

Changes in mental health service use among eight-year-old children: a 24-year time-trend study

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Acknowledgements

The study was funded by grants from the Finnish Brain Foundation, the Foundation for Pediatric Research, Orion Research Foundation sr, and the University of Turku Graduate School (UTUGS) (Lotta Lempinen), and from the Academy of Finland (288960) and Turku University Hospital (EVO grant) (Andre Sourander). The authors wish to thank Kristiina Saanakorpi (RN) and Kalle Vaintola (MA) for assisting with the data collection.

ABSTRACT

The use of children's mental health services has increased, but most children with psychiatric problems are still not in contact with these services. This time-trend study assessed changes in considered and reported service use over a 24-year period and studied the factors associated with it using four cross-sectional studies. Information was gathered on eight-year-old children living in the area covered by Turku University Hospital, Finland, at four time points: 986 children in 1989, 891 in 1999, 930 in 2005, and 942 in 2013. The same study design, methods and school districts were used each year and the participation rates varied between 86% and 95%. Parents and teachers completed questionnaires concerning the child's psychiatric symptoms and service use.

The considered and reported service use increased continuously during the study period. In 1989 2.4% of children had used services and in 2013 this was 11.0% (OR 5.0, 95% CI 3.1-8.0). Reported service use also increased among children with comorbid problems, from 18.3% to 50.7% (OR 5.0, 95% CI 2.1-12.0). Psychiatric problems and some family factors were associated with service use, but the increase was not explained by these factors. The increase in child mental health service use may reflect better public awareness of mental health problems, fewer barriers to accessing care and decrease of stigma. Although more children are using mental health services, there are still a large number of children with mental health problems who have not been in contact with services.

Keywords: mental health service use, psychiatric problem, time trend study, change, child

INTRODUCTION

A major challenge for child and adolescent psychiatric services is that only a minority of the children and adolescents with mental health problems actually receive care [1-5]. Interview-based epidemiological studies have shown that their use of specialized mental health services ranges from about 8% to 30% [4-7]. At the same time, other studies have indicated that the percentages of service use are increasing [1, 3, 8-12]. For example, the use of mental health services by youths in the USA has increased, [9,10], but still less than half of the children and adolescents aged six to seventeen with more severe impairment accessed services in 2010–2012 [10]. A clear increase in the use of mental health services by children and adolescents has also been found in European studies [1-3, 8, 11, 12]. One Finnish study compared the use of specialized service use by adolescents from birth cohorts in 1987 and 1997, and the results indicated an increase in the use of services for psychiatric and neurodevelopmental disorders [12]. The Dutch study included the data of five consecutive years (2004-2008) and showed an increase in children's referral to mental health care [2]. However, the majority of these studies only included two assessment points [3, 11], and were based on clinical data [2, 9, 12] or just parental reports [3, 10].

In Finland, information on mental health trends for children with severe psychiatric problems who are referred to inpatient wards or specialized services, can be reliably obtained from official registries. However, of those children who have more common psychiatric problems, such as anxiety or conduct problems, only some access these services and that is why registry information on these mental health visits cannot be considered reliable. Instead, measuring different psychiatric problem and service use indicators repeatedly with comparable measures and study designs, we can get more reliable information about mental health time-trends. Also, multiple informants are needed, as the agreement between reports from parents and teachers about children's psychiatric symptoms has been shown to be low [13-15]. In addition, parents' and teachers' thresholds to see the need for mental health services may also have been affected differently by a number of changes in recent decades, such as increased divorce rates and parental education levels [8, 16], as well as cuts in educational resources [17], preventive health-care and low-threshold social services for families [18].

It is important to identify what determines children's and adolescents' use of psychosocial care, in order to improve access to services. Previous study results have not been consistent, but they have shown that factors such as sex, age, ethnicity, internalizing and externalizing problems, physical health, child maltreatment, family structure, socioeconomic status, family stress, parental attitudes, parents' mental health service use and perceived parental burden, affect service use [5, 19, 20]. A Dutch study found that poor parenting skills and low family social support were associated with a higher chance of children enrolling in psychosocial care. This association was mediated by psychosocial problems [21]. A Norwegian longitudinal study showed that only a few four-year-old children with mental health problems used services compared to school-age children [22]. The same study indicated that the probability of service use was increased by disruptive behavioral symptoms in a number of situations: if the child's symptoms led to impairment, the impairment was a burden for the parents and if the parents, and, especially, the day care teachers felt that

the child needed help. A number of reasons have been put forward to explain some of the perceived changes in service use over time. These have included changes in emotional and behavioral problems, educational problems and family structure [3]. It is important to explore these relationships in detail, to be able to offer services that meet the requirements of the children.

