REVIEW

Risk factors leading to behavioural problems in individuals with hearing impairments and intellectual disabilities

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ABSTRACT

Background and Objective: Behavioural problems in individuals with both a hearing impairments (HI) and an intellectual disability (ID) are common. A literature search was conducted, focussed on the prevalence of behavioural problems in people with HI or ID and in people with both HI and ID. A special focus is on possible risk factors.

Results: Prevalence rates in both groups vary among the studies. For people with HI, differences seem related to the composition of the samples. For people with ID, there are differences in the terminology indicating behavioural problems, type and age of the population, the methods of data collection used and the measuring instruments. In both groups an increase of behavioural problems is found when additional handicaps occur. The existence of ID in children with HI and conversely sensory impairment in people with ID form risk factors for behavioural problems. Understandably difficulties with communication increase the risk of developing behavioural problems.

Conclusions: We might expect prevalence rates in people with both HI and ID to be higher than in both groups separately. We suggest further research into the influence of external and internal factors on developing or increasing behavioural problems in people with HI and ID. A more precise definition of behavioural problems is also highly recommended.

KEYWORDS

Behavioral problems, deaf, hard of hearing, intellectual disability

Introduction

From clinical practice it has been reported that professional carers, working with people with a Hearing Impairment (HI) as well as an Intellectual Disability (ID) are frequently confronted with behavioural problems¹. In particular, aggressive incidents such as destructive behaviour aimed at objects or other people and self-harming behaviour are common problems. In the current article we use the term “Hearing Impairment” to describe those people who are deaf or hard of hearing. The Dutch classification for this is a loss of hearing from 20dB. The term “Intellectual Disabilities” is also used, which according to the American Association on Intellectual and Developmental Disabilities” (AAIDD) refers to people with “significant limitations, both in intellectual functioning and adaptive behavior as expressed in conceptual, social and practical skills which are apparent prior to the age of 18”.

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Although evidence indicates that (problem) behaviour may partly serve a self stimulatory function\(^2\) it is a generally accepted concept that (problem) behaviour is a form of communication. Hammermeister & Timms\(^3\) demonstrated the close relationship between verbal and non-verbal communication in human interaction: proximity and the use of space, bodily contact, hand gestures, head-nods, facial expression, eye contact and gaze and body movements. Brumback, Harper & Weinberg\(^4\) discussed effective human communication and concluded that it consists of more than words alone. Campbell & Fletcher\(^5\) examined the non-verbal behaviour of people with ID. The results indicated that individuals with ID who have no verbal skills show significantly more non-verbal behaviour intended as communication than people with verbal skills. Granlund & Olsson\(^6\) state that even such behaviour as licking, squeezing, smiling, crying, hitting, or smearing with faeces should be seen as communicative signals.

People with a limited ability to express and understand verbal communication largely depend on non-verbal communication, in particular those with both HI and ID. It is conceivable that these individuals are often misunderstood or that they misinterpret situations in which they are involved. Based on this double risk, we assume that behavioural problems will occur frequently in this group.

We attempted to carry out a literature study on the prevalence of behavioural problems and incidents of aggression in people with either HI or ID and have compared this to people with both HI and ID. A special focus in this review was on possible risk factors leading to behavioural problems. We expected to find that communication difficulties formed the major risk factor to behavioural problems.

**Method**

The aim of our first literature search was to find prevalence rates of behavioural problems in people with both HI and ID. A literature search was carried out in October of 2011 in “Psycinfo” using the following search terms:

1: Hearing Impairment or Auditory Disabilities or Deaf or Deaf-Blind or Auditory Acuity or Auditory Cortex or Auditory Perception or Hearing Disorders or Partially Hearing-Impaired or Speech and Hearing Measures (30,413 publications).

2: Mental Retardation or Mild Mental Retardation or Moderate Mental Retardation or Profound Mental Retardation or Psycho-Social Mental Retardation or Severe Mental Retardation or Developmental Disabilities or Cognitive Impairment or Learning Disabilities (72,191 publications).

