory – II.⁴⁰ There was no comparison group. The assessment was made with the participants’ preferred mode of communication. Twenty-six percent of the students reported having been severely depressed at some time. This is almost twice the prevalence of positive screens for depression of 13.8 percent reported for hearing undergraduate students by Eisenberg and associates.⁴¹

Study	Sample	Affective (mood) disorders, Including depression		Neurotic & somatoform disorders, Including anxiety		Disorders due to psychoactive substance use		Schizophrenia, schizotypal delusional and psychotic disorders		Personality disorders		Other Diagnoses	
		D	H	D	H	D	H	D	H	D	H	D	H
Deaf=D Hearing=H		D	H	D	H	D	H	D	H	D	H	D	H
Appleford 2003	Outpatients (O)	20	51	19	8	5	6	27	19	6	4	O: Organic disorder: 4 MR: 4 Other: 14	O: Organic disorder: - MR: - Other: 11
	Inpatients (I)	19	50	10	9	2	13	49	22	10	3	I: Organic disorder: 6 MR: 3 Other: -	I: Organic disorder: 3 MR: - Other: -
Black & Glickman 2006	Inpatients	39	21	40.7	8.8	33	41.6	28	88.9	44	21.6	PDD: 6.3 Asperger syndrome: 1.6 MR: 17.2 Language dysfluency: 75 Impulse control disorder: - Other: -	PDD: 2.2 Asperger syndrome: - MR: 4.4 Language dysfluency? Impulse contr. dis.:2.7 Other 13.6
De Bruin & de Graaf 2004/2005	Outpatients	13		9		5		8				Impulse control disorder: 3 Other: 2	
Haskins * 2004	Inpatients	42		18.6		51		27.9				Borderline intellectual function: 9 PDD-NOS: 4 Paraphilia: 2 MR: 16	
Landsberger & Diaz 2010	Inpatients in locked units	33	38	20	18	20	45	43	62	17	43	Borderline intellectual Function: 7 PDD: 10 Learning or language Disorder: 10 MR: 33 (mild) Impulse control dis.:23 Other: 6	Borderline intellectual Function: 12 PDD: - Learning or language Disorder: 3 MR: 3 (mild) Impulse control dis.:2 Other: 6
McClelland et al 2001	Residents in mental health facilities			19				18					
	In-depth study of residents			5				57.3		8		Dementia: 1.9	
For comparison Vernon & Daigle-King 1999 Historic overview	Deaf studies 1929-1994	3-20				3-6		17-54				Organic disorders: 1-32 Adjustment disorders: 24-39	

Table 2. The percentage of psychiatric diagnoses in studies of clinical populations. *Percentage calculated on the basis of numbers given by the author. PDD = Pervasive developmental disorder; PDD-NOS = Pervasive developmental disorder, not otherwise specified; MR = Mental retardation

In sum, the five studies indicate that there is a heightened vulnerability for developing depression and anxiety in the prelingually deaf population.

The distribution of mental disorders in clinical samples

Table 2 lists the articles reporting psychiatric diagnoses and the distribution of the main diagnostic categories.

Depression, anxiety and somatoform disorders

Appleford²⁷ reviewed the clinical activity at Denmark House, a specialist unit offering mental health services to deaf people in England and Wales, during one year.

The study included prelingually deaf inpatients and outpatients above eighteen years of age. A comparison group was drawn from a general psychiatric unit in the same hospital. The diagnoses were made in accordance with the International Classification of Diseases, ICD-10.²² The assessment of the inpatients was obtained from the patients' records and chart notes of medical conditions and clinical activity, and in cases of uncertainty, the diagnoses were verified by consultants. For the outpatients, activity and admission data were obtained from the records in the computerized patient register. The article does not provide information about the procedures of the initial assessment of the patients, assessment instruments applied or the language mode used. In the deaf sample, seventeen percent of the outpatients and nine percent of the inpatients received a diagnosis of unipolar depression, compared to forty-three percent and forty percent in the corresponding patient groups in the hearing sample. Three percent of the outpatients and ten percent of the inpatients in the deaf sample had a bipolar disorder, compared to eight and ten percent in the hearing sample. The deaf sample thus comprised relatively fewer persons with unipolar depression than the hearing sample.