This study examines time-trend changes in the considered and reported use of mental health services by eight-year-old children over a 24-year period by carrying out four cross-sectional studies in the same geographical area. The study is an extension of previous Finnish time trend studies [1, 8, 11]. Based on our literature search (Online Resource 1: Literature search) this is the longest population-based time-trend study ever carried out on changes in young children's use of mental health services using two informants – parents and teachers - and similar methodologies and sampling procedures at repeated time points. The study aims to answer three questions: 1) whether there are overall changes in the considered and reported mental health service use, 2) whether they differ between children with different levels of problems, and 3) whether family factors or psychiatric symptoms underlie these possible changes.

METHODS

Study context

Finland has about 5.3 million inhabitants and a public health system that is organized by municipalities. Municipalities and health centers also provide medical services in schools, including nurses, doctors and psychologists. There are publically funded child psychiatric clinics or child guidance clinics and the private sector plays a complementary role, supported by the public health insurance system.

Study design and subjects

The study design is presented in Fig. 1. In 1989, 13% of the children who were born in 1981 were selected so that sample represented urban, suburban and rural areas. The same study design was used in 1999, 2005 and 2013, by including children born in 1991, 1997 and 2004 from the same municipalities and school districts. Data were collected from the children's parents and their teachers using the same basic questionnaires at every time point. The research group contacted and informed all the study schools, principals and teachers and the parents received their questionnaire, study information and informed consent form from the school via their child. The parents completed the questionnaires and returned them to teachers in a sealed envelope. In 1999, 2005 and 2013, these were accompanied by a separate consent form, but in 1989 consent was provided by completing the questionnaire. The teachers filled out their questionnaires after they received permission from the parents. All the material was forwarded to the research group by the teachers. The total study cohort of 3,749 participants was equally split between the 1,876 boys and 1,873 girls and the breakdown by sex was fairly even at every time point.

The study was approved by the school principals, school authorities, and the ethics committee of Turku University Hospital.

Measures

The basic wording of the questionnaires were identical throughout the study, with some additions in years two to four.

Considered and reported service use

The parents and teachers were asked about the child's considered need for, and reported use of services. The parents were asked whether they had considered or sought help or treatment because of their child's emotional or behavioral problems and the possible responses were: 1) no, they hadn't considered or sought help, 2) yes, they had considered it, and 3) they had sought help. The teachers were asked whether they had considered referring the child or child's family for treatment because of child's behavioral or emotional problems and the possible responses were: 1) no, they hadn't considered or referred, 2) yes, they had considered it, and 3) they had referred the child or family. We combined the information received from the parents and teachers to create three categories: 1) both the parent and the teacher answered "no", 2) parent answered "have considered" or teacher answered "have considered" or "have referred", and 3) parent answered "have sought help". Further these three categories were named as "no", "considered use" and "reported use". The "reported use" category was only defined by the parents, because it is not possible to refer the child to mental health services without the parent's knowledge. The child could only be placed in the first or second category if both the parent and the teacher responded. In 1999, 2005 and 2013, the parental questionnaire also included questions about where they had sought help.

Parent and family variables

The parental questionnaire included questions about the family structure and the parents' education and employment status. Family structure was measured with eight options and the responses were combined into four categories of children living 1) with both biological parents, 2) in a reconstituted family with a step-parent, 3) with a single parent, or 4) with foster or adoptive parents or relatives. The mother's and father's vocational education were both measured using six options, which were: 1) no vocational education, 2) vocational course or courses, 3) vocational school, 4) college or polytechnic, 5) university and 6) other, specify. If possible, other specified education was placed into one of the previous categories, depending on the answer to the open question. If that was not possible, the education variable was coded as missing information. The variables were further dichotomized, with options 1, 2 and 3 combined as 1) lower vocational education, and options 4 and 5 combined as 2) higher vocational education. The parents' employment statuses were measured with four options and these were then divided into three categories: 1) not been unemployed, 2) unemployed for 1-12 months or 3) unemployed for over one year.

Psychopathology

Psychopathology was measured with the Rutter A2 questionnaire for parents, which provides 31 items with scores from 0-2 [23] and the Rutter B2 questionnaire for teachers with 26 items with scores from 0-2 [24]. These international scales have been used widely and they have been studied to be valid screening instruments to assess children's behavior [25]. They both include subscales of conduct, emotional and hyperactivity. In our analysis, the subscale scores from the parents and teachers were pooled together to highlight the most problematic group of children. Because the range of potential scores from the subscales differed in the two questionnaires, the mean values of each informant's subscale questions were used to create the pooled subscale variable, which was a mean value of the two sets of mean values. If information was only obtained from either the parent or teacher, a pooled scale was not created. In line with earlier studies [26], the sex-specific cut-off points of the 90th percentile, which was based on the distribution of the pooled subscales during the first measurement year, were used to define children with high or low problems scores. These pooled subscales have shown to strongly predict problems in a child's later life [26-28].

