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PUBLISHING TRENDS IN THE FIELD OF PSYCHIATRY IN FINLAND 2019

ABSTRACT

The field of psychiatry has evolved significantly in recent years: knowledge and general acceptance of mental health issues have increased and the treatment of psychiatric disorders has taken big steps forward. Despite progress in psychiatric care, the burden of mental illness on society is substantial. The best way to achieve improvements in psychiatry is by active, high-impact and correctly targeted research. The targeting of research requires information about the current state of the field.

The aim of this study was to determine publishing trends in Finnish psychiatric research. We conducted this work by reviewing articles with contributions from individuals with Finnish affiliations, published in 2019 in the field of psychiatry. We included journals from all fields of science, not just psychiatry. We evaluated research productivity, publication forums and research topics and determined differences in areas of publication activity between institutions.

Altogether 415 articles matching our selection criteria were published in 2019 by individuals with Finnish affiliations. The most common ICD-10 category as a focus of research was mood disorders (F30-39) and the single most researched disorder was depression. Other commonly researched disorders were schizophrenia, substance abuse and anxiety. Most publication forums were ranked as low level and eleven articles were published in the top 6 journals in the field, as ranked by impact factor (IF). Journal Citation Reports and Web of Science data from recent years indicates that the number of articles in high-impact publication forums is considerably lower in Finland than in other Nordic countries. While topics of psychiatric research match well with the disease burden in society, low impact of the psychiatric research in comparison with other Nordic countries should be considered further. Similar data from different years, medical specialties and countries should be gathered in future studies to further assess the relative impact of psychiatric research in Finland. Present information about research focus in different Finnish institutions is hoped to help researchers find interesting projects and collaborations, although increasing research impact needs more widespread contribution within and beyond the psychiatric research community.

KEY WORDS: PSYCHIATRY, PUBLISHING, ICD-10, RESEARCH PRODUCTIVITY, JUFO

INTRODUCTION

Psychiatry is a constantly growing field of medicine and the treatment and knowledge of psychiatric disorders has taken big steps forward, but there is still plenty of room for development. For instance, the 2018 edition of *Health at a Glance: Europe* emphasizes the importance of promotion of mental health and prevention of mental illness. In 2016, more than one in six (17.3%) people across the EU suffered from mental disorders. The number was even higher in Finland, as its estimated prevalence of mental illness was the highest of all EU countries (i.e. 18.8%). Subsequently, mental health issues also cause a remarkable strain on the countries' economies. In Finland, the total costs of mental health problems were estimated to be 11 billion euros in 2015, which accounted for 5.32% of the GDP. Anxiety and depressive disorders were the most common mental disorders in the EU (1). Research should be targeted towards the most pressing issues of the field to improve the treatment of psychiatric disorders and to decrease morbidity, mortality and healthcare costs caused by mental health problems.

Apart from conducting the actual research and publishing articles, it is therefore important to assess the research field of psychiatry in Finland and to evaluate the impact and quantity of scientific output. This information could be used to reduce overlapping research and to guide researchers aspiring to look for interesting research projects, by providing information on current trends in the field of psychiatry in Finland. It could also help to improve the targeting of funding and other resources, while also contributing to building collaboration networks between research groups and universities.

The number and type of publications from an institution can be used as an indicator for their contributions to generating new knowledge (2). In psychiatry worldwide, publishing trends that have been studied include research productivity in different institutions (3), countries and regions (3,4,5), geographic differences in citation practices (3) and subject trends (3). This type of evaluation has also been made in other fields of medicine (6,7). Koskinen et al. have studied the use of bibliometric methods in evaluation of scientific research, using Finnish schizophrenia research as an example (8). The results of their study imply that the use of bibliometric methods is a practical, time-saving and impartial way of evaluating publications. In addition, Miettunen et al. published an article in 2019, in which they reviewed the psychiatric research in the Northern Finland Birth Cohort (NFBC) 1986 (9). To our knowledge, no other previous studies have reviewed the scientific productivity in the field of psychiatry in Finland.

The aim of this study was to provide up-to-date information about the research conducted in the field of psychiatry in Finland by systematically reviewing research topics, publication forums and the number of articles in Finnish universities and other affiliated institutions in the field of psychiatry in 2019.