3: Behavior Problems or Problem Behaviour or Aggressive Behavior or Attack Behavior or Behavior Disorders or Criminal Behavior or Self Destructive Behavior or Self Injurious Behavior or Stereotyped Behavior (57,819 publications).

**Results**

Combining all these three groups of search terms resulted in forty results. Limited to studies on prevalence alone, thirteen studies remained. The case studies cited in these publications\(^7-9\) were not useful for our purposes because prevalence rates were not given. Other studies\(^10,11,12\) focused on the Waardenburg syndrome in which HI is a common co-morbidity. In these studies, no prevalence rates are mentioned either. Eventually only six studies proved to be relevant for our purposes.

Stryker\(^13\) concluded that although we know that ID exists in people who are deaf or hard of hearing, it is difficult to identify them. Schum\(^14\) confirmed these findings. Assessment of people with HI and such co-morbidities as epilepsy, visual impairment, ADHD or ID is very difficult because of communication problems.

Carvill & Marston\(^15\) searched studies that explored the frequency of psychiatric problems amongst people with ID and sensory impairment (SI). They could not identify any studies involving people with both ID and SI.
The three remaining studies16,17,18 explored the frequency of hearing problems in people with learning disabilities. Findings in these studies illustrated that the hearing status of people with a learning disability is commonly disregarded when the deafness is suppressed by other problems. Timehin and Timehin17 identified the scarcity of studies exploring the frequency of problem behaviour in people with both ID and HI. They also indicated that “deafness in learning disability has been described as a ‘double jeopardy’ because the difficulties are compounded to be more than the sum of their parts” (Timehin & Timehin, 2004 pg 128). This was the only study to report a prevalence of behavioural problems in (British) people with both ID and HI. 62% of these showed problem behaviour and 34% had self-harming behaviour.

Table 1. Prevalence of behaviour problems in people with hearing impairment (HI).

<table>
<thead>
<tr>
<th>Author</th>
<th>Age</th>
<th>Measuring instrument</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rutter et al. (1970)</td>
<td>5-14 y</td>
<td>Rutter Scales</td>
<td>15%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meadow (1971)</td>
<td>4-20 y</td>
<td>Interview</td>
<td>32%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freeman et al. (1975)</td>
<td>5-15 y</td>
<td>Rutter Scales / Interview</td>
<td>23%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fundudis et al. (1979)</td>
<td>7-10 y</td>
<td>Rutter Scales</td>
<td>54%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aplin (1985)</td>
<td>7-15 y</td>
<td>Rutter Scales</td>
<td>36%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aplin (1987)</td>
<td>7-16 y</td>
<td>Rutter Scales</td>
<td>18%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kammerer (1988)</td>
<td>10-13 y</td>
<td>Parents Interview</td>
<td>54%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arnold &amp; Atkins (1991)</td>
<td>4-10 y</td>
<td>Rutter Scales</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sinkkonen (1994)</td>
<td>6-16 y</td>
<td>Rutter Scales</td>
<td>19%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindley et al. (1994)</td>
<td>11-16 y</td>
<td>TCL / PCL</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitchell &amp; Quittner (1996)</td>
<td>6-14 y</td>
<td>CBCL / TRF</td>
<td>33%/50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vostanis et al. (1997)</td>
<td>2-18 y</td>
<td>CBCL/PCL</td>
<td>40%/77%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Van Eldik et al. (2004)</td>
<td>4-18 y</td>
<td>CBCL</td>
<td>41%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Van Eldik (2005)</td>
<td>11-18 y</td>
<td>YSR</td>
<td>37%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cornes et al. (2006)</td>
<td>11-18 y</td>
<td>YSR</td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Van Gent et al. (2007)</td>
<td>13-21 y</td>
<td>CBCL/ TRF/SCICA</td>
<td>11%/27%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hintermaier (2007)</td>
<td>4-13 y</td>
<td>SDQ</td>
<td>36%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fellinger et al. (2009)</td>
<td>6-16 y</td>
<td>Interview Parents</td>
<td>33%</td>
<td></td>
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</tr>
</tbody>
</table>

The results of our literature study suggested that people with a combination of intellectual and hearing impairment form an under-reported group. Because of the lack of results from our searches we carried out additional searches into the prevalence of behavioural problems in people with HI and people with ID in an attempt to reconstruct the prevalence by looking at HI and ID separately.