In the further analysis, these pooled dichotomous subscale variables - conduct, emotional and hyperactivity - were pooled together to create a variable that represented the children with 1) no high scores on any scale, 2) high scores on one subscale, or 3) high scores on two or three subscales, indicating comorbid problems. These categories were then called "no problems", "problems in one domain" and "comorbid problems".

In addition, we wanted to clarify the possible different weights of the parental and teacher reports of the child's different psychiatric symptoms on considered and reported service use. Each psychopathology domain (i.e. conduct, emotional, hyperactivity) were categorized into four groups: 1) no problems according to both the parent and teacher, 2) problems according to only the parent, 3) problems according to only the teacher, and 4) problems according to both the parent and teacher.

Statistical methods

Any associations between the explanatory variables and considered and reported service use were examined using single predictor and multiple logistic regression. We also tested the interaction of year and sex on the explanatory variables. The odds ratios (OR), corresponding 95% confidence intervals (95% CI) and *p* values were calculated for all associations. The analyses were adjusted for year and sex. A two-sided *p* value of <0.05 was considered statistically significant for all analyses, except for the interaction analyses, where it was *p* <0.1. The analyses were carried out using SAS for Windows, version 9.4 (SAS Institute Inc, Cary, NC, USA).

RESULTS

Fig. 2 shows the percentage of considered and reported service use in the different assessment years. Between 1989 and 2013, reported service use increased from 2.4% to 11.0% (OR 5.0, 95% CI 3.1-8.0) and considered service use increased from 6.6% to

10.0% (OR 1.7, 95% CI 1.2-2.4). When they were combined, service use increased from 9.0% to 21.0% (OR 2.6, 95% CI 2.0-3.4).

Tables 1 and 2 show the changes in considered and reported service use of children with no problems, problems in one symptom domain and comorbid problems. The reported service use increased in both the problem groups from 1989 to 2013. Despite this, the percentage of children with comorbid problems who had not used the services in 2013, and whose teachers and parents had not considered using services or referring the child to the services, was 31.3%. The corresponding percentage of children with problems in one symptom domain was 50.4%. The interaction between year and level of problems was not significant, indicating that the change in service use was similar for all problem groups when both considered and reported service use were taken into account. When we studied the changes in service use, adjusted for different psychiatric problem groups, the OR for the increase in reported service use between 1989 and 2013 was 7.1 (95% CI 4.2-12.0) and the corresponding OR for considered service use was 2.0 (95% CI 1.4-2.9). When the results were adjusted by year, the reported service use was higher among children with comorbid problems (OR 32.0, 95% CI 21.4-47.7) and with problems in one symptom domain (OR 7.6, 95% CI 5.3-11.0) than among children with no problems. This means that both the year and the amount of problems were independent predictors of reported service use.

Tables 3 and 4 show the associations between the explanatory variables and considered and reported service use. In addition to the year, the child's sex, family structure, the mothers' and fathers' education, mothers' employment status and all the separately studied psychiatric symptoms (for linear results see Online Resource 2: Supplementary table 1) were associated with service use, in the sex-adjusted and the sex- and year-adjusted models. The level of the ORs stayed practically the same in both adjusted models. This suggests that the association between the explanatory variables and considered and reported service use was independent of the study year. Finally, in full multivariate analysis the year, child's sex, family structure and all of the psychiatric symptoms remained significant, indicating that all these were independent predictors of considered and reported service use.

We also examined all three-way and two-way interactions of explanatory variables and year and sex. There were significant interactions between conduct problems and year, and between conduct problems and sex. Having conduct problems increased reported service use by both sexes, with a higher increase among boys (Online Resource 3: Supplementary table 2). Those who had conduct problems used services more than those without these problems at each time point, but in 1989 and 2005 the difference between the groups was smaller than in 1999 and 2013. (Online Resource 3: Supplementary table 2). The findings were thus inconsistent.

In additional analysis, to clarify different weights of the informants on service use, psychopathology domains were categorized into four groups (no problems, problems only according to parent, problems only according to teacher, problems according to both informants). As shown in supplementary table 3, both parent and teacher reports of psychiatric symptoms were associated with

considered and reported service use. The strongest association was found in those children who scored highly in both the parental and teacher reports. Furthermore, we conducted pairwise comparisons (Online Resources 5: supplementary table 4). Reported service use was higher for every subscale when both informants reported that the child had problems than when the problems were only reported by parent or teacher. No significant difference was found in service use when we compared children who only had problems according to their parent and those who were only considered to have problems by their teachers. These findings were similar for all of the psychopathology scales.