METHODS

The PubMed search engine was used for a computerized search in the MEDLINE database on January 15th, 2020. We mainly utilized the ICD-10 classification group F (Mental and behavioral disorders) when defining our search terms and complemented the search with words and phrases from the DSM-IV classification, to reach publications from all fields of psychiatry as broadly as possible. We only included articles with contributions from authors from Finnish institutions, by choosing Finland as affiliation for the search. To limit our search results to the year 2019, we used 2019 as a filter for our search. We only included articles that were published for the first time in any form in 2019: articles published online ahead of print in 2018 or earlier were excluded. This gave us a total of 704 matches. After excluding letters, editorial material, corrections and articles from other fields of science, 415 articles met our inclusion criteria.

We examined research productivity of individual institutions by counting the number of publications. Information about the affiliations of the authors was retrieved from the author lists of each article. For articles where several (>1) Finnish institutions were listed, all Finnish institutions were counted. In addition, we counted the number of articles written in collaboration between ≥ 2 of the sixteen most productive institutions (i.e. institutions with ≥ 10 articles). For this purpose, each university and its respective University Hospital were labelled as the same institution, otherwise they were treated as separate organizations. Institutions with less than 10 articles were listed as "other". We also ranked the five universities with medical faculties by institution size to see how the institution size correlates with productivity: here we report absolute productivity and productivity adjusted for the number of inhabitants of each University Hospital's catchment area (2017) (10).

In addition to quantity, we aimed to assess the impact of the research. We did this by utilizing publication forum (JUFO) ratings. JUFO is a Finnish rating and classification system used for quality assessment of scientific output. One of its advantages compared to citation analyses is that it takes

into consideration field-specific publication practices and the classifications are made by expert panels. The scientific community is also able to contribute to the development of the classification (11). The rating system consists of the following levels (11):

No marking = the journal in question is currently under evaluation

0= identified publication, no rating

1= basic level

2= leading level

3= highest level

We also utilized impact factor (IF) based journal rankings (2018) to determine the six most cited journals in the field of psychiatry and assessed the number of articles published in these journals (12). In the absence of superior indicators for quality assessment, we used these two indicators as a proxy of research impact.

We categorized the publications by publication type: reviews, original articles and meta-analyses. Reviews and meta-analyses were identified from the results by using the filters “review” and “meta-analysis” in Pubmed. Abstracts were then evaluated manually to exclude editorials, letters and corrections and the remaining publications were labelled as original articles.

Next, we reviewed the research topics of the articles based on their titles and abstracts and divided them into different ICD-10 categories (*Table 1*). We included articles from journals of all fields of science. The suitable categories for each article were determined by the content of the titles and abstracts. In addition to the disorder-based classification, we classified publications according to some major methodological fields of research, including imaging, genetics, psychopharmacology and molecular biology. Author S.H classified the articles with help of senior authors (S.M.L and T.T.R). In cases of ambiguity, classification was based on consensus between the senior authors. We sorted the publications to as many of our categories as they fit into. After constructing a picture of the state of the research field in Finland, we compared institutions, determining differences in areas of publication. We also utilized Journal Citation Reports (JCR) and Web of Science (WoS) data for international comparison of research productivity and impact by assessing the number of contributions (articles and reviews; “citable items” in JCR) from selected countries (USA, Germany, Finland, Sweden, Denmark, Norway and Iceland) in the top 6 psychiatry journals listed by JCR during 2016-2019 (12). The

WoS search was conducted 16.5.2020. We also adjusted the productivity numbers for GDP and population in 2018, using World Bank data (13). Ethics approval was not necessary for this study, as no study participants were involved.

RESULTS

RESEARCH PRODUCTIVITY AND ARTICLE TYPES

We identified four articles as meta-analyses, 22 as reviews and the remaining 389 as original articles. A total of 108 different institutions contributed to the publications.

The productivity of institution was the highest in the five universities with medical faculties (UH, UTU, TUNI, UEF, UO), Helsinki University Hospital (HUH) and Finnish Institute for Health and Welfare (THL). Ranking of productivity depended on the method of assessment, as shown for the five universities in *Table 2* and *Figure 1*. The most productive institution in absolute number of articles was The University of Helsinki (UH), contributing 181 articles, followed by The University of Turku (UTU, 100 articles), Finnish Institute for Health and Welfare (THL, 92 articles), Helsinki University Hospital (HUH, 88 articles), The University of Eastern Finland (UEF, 83 articles), The University of Tampere (TUNI, 82 articles) and The University of Oulu (UO, 74 articles). UH and THL have close collaboration with each other, so we counted the number of articles with contributions from both institutions, which resulted in 58 articles. In addition, 215 articles had contributions from at least one of these two Helsinki institutions (UH + THL).