Prevalence of behavioural problems in people with hearing impairment (HI)

Studies on the prevalence of behavioural problems in people with HI are rare. Using “Psycinfo” the search terms in numbers 1 and 3 above produced 186 results. Limited to studies on prevalence, 18 studies remained. Only six of these were published after 2001. The results are summarized in Table 1.

Studies on behavioural problems in people with HI are concentrated on children and adolescents. From the publications mentioned in the table above, the Finnish study of Sinkkonen20 was the only one that did not find behavioural differences between hearing children and children with HI. Another exceptional result was reported in an Indian study by Arnold & Atkins21 who found no behavioural problems in both the group people with HI and the control group. It is apparent that there is much variation in the prevalence found in the above mentioned studies. This was possibly due to the use of different measures.

Until 1994, the Rutter Scales22 were the most common method of measuring behavioural problems. Using his own scale along with interviews with the children tested and their parents Rutter23 found that 15% of a population of
British school children with HI showed behavioural problems. His findings were confirmed by other studies which used the same scale\textsuperscript{20,24-27}. Psychiatric reports on interviews with parents alone were also used.

Meadow & Schlesinger\textsuperscript{28} used a diagnostic interview and found that 32\% of the population at an American school for deaf children were considered to be emotionally disturbed of which 12\% severely. Kammerer (1988) also used diagnostic interviews with parents to discover behavioural problems among 54\% of American deaf children between the ages of 10 and 13. The more recent German study by Fellinger et al.\textsuperscript{29} corroborates these findings from diagnostic interviews with a prevalence rate of 33\%. Hintermaier\textsuperscript{30} is the only one who interviewed parents using the Strength and Difficulties Questionnaire\textsuperscript{31}. 36\% of German children (4-13 years old) in this group displayed emotional/behavioural problems. The Child Behaviour Check List (CBCL)\textsuperscript{32} has been used since 1991. Mitchell & Quittner\textsuperscript{33} used the parent and teacher forms of the CBCL in their study on deaf American children. The parents’ ratings indicated that half of the children with hearing impairments show externalizing behavioural problems, while the teachers’ ratings indicated that one-third of the children showed significant behavioural problems. Vostanis et al.\textsuperscript{34} found that 40\% of a sample of deaf British children scored within the clinical range of the CBCL. 43\% of the children scored within the clinical range on the domain “social functioning”. Parents identified a much higher percentage (77\%) on the Parents Check List of the CBCL. Van Eldik\textsuperscript{35} studied the emotional/behavioural problems in 238 Dutch deaf children aged from 4-18 years. The parental reports indicated that 41\% showed emotional/behavioural problems. Deaf children with a relatively low intelligence showed more problems. An Australian study by Cornes et al.\textsuperscript{36} reported emotional/behavioural problems in 43\% of adolescents. Hindley et al.\textsuperscript{37} used various diagnostic measures. By combining the results of interviews with British children as well as their parents with questionnaires for parents and teachers they found in their study psychiatric problems in 42\% of the deaf children and in 61\% of the hard of hearing children.

However, differences in prevalence rates are also found in the above-mentioned studies in which the same instrument measure was used. Van Gent, Goedhart, Hindley & Treffers\textsuperscript{38} assumed that these differences may be related to the composition of the samples. In their own study of Dutch adolescents they used a multiple informant approach, combining relevant information from parents, teachers, the children themselves, their clinicians and medical files. Despite comparable results the authors found a variation in prevalence rate. These differences can be partially explained by the source of data collection (e.g. parents, teachers or professionals). Percentages of “Total Problems” scores in the borderline clinical range plus the clinical range, using the CBCL, TRF and SCICA, were 28\%, 32\% and 49-63\% respectively. Expert dossier ratings identified psychiatric cases in 49\% and DSM classifications in 46\% of the adolescents.