The supplementary table 5 describes the mental health service providers in 1999, 2005 and 2013, while there was no information available at 1989. The most commonly used services were either child psychiatric services in specialized healthcare or child guidance clinics in the social sector (Online Resources 6: supplementary table 5).

DISCUSSION

Our findings show that the child mental health service use increased dramatically during the 24-year study period. In 1989 only 9% had considered or used services while in 2013 the corresponding percentage was 21%. The increase was sharper in reported service use - 2% in 1989 and 11% in 2013, than in considered service use. Only 3% of the children with high symptom levels in just one symptom domain (i.e. conduct, hyperactivity, or emotional problems), were in contact with mental health services in 1989, whereas the corresponding percentage in 2013 was 24%. In 1989, 18% of the children with comorbid problems, indicating a more serious condition and a greater likelihood of needing an assessment by child mental health services, were in contact with services. This percentage had risen to a notable 51% in 2013. The rates for just considering services remained stable. For example, in the group with comorbidities the percentage was 25% in 1989 and 18% in 2013. Psychiatric symptoms and family related factors were associated with considered and reported service use, but the increase in service use was not due to changes in, or due to the changed impact of these factors. Both parent and teacher reported psychiatric symptoms were associated with service use, while the strongest association with reported service use was found, when both the parent and teacher identified that the child had problems.

Taken together, the highest absolute increase in the use of mental health services was by the children who had the greatest need of them. This finding is important because concerns have been expressed, for example in the popular media, that providing increased child mental health services per se could lead to the medicalization of normal childhood problems and this could result in children receiving services that they don't actually need. Although the increase in mental health service use is positive, the results also show considerable unmet needs and reflect numerous studies from Western countries that have showed that only a minority of children with psychiatric problems have been referred [2-5]. The World Health Organization reports that psychiatric illness is one of the leading causes of worldwide disability and that most of those disorders begin in childhood and adolescence [29]. Birth cohort studies as well have shown strong associations between childhood psychiatric problems and a wide range of adversities in

adulthood. It is worth noting that the baseline 1989 data collected in this study in South-Western Finland was a subsample of a nationwide Finnish birth cohort study that extended from eight years of age until mid-adulthood. Using the same parent and teacher Rutter questionnaires and 90th percentile cut-offs among eight-year-olds, studies showed strong associations with most psychiatric disorders in adolescence and adulthood, in addition to criminality, suicidality and other adversities [26, 27]. The strongest adversities more than 20 years later after the baseline assessment at the age of eight were found among those with comorbid problems. These longitudinal findings strongly support the fact that our questionnaire-based data is meaningful and that the interpretation about unmet needs is highly justified. Psychiatric issues are one of the most prevalent disorders affecting children in developed countries. Given their early onset, it is worrying that by 2013 half of the eight-year-old children with comorbid problems and three-quarters of the children who scored highly in only one domain had still not been in contact with mental health services. It should also be noted that we did not have any information about the services that were used by our study cohort in relation to the type or extent of the services, and whether the treatments were evidence-based. The study was carried out in a Nordic welfare country with good public health services, a high human developmental index and a high rate of child psychiatrists, indicating well-developed child mental health services. Therefore, it is likely that the unmet needs identified by this study were lower than in most countries worldwide. Despite the unmet needs identified in this study, the findings show that the situation is moving in a positive direction and that the children in most need are making more use of mental health services.

The service use determinants were similar during the 24-year study period and according to our findings, males used more services than females. Help is more likely to be sought for externalizing problems, which are more prevalent in boys, whereas girls are more likely to have internalizing problems which may be less often recognized by adults. Our study confirmed these findings as boys with conduct problems used services more than girls with similar problems. It could also be that less attention is paid to the other types of problems that the girls experience. For example, a Finnish population-based study showed that attention deficit hyperactivity disorder was under-diagnosed among Finnish girls resulting in a male:female ratio of 5.3:1 [30]. In line with the findings of other studies [3], the risk for service use was higher among children living in a non-nuclear family. Living in any other model than with two biological parents is a proxy indicator for several major child psychiatric risk factors that were not included in our study, such as parental psychopathology, severe dysfunctional family relationships, social network problems, and experience of separations, abuse and neglect. In line with previous studies, child psychopathology was strongly associated with help-seeking behavior [3, 20]. Children with comorbidities used services more often, but we could not examine the combinations of different psychopathologies and their association with service use in more depth because of a lack of statistical power.