There were also fewer deaf outpatients with a diagnosis of bipolar disorder, while ten percent had a bipolar disorder in both the deaf and hearing inpatients. In the deaf sample, nineteen percent of the outpatients and ten percent of the inpatients were diagnosed with neurotic, stress-related and somatoform disorders (including anxiety), compared to eight and nine percent in the hearing patient groups. Thus, these disorders were twice as frequent among the deaf as in the hearing outpatients, whereas the prevalence was the same among the inpatients.

In an archival study, Black and Glickman²⁹ studied sixty-four severely and chronically mentally ill patients who had been discharged from the Deaf Unit at Westborough State Hospital in Massachusetts, USA, over a period of five years. Two comparison groups were included, one with sixty-four hearing patients from the same hospital, selected randomly from the patients who had been discharged during the same time period as the deaf sample. The other comparison group consisted of one hundred and eighty hearing patients who attended the hospital one day in March 2006. The study used archival data from a 5-year period, reviewing diagnostic assessments that had been administered by a specialist multidisciplinary team including a communication specialist. The psychiatric diagnoses were made according to the Diagnostic and Statistical Manual of Mental Disorders, DSM-IV-TR²³ and language and communication was assessed with the Language Rating Scale.²⁹ Most of the patients were found to have more than one diagnosis. Among the deaf patients, thirty-nine percent were diagnosed with mood disorders, compared to twenty-one percent in the hearing patient group. Of these, 12.5 percent of the deaf and 9.4 percent of the hearing sample had bipolar disorder. Only 2.6 percent of the deaf patients were diagnosed with unipolar depression, compared to 8.3 percent in the hearing sample. This means that depression was found to be more than three times as

frequent in the hearing patient group, while anxiety disorders were diagnosed in 39.1 percent of the deaf patients compared to 8.8 percent in the hearing patients. Post traumatic stress disorder (PTSD) was also much more frequent in the deaf sample (29.7 vs 6.6 %). The high prevalence of PTSD in the deaf sample may reflect that fact that fifty-two percent of these patients had a known history of abuse. Somatoform disorders were rare in both the deaf (1.6 %) and hearing patients (0 %).

De Bruin and de Graaf²⁸ examined the distribution of mental disorders in one hundred and seven male and one hundred and seven female patients attending an ambulatory mental health service at the North-west Netherlands Mental Health Service for the Deaf and Partially Hearing (PsyDoN) over a period of thirteen years. The majority, sixty-nine percent, were prelingually deaf, while three percent were postlingually deaf and twenty-eight percent were hard of hearing. All the patients were assessed with a standard assessment interview^{42,43} by a deaf or a hearing professional using Dutch sign language or spoken Dutch supported by signs. Psychiatric diagnoses were assessed according to the DSM-IV.²³ Thirteen percent of the patients were found to fulfil the criteria for a diagnosis of depression. There was no significant difference in frequency between the male and female patients. Seven percent received a diagnosis of anxiety disorders; nine percent of the male and six percent of female patients. Somatoform disorders were diagnosed in two percent of the patients, equally in females and males.

Haskins³⁰ reviewed the records and charts of forty-three patients at the Mental Health Center for the Deaf in Western State Hospital, Virginia, USA. Thirty-seven patients were prelingually deaf, five were hard of hearing and one was deaf-blind. No information is offered about the diagnostic procedures or translation and adaptation of the assessment instruments, except that the initial assessments

were made by signing clinicians. Calculations based on the numbers provided in the article show that forty-two percent of the patients had affective disorders. Among these, 16.3 percent had major depression, 18.6 percent had bipolar disorder, and 18.6 percent were diagnosed with anxiety disorder. No comparison group was included in the study.