In summary, we may conclude that research on behavioural problems in people with HI is concentrated on children and adolescents. In those studies in which a hearing control group was used, higher prevalence rates of behavioural problems were reported in children with HI. Prevalence rates of behavioural problems in the control group varied from 0 to 18\%. We can therefore conclude that children with HI show more emotional and behavioural problems than hearing children.

Prevalence of behavioural problems in people with intellectual disability (ID)

Behavioural problems such as aggression, self-harmful behaviour, destructive behaviour, outbursts of fury, hyperactivity, screaming and attention seeking is frequently seen in people with ID. The prevalence of these forms of behaviour disorders in people with ID has been studied extensively. In “Psycinfo”, 4,758 search results were obtained using the above-mentioned search terms (numbers 2 and 3). When limited to articles published after 2001, a total of 1,777 search results were obtained. In 49 of these studies
prevalence was mentioned. In this review, we have concentrated on the most recent articles. Furthermore, we focused on 13 metastudies in which the main goal was research into prevalence rates.

Our literature study is summarized in Table 2.

Table 2. Percentage behavioural problems in people with intellectual disability

| Author                  | Pop         | Research tool                          | 1  | 2   | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|-------------------------|-------------|----------------------------------------|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Deb et al. (2001)       | 101; adults | Disability Assessment Schedule         | 23%|  29%| 36%| 38%|    | 26%|    | 24%| 12%| 20%| 18%|    |    |    |    |    |
| Molteno et al. (2001)   | 355; children | Developmental Behaviour Checklist       |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 31%|
| Emerson et al. (2001)   | 264; adults | Questionnaires                         |  7%|  10-15%|    |    |    |  4%|  4.5%|    |    |    |    |    |    |    |    |    |
| Kamio (2002)            | 657; 12-18 year | Questionnaires and psychiatric evaluations | 2.4%|     |  2.4%| 1.2%| |    |    |    |    |    |    |    |    |    |    |    |    |
| Taanila et al. (2003)   | 106; 8 year | Rutter scales                          |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 9-12%|
| Dekker & Koot (2003)    | 474; 7-20 year | Diagnostic Interview Schedule for Children |    |     |    |  25%|  4%|    |    |    |    |    |    |    |    |    |    |    | 22%|
| Tyrer et al. (2006)     | 3065; adults | Interview                              |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 14%|
| Crocker et al. (2006)   | 3165; adults | Modified Overt Aggressive Scale        |    |     |    |  24%|  10%|  24%|  24%|    |    |    |    |    |    |    |    |    |    |
| Lindquist et al. (2006) | 107; children | Conners'parent rating scale            |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 39-67%|
| Myrbakk von Tetzchner (2008) | 140; Adol & adults | ABC                                   |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 20%|
| Jones et al. (2008)     | 1023; adults | Psychiatrist opinion / DC-LD           |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 23% / 19%|
| Cooper et al. (2009A)   | 651; Adults | DC-LD                                  |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 4.9%|
| Cooper et al. (2009B)   | 651; Adults | DC-LD                                  |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 9.8%|
Rojahn & Esbensen\textsuperscript{39} and Anderson\textsuperscript{40} also referred to these problems. Prevalence rates obtained therefore mainly depend on definition and terminology indicating behavioural problems, type and age of the population, the methods of data collection used and the psychiatric measures. Rojahn & Meier\textsuperscript{41} concluded that some improvement regarding these problems was made in the last decade, but it still is an area of concern.

In order to gain a better understanding a distinction was made between studies of children and those of adults. In the studies of children with ID the following results were shown.

In a population of 355 South African children with ID Molteno, Finchilescu & Dawes\textsuperscript{42} found a prevalence rate of 31\% for psychopathology. They also found that boys show more behavioural problems than girls and that behavioural problems are related to the severity of the intellectual disability. Children who depend on non-verbal communication also show more behavioural problems.