When we examined research productivity adjusted for the number of inhabitants of each specific catchment area, the most productive university was UTU (115 articles/1,000,000 inhabitants), followed by UEF (103), UO (100), TUNI (91) and UH (84). UH + THL produced 99 articles per 1,000,000 inhabitants.

In addition to these institutions, other important contributors (≥ 10 articles, *Table 3*) were The University of Jyväskylä (24 articles), the Finnish Institution of Occupational Health (19 articles), Folkhälsan Research Center (18 articles), Aalto University (Aalto, 12 articles) and Åbo Akademi (ÅA, 10 articles). In addition to HUH, the remaining four University Hospitals (Turku, Tampere, Kuopio and Oulu University Hospitals) also made significant contributions, often in collaboration with their respective universities. Turku contributed to 64, Oulu to 57, Tampere to 46 and Kuopio to 40 articles. Of the included 415 articles, 179 (43.1%) were

written in collaboration between ≥ 2 of these sixteen most productive institutions.

PUBLICATION FORUMS

The publication forums of most of the included articles (272, 65.5%) were rated as level 1 on the JUFO scale, 88 (21.2%) as level 2 and 48 (11.6%) as level 3. Five articles (1.2%) were published in journals that received 0 points on the JUFO scale, the publication forum of one article (0.2%) was identified but had no review and the publication forum of one article (0.2%) was not found in the JUFO database (*Figure 2*). Of the articles in publication forums with level 3 ratings, UH was the most productive when the absolute number of articles was considered (28 articles). When adjusted for the number of inhabitants of the specific catchment areas, UTU was the most productive of the five universities with medical faculties on level 3 (19.5 articles/1,000,000 inhabitants) (*Table 4*). The distribution of articles in the most productive institutions to publication forums on each rating level is presented in *Table 5*.

The three most common journals were *The Journal of Affective Disorders* (14 articles), *The Nordic Journal of Psychiatry* (8 articles) and *Scientific Reports* (8 articles). Ranked by impact factor (IF), the top 6 journals in the field of psychiatry in 2018 were *World Psychiatry*, *Lancet Psychiatry*, *JAMA Psychiatry*, *Psychotherapy and Psychosomatics*, *American Journal of Psychiatry* and *Molecular Psychiatry*. A total of 11 articles were published in these Journals: six in *JAMA Psychiatry* and five in *Molecular Psychiatry*. We compared the number of contributions in these top 6 journals during 2016-2019 from selected countries (*Table 6*). The rank depended largely on adjustment. While USA produced the largest absolute number of articles in high-impact publication forums, Nordic countries produced far more when adjusted for population size and GDP. Finland and Norway were the least productive Nordic countries. In comparison with Sweden, Finland produced less than half the number of articles in high-impact publication forums, even when adjusted for population and GDP.

RESEARCH TOPICS

The distribution of articles to ICD-10 categories is presented in *Table 1*. The most researched category was F30-39 (Mood [affective] disorders) with 75 articles. Depression was the single most researched disorder of the category (82.7% of the category), as well as of all categories. The most researched topics within category F10-19 (Mental and behavioural

disorders due to psychoactive substance use) were smoking/nicotine dependence (34.1% of the category) and alcohol use (27.3% of the category). Schizophrenia was the most researched topic of category F20-29 (Schizophrenia, schizotypal and delusional disorders), covering 66.7% of the category. Most articles in category F50-59 (Behavioural syndromes associated with physiological disturbances and physical factors) covered sleep-related problems (65.7% of the category) and 17.1% covered eating disorders. In category F40-48 (Neurotic, stress-related and somatoform disorders), 75.0% of the articles covered anxiety disorders or anxiety symptoms. In F60-69 (Disorders of adult personality and behaviour), gambling was the most frequently researched topic (41.2% of the category). Autism spectrum disorders (F84.0-84.9) were the most prevalent topic (75.0%) in category F80-89 (Disorders of psychological development). In category F90-98 (Behavioural and emotional disorders with onset usually occurring in childhood and adolescence), most articles covered ADHD (14 articles, 66.7%).