The findings showed that the increase in service use was not due to studied family factors and psychiatric symptoms. Even when all of the sociodemographic and psychiatric variables were included in the same model, the increase in considered and reported service use still remained significant over time. The explanation for the increase could thus be explained by changes in mental health service system and society or by other factors not measured in our study. For example changes in attitudes, increased

awareness of mental health problems and reduced stigma, could have increased service use. As a result, children's mental health problems may be better recognized, and their parents and other adults may have more proactive and positive attitudes to seeking help. There have also been a number of positive changes in the Finnish child psychiatric healthcare system during our study period. Legislative changes in 2005 have obligated Finnish communities to provide access to services within three weeks of referral, and the financial resources for child psychiatric care, as well as the number of child psychiatry specialists, have increased. Greater treatment variety and shorter treatment times have made it possible to treat an increased number of children [31]. Getting services is now easier due to greater availability and fewer barriers to access. Since the beginning of 2011, the law requiring a wider and standardized assessment of the child's and family's psychosocial situation has also added attention to the acknowledgement of psychosocial problems in Finland [32]. At the same time, there has been cuttings in primary health care, educational resources and low-threshold social services provided for families [17,18]. All these factors could have affected the use of mental health services. It is also possible that the changes in considered and reported service use relate to increased family problems, reflected also by the rise in child custody cases [33]. Parents' own mental health problems and treatment also influence how they detect their children's problems and whether they seek help [20]. It is also possible that increase in the service use reflects rising child mental health problems, even though there is no clear evidence about this and many studies have reported that children's problems have decreased or stabilized [8, 34]. Thus, it is possible that the increase in service use that was found among children with no problems or problems only in one domain, could be due to parents and teachers nowadays experiencing minor issues that actually are a part of the normal development, as troublesome or related to psychiatric problems.

This study had several strengths, including the long study period, multiple study years characterized by identical study methods and designs, two different informants and consistently high response rates. However, there were also limitations, as we had no information about non-respondents and the data did not include what kind of help the children received and how often. In addition, factors concerning the service system were missing and therefore we could not study how, for example, changes in financial resources and structures affected the changes in considered and reported service use. There also may have been more positive attitudes to child mental health problems later in the study period and this could have encouraged parents to consider or to use services, and also to report this. Finally, our study was cross-sectional and data only covered one area of Finland. Because of the cross-sectional design, any conclusion about causality between problems and service use could not be made. Despite these limitations, generating data from the same study area and the same aged children made it possible to compare changes in a reliable ways and these results may be generalized to cover the wider Finnish population.

CONCLUSION

There was a great increase in the use of mental health services by Finnish eight-year-old children over the 24 years from 1989-2013, both in the total sample and among the children with comorbid problems. This indicates that the children who needed the services most, based on reported symptoms from their parents and teachers, received help more often than previously. The

increase in the number of children using mental health services may reflect better public awareness, fewer barriers to accessing care, increased mental health service resources and reduced stigma. However, there are still a considerable number of children with problems who are not in contact with services. The future challenge is to find the ways to increase services for those in need of them, e.g. by providing effective services at an early stage and increasing the awareness of these services. This is important if we are to reduce the impact that mental health problems have on human suffering, economics and society as a whole.

Supporting information

Additional supporting information can be found online:

Supplementary material: Literature search

Supplementary table 1: Association between linear psychiatric variables and considered and reported service use adjusted by sex and by both year and sex.

Supplementary table 2: Associations between explanatory variables and service use separately for sexes or for years in the cases of significant interaction.

Supplementary table 3: Adjusted analyses of the association between parent and teacher reported problems and considered and reported service use

Supplementary table 4: Additional pairwise comparisons of parent and teacher reported problems and reported service use.

Supplementary table 5: Services used as a number and percentage of children who used services

Conflicts of interest

None of the authors has any biomedical, financial, or other potential conflicts of interest to report.

Ethical standards

The study was approved by the school principals, school authorities, and the ethics committee of Turku University Hospital.