In a group of Japanese adolescents with ID Kamio\textsuperscript{43} compared individuals with autism to those without. The prevalence rate of self-harming behaviour was significantly higher in the group with autism. She concluded that aggressive behaviour is related to severe ID while self-harming behaviour tends to be related to autism. Taanila et al.\textsuperscript{44} studied 8-year-old Finnish children. This group consisted of children both with and without ID. They discovered that 44\% of the children with ID showed probable psychiatric disturbances, 21\% showed behavioural problems, 18\% suffered from emotional problems and 36\% were hyperactive. The prevalence rates in the group without ID were respectively 14\%, 9\%, 5\% and 9\%. In both groups it appeared that boys tend to have more problems than girls, although the difference in the group of children with ID was not significant. Dekker & Koot\textsuperscript{45} used the Diagnostic Interview Schedule for Children on parents of Dutch children with ID. The following prevalence rates were found: 4.4\% mood disorder, 21.9\% anxiety disorder and 25.1\% disruptive disorder. More than half of the children who scored on these symptoms were severely impaired in daily functioning and about 37\% had co-morbid disorders such as visual, auditory or physical problems and epilepsy. Lindquist et al.\textsuperscript{46} investigated the prevalence of behaviour problems in a group of Swedish children with hydrocephalus. They found that parents rated 67\% and teachers 39\% of the children as having behavioural problems.

Studies of adults with ID showed the following results: Deb, Thomas & Bright\textsuperscript{47} aimed to establish the overall rate and types of behavioural disorders in a population of Welsh adults with ID. A total of 101 adults with ID were randomly selected, and prevalence rates were found for several different behavioural disorders. These varied from 12\% for destructive behaviour up to 38\% for attention-seeking behaviour. 23\% showed aggressive behaviour. Emerson et al.\textsuperscript{48} found lower rates of prevalence in a sample of 264 British people with ID of whom approximately two thirds were male and close to two-thirds were young adults: self-harming behaviour 4\%, aggression 7\%, destructive behaviour 4-5\%. Most notable is the category “other” behaviour in which 9-12\% of the screened individuals scored. In this category all kinds of challenging behavioural disorders were noted, the majority of whom showed more than one form of challenging behaviour. The individuals who showed more demanding challenging behaviour were more likely in need of greater levels of assistance in their daily routine such as eating, dressing and using the toilet. These people also had more restricted expressive and receptive communication. Tyrer et al.\textsuperscript{49} used interview data from 3065 British adults with ID and found that 14\% were physically aggressive towards others. Over a period of one year, Crocker et al.\textsuperscript{9} found prevalence rates of 51.8\% of aggressive behaviour in Canadian people with ID. They identified 24\% property damage, 37.6\% verbal aggression, 24.4\% self-orientated aggression, 24.4\% physical aggression and 9.8\% sexual aggression. Myrbakk & Von Tetzchner\textsuperscript{50} found a prevalence rate of 20\% challenging behaviour in Norwegian adolescents and adults with ID living in community settings. In Scottish adults with ID,
Jones et al.\textsuperscript{51} found a prevalence of problem behaviours of 22.5\%. Also in Scottish adults with ID, Cooper et al.\textsuperscript{52} found prevalence rates of self-harming behaviour of 4.9\% and from all types of aggressive behaviour a prevalence rate of 9.8\%.\textsuperscript{53}

Taking all the evidence together prevalence rates varied widely across the studies. Behavioural problems in general were mentioned as such in only three publications. Prevalence rates in these studies were 21\%\textsuperscript{44}, 39-67\%\textsuperscript{46} and 23/19\%\textsuperscript{51}. As mentioned above in the other studies several categories of behavioural problems were defined. This could explain the observed differences, but even within similarly defined behavioural categories differences were found. For physical aggression, prevalence rates ranged from 2.4\%\textsuperscript{43} to 24\%\textsuperscript{9}. Self-harming behaviour ranged from 1.2\%\textsuperscript{43} to 24\%\textsuperscript{47}. Destructive behaviour towards objects was mentioned in three studies and prevalence rates here ranged from 4.5\%\textsuperscript{48} to 24\%\textsuperscript{9}. Furthermore, differences could occur owing to the fact that several psychiatric measures were used or the method by which this data was obtained.