Landsberger and Diaz³¹ reviewed archival data to investigate the distribution of mental disorders in thirty deaf adults who had been admitted to a Midwestern state psychiatric hospital over a period of ten years, after having been committed by the court to psychiatric treatment in locked psychiatric wards. A comparison group consisted of sixty randomly selected hearing inpatients from the same hospital. None of the psychiatrists who initially assigned diagnoses to the patients were fluent in sign language or specialists in mental health care of deaf patients. Thirty-three percent of the deaf and thirty-eight percent of the hearing patients had a diagnosis of affective disorder. Among these patients ten percent of the deaf and fifteen percent of the hearing sample had major depression. Another ten percent of the deaf patients had bipolar disorder, compared to eighteen percent in the hearing sample, and thirteen percent of the deaf and five percent of the hearing patients were diagnosed with other mood disorders. Twenty percent of the deaf and eighteen percent of the hearing sample had anxiety disorders.

McClelland and associates³² investigated mental health problems in deaf individuals aged sixteen to sixty-five years receiving residential and other services in the UK. There was no comparison group. The assessments were made with a schedule used for individual assessment in a previous survey of mental health residential care, providing information on placement, psychiatric history, mental and behavioural problems, and personal functioning.⁴⁴ Among the three hundred and sixty-one residents, eighty-seven percent were signing, five percent were signing in deaf-

blind mode and six percent were speaking. In this group, one hundred and sixty-one residents had a diagnosis of mental disorder, of which nineteen percent were diagnosed with neurotic disorders. Of the three hundred and sixty-one residents, one hundred and sixty were included in an in-depth study and fifty-four percent of this sample was diagnosed with mental disorders. Five patients (3.1 %) had neurotic disorders.

To sum up, the rather large differences in distributions found in the deaf and hearing samples indicate that the deaf samples may be representative of different patient populations, and that the deaf and hearing samples are not really comparable.

Schizophrenia, schizotypal, schizoaffective, delusional and psychotic disorders

The picture that presents in the distribution of psychotic disorders is quite similar to that of the studies of depression and anxiety reported above. De Bruin and De Graaf²⁸ found that four percent of the outpatients in their study had received a diagnosis of schizophrenia and four percent of other psychotic disorders. Among the deaf patients in Appleford's study,²⁷ twenty-seven percent of the outpatients and forty-nine percent of the inpatients were diagnosed with schizophrenia, schizotypal and delusional disorders, compared to nineteen percent of the hearing outpatients and twenty-two percent of the hearing inpatients. Thus, more than twice as many deaf than hearing inpatients were diagnosed with these disorders.

Black and Glickman,²⁹ however, reported the same frequency (1.6%) of delusional disorders in the deaf and the hearing patients. Psychosis not otherwise specified (NOS) was diagnosed in one percent of the deaf and 1.6 percent of the hearing patients, whereas schizoaffective disorders were more frequent among the hearing (37.7 %) than among the deaf (20.3 %) inpatients. The most striking difference was found with regard to schizophrenia, which

was diagnosed in 6.3 percent of the deaf and 47.7 percent of the hearing patients. The total prevalence of these disorders was twenty-eight percent in the deaf sample, compared to 88.9 percent in the hearing sample. Haskins³⁰ report a similar occurrence (27.9 %) of these disorders in her study of deaf inpatients, with 20.9 percent schizophrenia and seven percent schizoaffective disorder.

In the sample reported by Landsberger and Diaz,³¹ twenty percent of the deaf and twenty-eight percent of the hearing sample had received a diagnosis of schizophrenia. Schizoaffective disorder was significantly more frequent among the hearing (32 %) than among the deaf patients (6 %), while an opposite pattern was evident for psychosis NOS, showing a significant difference with seventeen percent among the deaf and two percent among the hearing patients. In the study of residents in mental health services for deaf individuals, McClelland and associates³² found that eighteen percent of the one hundred and sixty-one residents with mental disorders were diagnosed with schizophrenia.

Summing up, like above, the studies indicate that the deaf samples may be representative of different patient populations, and that the deaf and hearing samples are not really comparable.