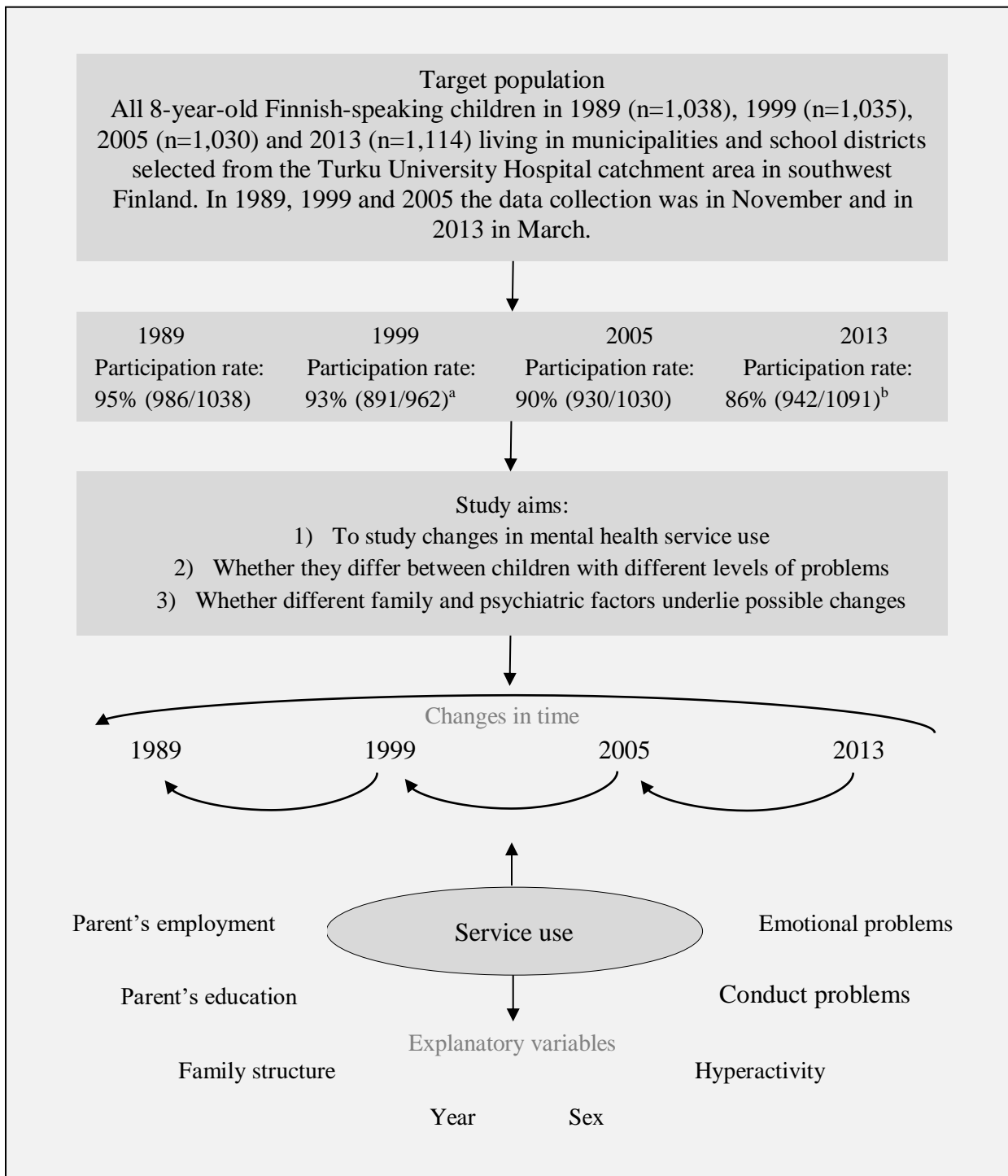
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Fig.1 Flowchart of the study



^a Three teachers refused to participate and because of that 73 children were not reached at all.

^b Three teachers refused to participate and because of that 23 children were not reached at all.

Fig.2 The percentage of children with considered and reported use of services

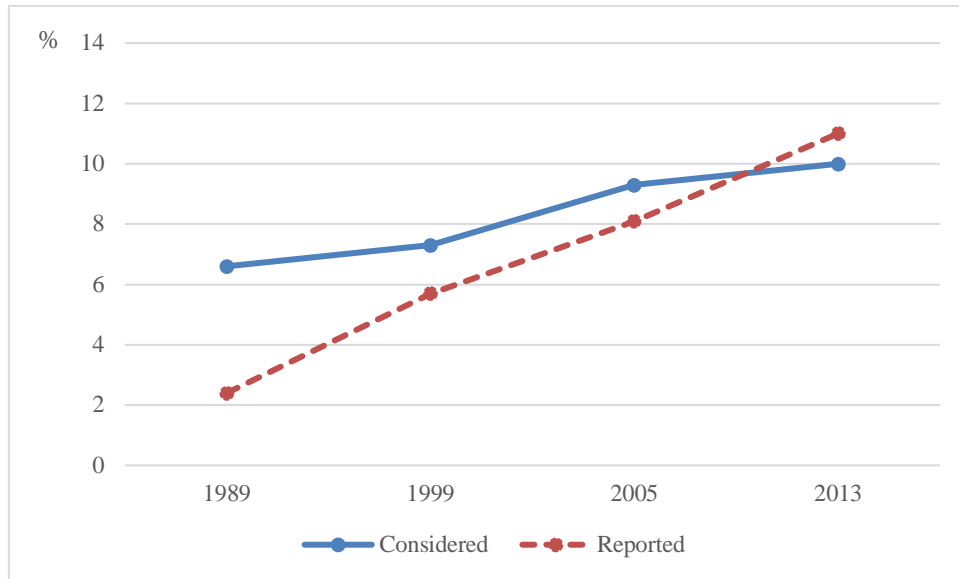


Table 1. Considered and reported service use at different time points among children with no problems, high problems in one symptom domain and comorbid problems.