\textit{Risk factors in HI}

A separate literature search on this subject was conducted in October 2011 in “Psycinfo”, using the search terms in numbers 1 and 3 above, combined with the search term Risk Factors or Risk Assessment (18,096 publications).

A combination “and/and” of these three groups of search terms resulted in 19 publications.

Sinkkonen\textsuperscript{20} found that children with HI and additional handicaps showed more frequently disturbed behaviour. Both Vernon & Greenberg\textsuperscript{54} and Miller & Vernon\textsuperscript{55} studied the relationship between hearing loss and violence and discovered that people with HI are over-represented in the prison population in the United States. They suggest that ID, communication disorders and underemployment in the deaf and hard-of-hearing population creates frustration, which tends to manifest itself in disproportionate aggression. Cappelli et al.\textsuperscript{56} found that Australian children with HI who are integrated into regular classrooms are more likely to be rejected by their peers than hearing children. This was caused by a reduced degree of competence in social skills in the children with HI. Vostanis et al.\textsuperscript{34} found that the use of speech in addition to sign language has a protective effect for adolescents with HI. In their study on the relationship between parenting practice and behavioural problems Brubaker & Szakowski\textsuperscript{57} concluded that there was no evidence that the greater prevalence of behavioural problems among deaf American children was the result of inadequate parenting. Van Eldik et al.\textsuperscript{35} found an increase in behavioural problems in Dutch children with HI who also had intellectual disabilities. Sarimski\textsuperscript{58} concluded that it is very difficult to differentiate between the various risk factors leading to mental health disorders among children and adolescents with hearing disorders, blindness, physical handicaps or intellectual disabilities. Problems in parent-child relationships and issues on the development of social competence and social participation are all possible risk factors.

In summary, two groups of risk factors were mentioned. Firstly, co-morbidity of physical handicaps or ID form an increased risk in developing behavioural problems; secondly difficulties in communicating were also cited as a risk factor.

\textit{Risk factors in ID}

A separate literature search on this subject was conducted in October 2011 in “Psycinfo”, Using the search terms in numbers 2 and 3 above, combined with the search term Risk Factors or Risk Assessment (18,096 publications). A combination “and/and” of these two groups of search terms resulted in 33 publications.

In some studies a gender effect was found. In general males showed more behavioural problems\textsuperscript{42,48,49,59}, although Crocker et al.\textsuperscript{9} did not find this difference. Deb, Thomas & Bright\textsuperscript{47} found that the rate of self-harming behaviour was significantly associated with the female gender. Emerson et al.\textsuperscript{48} and Tyrer et al.\textsuperscript{49} reported an age-effect: young adults and adolescents displayed
more behavioural problems. The severity of the ID was also cited as a risk factor\textsuperscript{42,43,47,49,59}. Additional problems such as sensory impairment\textsuperscript{45,60} and autism\textsuperscript{42,59,61} were also established as risk factors, although Tyrer et al.\textsuperscript{49} questioned the relationship between aggression and autism.

Chadwick et al.\textsuperscript{62} and Emerson et al.\textsuperscript{48} found a higher prevalence rate of behavioural problems when people with ID were more limited in their daily skills, such as eating and dressing. Crockett & Hagopian\textsuperscript{63} found an increase in behavioural problems when people were faced with challenging situations.