Personality disorders

The prevalence of disorders of adult personality in the general western population is approximately thirteen percent.⁴⁵ Personality disorders are usually assumed to be related to adverse childhood conditions, and due to the complexity of the communicative challenges many deaf individuals experience during their childhood years, one might expect a relatively high prevalence of personality disorders in the prelingually deaf population.

Four of the studies reviewed here report personality disorders. Appleford²⁷ found that

six percent of the deaf and four percent of the hearing outpatients had a diagnosis of personality disorder. Among the inpatients, the prevalence was ten percent in the deaf and three percent in the hearing sample. Black and Glickman²⁹ report a much higher frequency of personality disorders among their patients, forty-four percent of the deaf and 21.6 percent of the hearing sample. The most prevalent personality disorder among the deaf inpatients was borderline personality disorder. This was found in 14.1 percent of the deaf patients, compared to 6.6 percent in the hearing sample. Personality disorder NOS was the most prevalent personality disorder among the hearing patients, with 10.5 percent, compared to 6.3 percent in the deaf patients. However, Landsberger and Diaz³¹ found a significant difference in the opposite direction. Seventeen percent of the deaf and forty-three percent the hearing inpatients had a diagnosis of personality disorder. Among the one hundred and sixty residents of mental health facilities studied by McClelland and associates,³² eight percent had a personality disorder diagnosis.

The results indicate that the patients in the deaf and hearing samples receive somewhat different diagnoses, but they do not provide a consistent pattern and do not indicate a generally higher prevalence of personality disorders in the deaf psychiatric population.

Disorders due to psychoactive substance use

Traditionally, disorders due to psychoactive substance have been considered to be less frequent among deaf than among hearing patients.²⁰ Similar results were reported by five of the clinical studies. In Appleford,²⁷ five percent of the deaf outpatients and two percent of the deaf inpatients had received a diagnosis of disorders related to psychoactive substance use, compared to six percent and ten percent among similar patients in the hearing sample. Among the patients studied by Black and Glickman,²⁹ thirty-three percent of the deaf and 41.6 percent of the hearing samples had substance abuse disorders. The most

prevalent diagnosis among the deaf patients was polysubstance abuse, 9.4 percent compared to 4.4 percent in the hearing sample. The most prevalent diagnosis among the hearing patients was alcohol dependence, 16.6 percent in the hearing and 3.1 percents in the deaf sample.

De Bruin and de Graaf²⁸ found that five percent of the total outpatient group had substance dependence or substance abuse disorders. These disorders were diagnosed four times as often in males (8%) than in females (2%). In Haskins,³⁰ fifty-one percent of the inpatients were diagnosed with substance use disorders. Landsberger and Diaz³¹ found twenty percent substance use disorders among the deaf inpatients and in forty-five percent the hearing patients.

In sum; the clinical studies that include hearing comparison groups seem to indicate that disorders due to psychoactive substance use is more prevalent in the hearing than in deaf clinical populations.

Discussion

The present article reviews studies published in the time period from 1995 to 2011. Vernon and Daigle-King²⁰ pointed out that in spite of an increase in mental health services there had been little empirical research related to prevalence and distribution of disorders of psychiatric symptoms and disorders in the deaf population, and the present review shows that research in the years following their review has remained meagre. The literature search disclosed that there are many articles on deafness and mental health, but most of them discuss mental health and deafness from a practice perspective without providing new data. In fact, less than one article per year fulfilled the present search criteria, indicating that the evidence base for this group of patients is limited.

Many of the studies of deaf patients are retrospective and build on archival data, and

hence reflect the development in populations that have grown up under different communicative conditions and with different educational and social services than deaf people today. However, in spite of the fact that there have been important developments in health services for deaf people since the time of patient diagnosis for many of the retrospective studies reported here, they are important because they contribute to the continuous monitoring of mental health in deaf people and their service needs.