	Frequency.....											
	1989 (N=885)			1999 (N=733)			2005 (N=749)			2013 (N=883)		
	No N (%)	Considered N (%)	Reported N (%)	No N (%)	Considered N (%)	Reported N (%)	No N (%)	Considered N (%)	Reported N (%)	No N (%)	Considered N (%)	Reported N (%)
Psychiatric problems												
No problems	665 (96.8)	17 (2.5)	5 (0.7)	546 (93.2)	29 (4.9)	11 (1.9)	520 (91.7)	25 (4.4)	22 (3.9)	608 (90.1)	39 (5.8)	28 (4.1)
Problems in one domain	107 (77.5)	27 (19.6)	4 (2.9)	77 (73.3)	18 (17.1)	10 (9.5)	78 (62.4)	27 (21.6)	20 (16.0)	71 (50.4)	36 (25.5)	34 (24.1)
Comorbid problems	34 (56.7)	15 (25.0)	11 (18.3)	20 (47.6)	5 (11.9)	17 (40.5)	24 (42.1)	16 (28.1)	17 (29.8)	21 (31.3)	12 (17.9)	34 (50.7)

Table 2. Changes in considered and reported service use between different time points and between different problem groups.

Multinomial logistic regression.....	
	Considered	Reported
	OR (95% CI)	OR (95% CI)
2013 vs. 1989	2.0 (1.4-2.9)^a ***	7.1 (4.2-12.0)^a ***
1999 vs. 1989	1.3 (0.8-1.9) ^a	3.0 (1.7-5.3)^a ***
2005 vs. 1999	1.3 (0.9-1.9) ^a	1.5 (0.9-2.3) ^a
2013 vs. 2005	1.2 (0.9-1.8) ^a	1.6 (1.1-2.4)^a *
Problems in one domain vs. no problems	7.0 (5.3-9.4)^b ***	7.6 (5.3-11.0)^b ***
Comorbid problems vs. no problems	10.8 (7.3-16.1)^b ***	32.0 (21.4-47.7)^b ***

^a Adjusted with the amount of problems. ^b Adjusted with the year.

Abbreviations: OR, Odds ratio; CI, Confidence interval.

Bold type indicates *p*-values at a 0.05 significance level. *: *p*<0.05; **: *p*<0.01; ***: *p*<0.001.

Table 3. The frequencies of explanatory variables by service use.

	N	No %	Service use	
			Considered %	Reported %
Year				
1989	899	91.0	6.6	2.4
1999	755	87.0	7.3	5.7
2005	766	82.6	9.3	8.1
2013	893	79.1	10.0	11.0
Sex				
Girl	1654	90.0	6.3	3.7
Boy	1659	79.9	10.2	9.9
Family structure				
Two biological parents	2567	88.5	6.7	4.8
Reconstituted family	277	73.3	15.2	11.6
Single parents	418	73.2	12.4	14.4
Adoptive/foster parents or relatives	35	60.0	17.1	22.9
Mother's vocational education				
Higher	1686	86.2	7.5	6.3
Lower	1475	83.1	9.4	7.5
Father's vocational education				
Higher	1163	88.4	7.0	4.6
Lower	1614	85.6	7.9	6.4
Mother's employment status				
Not unemployed	1625	84.6	8.3	7.1
Unemployed 1-12 months	481	80.2	9.4	10.4
Unemployed over one year	267	76.0	12.0	12.0
Father's employment status				
Not unemployed	1688	85.1	7.9	6.9
Unemployed 1-12 months	289	81.0	10.7	8.3
Unemployed over one year	144	86.1	5.6	8.3
Conduct				
< 90% cut-off	2991	88.9	6.5	4.6
≥ 90% cut-off	304	48.4	26.0	25.7
Emotional				
< 90% cut-off	2961	88.3	7.0	4.6
≥ 90% cut-off	320	55.6	19.7	24.7
Hyperactivity				
< 90% cut-off	2877	89.1	6.7	4.2
≥ 90% cut-off	387	57.1	19.1	23.8

Table 4. Adjusted analyses of association between explanatory variables and considered and reported service use.