Figure 3 demonstrates the top 3 categories of the most productive institutions. In most of the 16 institutions with ≥ 10 articles, the most common ICD-10 category was F30-39 (except TUNI and ÅA). In TUNI, the most prevalent category was F10-19 (15 articles, 18.3% of all articles from TUNI), although F30-39 was the second most common (14 articles, 17.1% of all articles from TUNI). Apart from F30-39, UH and THL were particularly productive in category F50-59 (UH with 23 articles, 13.3% of all articles from UH; THL with 14 articles, 15.2% of all articles from THL). UO (and Oulu University Hospital) was particularly active in schizophrenia research category F20-29 (11 articles, 14.7% of all articles from UO).

One hundred and eight articles (26.0% of all articles) fit at least one of the selected methodological approach-based categories. The methodological approach-based classification resulted in 44 (11% of all articles) articles in genetics, 32 (7.7% of all articles) in imaging, 28 (6.7% of all articles) in molecular biology and 25 in psychopharmacology (6.0% of all articles) (*Table 1*). UH contributed to 32 (72.7%) articles in the genetics category and 18 articles (64.3%) in molecular biology. In the imaging category, UTU, Turku University Hospital, UH and Aalto were the most productive. Imaging was the most prevalent category (disorder-based classification included) for Aalto University (6 articles, 50% of all articles from Aalto).

One hundred and five articles did not fit into any specific disorder-based or methodological approach-based categories. The most frequent topics of these mental and often also

somatic health-related articles included Health-related quality of life (9 articles) and maternal (pre-, peri- or post-natal) health and impact on the offspring (4 articles). Several articles also covered behaviour or mental health on a more general level.

DISCUSSION

The Finnish population (14) formed 0.07% of the global population in 2019 (15) and 0.32% of the World GDP in 2018 (13). Meanwhile, a total of 17,691 articles were published worldwide with the median impact factor 2.4 in the “psychiatry” category in 2018 (878,334 cites in JCR) (12). JCR data from 2019 was not available at the time of our study, but our sample from 2019 would comprise ca. 2% of all articles worldwide, assuming that the number of articles in 2019 was similar to 2018 and that the JCR category “psychiatry” covered most articles of our search. Considering the above numbers, research productivity in the field of psychiatry in Finland appears to be on a reasonable level.

At the level of individual institutions, we aimed to compare productivity adjusted for the resources of each university. When the universities with medical faculties were ranked by the number of employees (person years) in 2018, the University of Helsinki (UH) was the biggest (7144 person years) (16), followed by UTU (3283) (17), UO (2610) (18), UEF (2438) (19) and TUNI (2032) (20). However, the credible evaluation of institution-specific resources proved more complicated than expected. We acquired data of the total number of employees, but detailed information of the resources directed towards psychiatric research in each institution was difficult to find. Thus, we adjusted productivity for the population size of each university’s catchment area in our data analysis. As the University of Helsinki is the largest university in Finland, it was expected to be the most productive as well, which it was when the absolute number of publications was considered. However, when adjusted for population size, UTU was the most productive and UH the least productive of the five universities with medical faculties. The adjusted rank of UH may be partially explained by the fact that in the Helsinki region, many psychiatrists and psychologists conduct their research at THL, which may reduce the net productivity of UH. The number of articles (215) with contributions from at least one of these two institutions adjusted for population size resulted in 99 articles per one million inhabitants, which places UH + THL together as 4th most productive. We categorized articles to

all Finnish institutions listed in the author list of each article, regardless of each author’s degree of authorship or number of listed institutions. In future studies, a more specific approach, where only the affiliations of the first, last or corresponding author are included, could be added to this method. This would provide additional information about the distribution of articles to each organization