The studies involving samples drawn from the general deaf population, which may provide information about actual prevalence, indicate that depressive symptoms may be somewhat more frequent among deaf than among hearing individuals, although this finding should be interpreted carefully (see discussion below). Importantly, none of these studies report diagnoses, and it is thus not possible to infer from them whether more deaf than hearing individuals receive a diagnosis of depression, or should have received such a diagnosis. Considering the difficult life situation of many deaf people, a relatively high prevalence of subclinical depressive symptoms would not be surprising. This may require a supportive social network rather than professional attention, but communication problems may reduce access to the support usually provided by family, colleagues and friends. In their review of depression, Connolly and associates¹⁷ have a similar conclusion.

The studies of clinical samples reviewed here present rather diverging results, preventing any conclusion regarding the possibly different susceptibilities to psychiatric disorders among hearing and deaf people. Instead they reflect the rather poor state of scientific knowledge related to the prevalence of mental disorders in the prelingually deaf population. Although there is some indication that depressive symptoms may be more frequent in deaf people, neither the statement regarding a higher prevalence of psychiatric disorders in the deaf population, nor the

contradiction of this statement, can be confirmed.

The problems in concluding from the present review, relate to a number of methodological factors, including differences in sampling related to aetiology, age, social background and gender, as well as in diagnostic practices and assessment procedures and instruments. Moreover, many of the studies of clinical samples report different diagnostic categories, making comparisons difficult.

Representativity and comparability of the samples

None of the five prevalence studies include procedures for obtaining a representative sample from the general deaf population. This is unfortunate because individuals with prelingual deafness are often excluded from epidemiological studies, either explicitly or implicitly, due to lack of appropriate measures for reaching and including signing people. Population studies are typically based on written forms, and the limited literacy skills of many deaf adults may prevent them from taking part.^{46,47} The lack of representativity raises doubts regarding the external validity of the reported prevalence of psychiatric symptoms, that is, the validity for the deaf population in general.

Knowledge about the distribution of mental disorders in clinical samples is important because this distribution indicates the treatment needs in different institutions. However, both a comparison with hearing samples and interpretation of distribution data require knowledge about the referral base of the sample. The referral of deaf patients to mental health services may differ in several ways from the referral practices for hearing patients. For example, the study by McClelland and associates³² indicates that in the UK, many deaf adults with mild to severe forms of mental health problems are never being referred to appropriate services. Several authors point to a likely under-referral of deaf

individuals, due to hindrances in the referral chain, communication problems and diagnostic overshadowing.^{17,26,27,32} Thus, a specialist institution for deaf people in the region may lead to increased referral of all types of patients, while the lack of such an institution may lead to under-referral.

The distribution of mental disorders in deaf and hearing adults may indicate if and how deafness may imply increased vulnerability to psychiatric disorders, and several studies have compared deaf and hearing samples. Unfortunately, none of the studies have optimal matching procedures and evidence is lacking that the deaf and hearing samples are drawn from similar populations and thus may be considered representative of the same patient group. It is thus not clear whether they represent similar base populations or not. For example, Appleford²⁷ found large differences between deaf and hearing patients, but he compares the deaf patient group with a sample drawn from a general psychiatric unit in the same hospital. It is not likely that the two units have similar functions for the populations they serve, meaning that they represent different base populations. As pointed out above, the presence or lack of an institution with specialist competence related to deafness and psychiatry may have a significant impact on the referrals of deaf patients. For example, the deaf and hearing patients compared by Black and Glickman²⁹ had quite different referral histories, the deaf unit representing the only clinic for deaf people with mental health problems in the area, while the patients in the comparison unit had been referred for psychosis and other severe disorders. The differences in the distribution of diagnoses are thus more likely to reflect differences in referral practices than different distributions of psychiatric disorders in deaf and hearing individuals in general.