.....Multinomial logistic regression.....						
	Sex adjusted analysis		Sex and year adjusted analysis		Full multivariate analysis ^a	
	Considered	Reported	Considered	Reported	Considered	Reported
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Year						
1989	1	1	-	-	1	1
1999	1.2 (0.8-1.7)	2.4 (1.4-4.1)***	-	-	1.3 (0.8-2.1)	3.4 (1.6-7.1)**
2005	1.6 (1.1-2.2)*	3.7 (2.2-6.1)***	-	-	1.8 (1.1-2.8)*	4.6 (2.3-9.2)***
2013	1.7 (1.2-2.4)**	5.0 (3.1-8.0)***	-	-	1.7 (1.1-2.7)*	6.2 (3.2-12.0)***
Sex						
Girl	1	1	1	1	1	1
Boy	1.8 (1.4-2.4)***	3.0 (2.2-4.1)***	1.8 (1.4-2.4)***	3.0 (2.2-4.0)***	2.7 (2.0-3.8)***	5.1 (3.3-7.9)***
Family structure						
Two biological parents	1	1	1	1	1	1
Reconstituted family	2.7 (1.9-4.0)***	2.9 (1.9-4.5)***	2.6 (1.8-3.8)***	2.5 (1.7-3.9)***	1.6 (0.99-2.5)	1.8 (1.04-3.0)*
Single parents	2.3 (1.6-3.2)***	3.7 (2.6-5.2)***	2.2 (1.6-3.1)***	3.5 (2.5-5.0)***	1.8 (0.6-5.7)	2.8 (0.8-9.3)
Adoptive/foster parents or relatives	4.2 (1.7-10.7)**	8.8 (3.7-20.9)***	4.0 (1.6-10.2)**	7.6 (3.1-18.3)***	5.6 (2.0-15.7)**	9.2 (2.9-28.9)***
Mother's vocational education						
Higher	1	1	1	1	1	1
Lower	1.3 (1.004-1.7)*	1.2 (0.9-1.6)	1.4 (1.1-1.8)*	1.4 (1.04-1.8)*	1.2 (0.9-1.7)	0.9 (0.6-1.3)
Father's vocational education						
Higher	1	1	1	1	1	1
Lower	1.2 (0.9-1.6)	1.5 (1.03-2.0)*	1.2 (0.9-1.7)	1.6 (1.1-2.2)**	0.8 (0.6-1.2)	1.0 (0.7-1.6)
Mother's employment status						
Not unemployed	1	1	1	1	-	-
Unemployed 1-12 months	1.2 (0.8-1.7)	1.5 (1.1-2.2)*	1.2 (0.8-1.7)	1.5 (1.1-2.2)*	-	-

Unemployed over one year	1.6 (1.1-2.5)*	1.9 (1.3-3.0)**	1.7 (1.1-2.6)**	2.2 (1.4-3.3)***	-	-
Father's employment status						
Not unemployed	1	1	1	1	-	-
Unemployed 1-12 months	1.4 (0.96-2.2)	1.3 (0.8-2.1)	1.5 (0.96-2.2)	1.3 (0.8-2.1)	-	-
Unemployed over one year	0.7 (0.3-1.5)	1.2 (0.7-2.3)	0.8 (0.4-1.6)	1.4 (0.7-2.6)	-	-
Conduct						
< 90% cut-off	1	1	1	1	1	1
≥ 90% cut-off	8.4 (6.1-11.6)***	12.8 (9.1-18.0)***	8.8 (6.4-12.2)***	14.4 (10.1-20.6)***	6.8 (4.3-10.7)***	6.0 (3.5-10.3)***
Emotional						
< 90% cut-off	1	1	1	1	1	1
≥ 90% cut-off	4.6 (3.4-6.4)***	9.1 (6.6-12.6)***	4.8 (3.5-6.7)***	10.2 (7.3-14.4)***	5.8 (3.9-8.7)***	9.7 (6.1-15.5)***
Hyperactivity						
< 90% cut-off	1	1	1	1	1	1
≥ 90% cut-off	4.8 (3.5-6.5)***	10.2 (7.4-13.9)***	4.8 (3.5-6.5)***	10.4 (7.5-14.3)***	2.2 (1.4-3.4)***	5.8 (3.6-9.4)***

Abbreviations: OR, Odds ratio; CI, Confidence interval.

Bold type indicates *p*-values at a 0.05 significance level. *: *p*<0.05; **: *p*<0.01; ***: *p*<0.001.

^a Full multivariate analysis were done only for variables which were measured in every assessment year i.e. mother's and father's employment statuses were excluded from these analysis.