Communication is often mentioned as a risk factor. Sigafoos\textsuperscript{64} explored the relationship between communication development and behaviour in 13 Australian pre-school children with developmental disabilities. Over a period of three years, communication skills and the severity of 58 behavioural patterns were assessed every six months. A strong inverse relationship was found between communication skills and aberrant behaviour such as hyperactivity and lethargy. Molteno, Finchilescu & Dawes\textsuperscript{42} found that children who depended on non-verbal communication had higher scores on all the subscales of psychopathology on the Developmental Behaviour Checklist. Self-harming behaviour increases significantly when people have poor communication skills\textsuperscript{47}. People who show more challenging behaviour have more restricted expressive and receptive communication\textsuperscript{48}. McClintock, Hall & Oliver\textsuperscript{59} also concluded that people with restricted expressive and receptive communication showed more challenging behaviour such as self-harm. Besag\textsuperscript{60} investigated the relationship between epilepsy and behavioural problems and discovered that communication difficulties and not the epilepsy itself were responsible for the high prevalence of behavioural disturbance.

In case studies\textsuperscript{65-67} a decrease in behavioural problems was reported when communication capabilities increased. Others concluded that there is a decrease in behavioural problems when carers interact more with people with communicative impairment\textsuperscript{68-70}.

In summary, it seems that there are several risk factors leading to developing behavioural problems. In males and young adults or adolescents the risk of developing behavioural problems is higher than in females and adults. The severity of ID was cited as another risk factor. Additional handicaps such as sensory impairment and autism also increase the chance of behavioural problems. When there are limited daily skills, such as eating and dressing or when situations are demanding, challenging behaviour is more likely to occur as well. When gender and age are not included, the above-mentioned findings seem to underline problems in communication as a major risk factor.

**Discussion**

**Prevalence:**

Firstly, our literature study showed that there is a scarcity of studies on people with both HI and ID and that in the only publication in which a prevalence rate was reported\textsuperscript{17} high prevalence rates of behavioural problems and self-harming behaviour were found. The fact that individuals with both HI and ID are seldom studied as a separate group would indicate that these individuals are a negligible group. A possible explanation could be that many individuals are misdiagnosed. It is difficult to identify ID in individuals with HI. Conversely the same problem is recognized in people with ID for whom it is difficult to detect the hearing status. HI is often suppressed by other – more urgent - problems.

Secondly, although some improvements are being made in research on behavioural problems in people with ID, there still are differences in the terminology indicating behavioural problems, type and age of the population, the methods of data collection used and the psychiatric measuring instruments. In studies on people with HI, behavioural problems are defined in a more general and similar way than in studies on people...
with ID. The most important reason for this seems to be the use of less diagnostic measures. In people with HI as well as in people with ID an increase in behavioural problems was found when additional handicaps occurred.

Risk factors:

It was presumed that difficulties in communicating would form a major risk factor in individuals with both HI and ID towards developing behavioural problems. Several risk factors were mentioned in the publications that we have identified. Communication difficulties form an important risk factor leading to behavioural problems in individuals with HI or ID. Sensory impairment in people with ID and the existence of ID in children with HI may increase communication difficulties and as a result form a higher risk leading to behavioural problems. All the same we would expect a higher prevalence rate of behavioural problems in people with both HI and ID than in either group separately. The results from the study by Timehin & Timehin (2004) and the findings from our study on risk factors in people with HI and those with ID, may provide evidence for this assumption.

We can speculate about the reason that behavioural problems form ongoing difficulties. Individuals with HI and ID will use all their abilities to make themselves understood and to express their motives. Knowing this, it is understandable that due to difficulties in communication, these people are at higher risk of developing behavioural problems. The reasons or motives for behavioural problems are frequently not understood by carers, which can easily lead to escalating situations. Obviously, these incidents have enormous psychological and physical implications and may result in a negative effect on the quality of life of those involved. More research is therefore necessary into the causes and exacerbation of problem behaviour. When greater insight is found, programmes can be developed aimed specifically at preventing problem behaviour and intervening expeditiously.

Such programmes will be more meaningful when communication between people with HI and ID and carers can be improved. Special education for carers in using and understanding sign language and other forms of non-verbal communication is therefore crucial. Observation and recognition of behaviour as a means of communicating should be important topics of study.

We suggest further research into the influence of external and internal factors on developing or increasing behavioural problems in people with HI and ID. A more precise definition of behavioural problems is also highly recommended.

References