Age

The vulnerability and resilience, as well as life events and challenges, changes over the life span.⁴⁸ Age is therefore always an important factor in research on prevalence and distribution of psychiatric symptomatology and disorders. The educational, societal and medical changes that are taking place may make age an even more important variable in studies of deaf patients. However, only some of the studies make use of the age variable; the Swedish study on depressive symptoms in elderly deaf people²⁶ and Leigh and Anthony-Tolbert's study²⁴ on depressive symptoms in undergraduate students both point to the issue of prevalence possibly being age-related. Kvam and associates²⁵ report few age related differences in their results, but find that both the younger deaf and hearing persons on average express significantly more feelings of hopelessness than do the older. McClelland and associates³² find striking age differences when comparing deaf and hearing male residents. The deaf residents had a mean age of thirty-five years, which is more than ten years younger than the mean age of male hearing residents of similar services. Otherwise, the studies make little use of the information about age. Most of the studies report the average age and the age distribution of the patients, but unfortunately further analysis is mostly lacking, even when samples are large enough for this.^{18,19,27}

Assessment procedures and instruments

Most assessment instruments applied in mental health diagnostics are developed for use with hearing individuals, and may need translation and adaptation to the sign language and communication mode of the individual in order to produce comparable results with deaf subjects. The use of such adaptations differs considerably in the studies reviewed. One study used computer-based self-assessment with sign language,¹⁹ another provided videos with questionnaires on request.²⁵ However, the request of a videotaped questionnaire

presupposed that the deaf person had read and understood the information about this possibility, and the fact that only twenty individuals asked for the video indicates that most of those who would have benefited from using this version did not request it. Some of the deaf individuals may have received interpretation from hearing professionals and relatives, but their translations are likely to vary, and a deaf person may be less open when answering an interpreter than when filling out the form independently.

Several of the studies reviewed archival data, patients' charts and records.²⁸⁻³¹ Retrospective studies are important in that they are likely to give an ecologically valid picture of the assessment procedures that were used, but they do not give a unified and coherent picture of the mental disorders of the patients studied, as researchers will depend on the information that has been included in the charts and records. In addition to assessment specificity and precision, individual clinicians may give priority and focus to different aspects of mental disorders and their development. The standard is likely to be less stringent than in prospective studies where identical assessment is implemented as part of the study. Moreover, diagnostic practices tend to undergo revisions and changes over time, leading to changes in information available in archival data.

Specialist competence, language and communication modes in the assessment of mental disorders

Most of the reviewed clinical studies were conducted in special units for deaf persons, and therefore represent a higher general competence on deafness and mental health than will be found in ordinary psychiatric units. A spectrum of language and communication modes and combinations of these are used among the adult deaf population. The skills and knowledge of these communication modes are crucial for the ability to diagnose mental health problems in this population.

The studies reviewed here indicate that the communication and language competence of the professionals who assess mental health in deaf people have improved greatly compared to the practices of earlier studies.²⁰ All but two studies^{25,31} state either that the assessment was conducted in the person's preferred language and mode of communication, or by signing professionals. Four of the studies^{18,19,24,25} offer information about the translation of the assessment instruments. In the other seven studies these procedures are not described. This makes it difficult to evaluate the validity and the reliability of the assessment.

The apparently good competence of the staff is a professional development that points to a significant increase in the quality of the mental health services for deaf people. It should be noted, however, that studies of clinical samples are conducted in units with special competence related to deafness. These institutions represent important examples of possible good practice, and it will be important also to study assessment of deaf patients in ordinary psychiatric institutions outside areas with specialist institutions for deaf people.

Potential causes of vulnerability to mental disorders in people who are prelingually deaf

The special challenges in the daily life of deaf persons, particularly related to communication and access to information, are likely to increase their vulnerability to developing psychiatric symptoms and disorders. The studies included in this review comprise individuals with somewhat different degrees of hearing loss, social backgrounds, proficiency in signed and spoken language, and different aetiologies behind their hearing impairment.

Aetiology may have a decisive role in the vulnerability of the individual but information about aetiology varies greatly in the studies reviewed here. Two of the clinical studies provided no information.^{27,32} One reason may

be that the aetiology of deafness is often unknown,⁴⁹ and many deaf persons therefore do not know the cause of their hearing loss. Most of the patients in Haskins,³⁰ more than fifty percent of the outpatients in de Bruin & de Graaf,²⁸ and twenty-eight percent in Black and Glickman²⁹ did not know the cause of their hearing loss. However, even when the aetiology is known, the studies rarely relate the mental health symptoms to different aetiologies.

Several of the studies indicate social and economic background differences between deaf and hearing patients. This may indicate that deaf patients experience higher levels of stress and less social support than hearing patients. Both social network and education are known to impact on the experience of stress and mental symptoms and disorders.

Language and communication ability are likely to crucially influence the development of psychopathology in deaf people.^{10,11,17,18,29,50} The studies of clinical samples report a high proportion of signers. For example, in the study of mental health service residents, eighty-seven percent preferred sign language.³² Landsberger and Diaz³¹ found sixty-seven percent signers, Haskins³⁰ sixty percent and Black and Glickman²⁹ fifty-one percent signers. The large number of signers may reflect the fact that the clinical studies were made in institutions with professionals who were proficient in sign language or had regular access to sign language interpreters. Still, a substantial percentage did not use signs as their main mode of communication. It is not clear whether they were signers or whether the proportion of non-signers was higher in the clinical samples than in the deaf population in general.

The use of a person's preferred language and mode of communication is important for assessment quality and is described by most of the reviewed studies. However, language problems were still frequent. Language

dysfluency was reported for seventy-five percent of the inpatients in Black & Glickman.²⁹ Calculation based on the numbers in Haskins³⁰ reveals thirty percent dysfluency, and among the Dutch outpatients, language dysfluency was reported for seven percent of the patients.²⁸ Research on hearing children indicates both a higher prevalence of psychiatric symptoms in individuals with language disorders, and a higher frequency of language disorders in psychiatric patients than in the general population.⁵¹ The question whether language dysfluency co-varies with any specific mode of communication, cause of deafness or mental disorders is yet to be investigated.

Conclusions

On the basis of current knowledge of psychiatry and developmental psychopathology, it has been assumed that deaf people are generally more vulnerable to developing psychiatric symptoms and disorders than the hearing population, but neither these nor earlier reviewed studies present firm empirical evidence for such vulnerability. The studies reviewed do not provide conclusive estimates of the prevalence of mental disorders in the prelingual adult population. The major reasons for this are the rather large heterogeneity and non-representativity of the samples, in addition to the diversity of assessment instruments and procedures applied. With these limitations in mind, the studies of subgroups of the general deaf population still indicate that symptoms of anxiety and depression may be more prevalent in prelingually deaf adults. The mediating and moderating factors involved also remain obscure. The studies on the distribution of psychiatric disorders are clearly limited to particular subgroups of patients in specific cultures and geographical areas.

Still, the studies reveal significant progress in assessment quality, which probably reflects the ongoing improvements in mental health services for deaf people. The improved quality

may mainly be apparent in specialist institutions but these institutions may disseminate knowledge about deafness to the general health services and contribute to a wider application of translated instruments. New telecommunication technologies have improved visual communication across distances and are now being used in staff training and follow-up of patients.⁵²

Future research

In the present literature review, there is one article from Austria, one from The Netherlands and one from Norway, the rest are from the UK and the USA. This may reflect that only papers written in English were included, although English is the *lingua franca* in present research. It should be noted that data are likely to be influenced by the financing and organizing of health services, the status of the deaf culture, and the position of sign language in the country, and there is reason to believe that variation along these dimensions will contribute to variation in the results. Research from a wider range of countries is therefore needed in order to better understand the relationship between deafness, mental health and environmental conditions. Efforts should be made to promote research in various countries and the publication of this research in English.

Research studies on psychiatric symptoms and disorders in the prelingually deaf population are still few and the evidence base very limited. However, new assessment instruments and procedures adapted for deaf people, and the presence of relevant knowledge and skills in psychiatric institutions and university departments hold great promises for more research in the future.

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