The publication forums of most articles (65.5%) were classified as level 1 in the JUFO rating system and eleven articles (2.7%) were published in the top 6 most cited journals in the field of psychiatry. Of all articles (citable items) in the JCR “psychiatry” category, 3% were published in the top 6 psychiatry journals in 2016-2018 (JCR data from 2019 was not available at the time of our study). Considering the comparison of these numbers, the impact of Finnish psychiatry research is on a decent level. However, it is notable that we also included journals from other fields of science. Furthermore, it should be mentioned that there is some controversy within the scientific community about the proper use and interpretation of publication forum ratings and impact factors. They are generally not recommended as indicators of quality or impact for individual articles and are best suited for analysis of large samples, preferably within the same research field (21,22). Since our focus was in evaluating bigger trends in research impact instead of evaluating individual articles, we concluded that these indicators were appropriate for our study as no better indicators were available. These publication forum-related findings alone are difficult to evaluate, since we only evaluated publications from Finland and only included one year. Therefore, we compared the number of contributions from different countries in 2016-2019 in the top 6 psychiatry journals listed by JCR. Finland ranked comparatively low in the list of the most contributive countries of each journal. The low adjusted rank of USA could be partly explained by bigger gaps in education and income equality in comparison with Nordic countries. For the Nordic countries, the results for the adjusted numbers followed a somewhat similar pattern as the absolute numbers, apart from the surprisingly high rank of Iceland. Excluding Iceland, Sweden and Denmark were the top 2 countries with significantly higher numbers than Norway and Finland. These numbers together with our findings are merely indicative, but they suggest that the impact of Finnish psychiatry research should be enhanced. Previous literature about the productivity and impact of Finnish research in the field of psychiatry is scarce, but we compared our findings to those of Ingwersen (23). During 1981-98, publication activity in Finland showed comparatively steep growth rates, and in the latter part of the studied period the absolute number of

articles was the second highest of the four included Nordic countries (Iceland was excluded from the study), with Sweden consistently as the most productive Nordic country. During the whole studied period, almost all Nordic countries showed significant fluctuations in citation impact. Finland was usually the weakest impact country, which is in line with our results. It should however be mentioned that during 1994-98, Finland actually beat all other Nordic countries, even Sweden, in citation impact. Nevertheless, this study is fairly old and differs from ours in that it takes into account all found articles, while we did our international comparison based on selected high-impact journals.

Psychiatry and mental health-related problems are currently important topics in public discussion and mental health problems account for a remarkable portion of public healthcare costs (1), causing an increasing number of sick leave days each year. Depression is the most significant mental health problem in Finland, when public health is considered (24). According to our findings, research efforts are in line with this fact, as mood disorders (F30-39) and more specifically depression was the most common research topic in most institutions. Globally, depression was the third largest cause for years lived with disability for females in 2017, after low back pain and headache disorders. For males, depression was ranked as the fifth leading cause after low back pain, headache disorders, diabetes and age-related hearing loss. Anxiety disorders ranked high as well: eighth for females and thirteenth for males. Our study found anxiety to be the third most researched disorder category in psychiatry in Finland, which correlates with the global disease burden of anxiety disorders.

F20-29 (Schizophrenia, schizotypal and delusional disorders) was the third most common disorder-based category in our study, although schizophrenia ranked only 19th for both sexes in years lived with disability (25). This discrepancy fits the common argument that besides considering prevalence in the population, public resources/attention should be directed towards the care of the most severely ill.

There were some institution-specific areas of interest. In TUNI, the most common topic category was F10-19. Substance abuse disorders and category F50-59 were also prevalent topics in THL. In UH, sleep was a frequently occurring topic, as well as genetics, compared to the other institutions. This could be explained by the fact that these are topics that are studied with basic research methods that require resources that are more easily accessible for big universities, such as UH. Imaging was largely concentrated to Aalto University and Turku University and University

Hospital. The contributions from Turku can be explained by research conducted at Turku PET Centre. UO was particularly invested in schizophrenia research.

This article has several limitations. We only searched articles in one database and although MEDLINE is extensive and widely used, no single database has 100% coverage. The degree of coverage in different databases has previously been found to vary significantly between psychiatric research topics. Articles that might be missing from our sample are most likely from the field of social psychiatry or psychology rather than biological psychiatry: these articles could potentially be better retrieved from other databases (psychological or educational), such as PsycINFO. (26) Despite careful and systematic revision of the results, the utilized categorization by research topic can be considered somewhat subjective. Although we classified articles by both research topic (ICD-10 disorder groups) and methodology, our main focus was in the disorder-based categorization. Because of the novelty of our study, deciding the number of relevant methodological categories in advance was not entirely straightforward. The four included methodological categories were considered not only important and interesting, but specific enough for practical categorization. Therefore, the methodology categorization in particular is not comprehensive and should be extended in future studies by adding more categories, such as epidemiology (preferably divided into more specific subcategories). We also advise researchers to cover sample-related issues in future studies. Another limitation is that we did not extensively compare our main findings to other years, medical specialties or countries. This should be considered in future research. Comparison of productivity between different institutions was difficult, as we had no credible information about person working hours resourced to psychiatric research at each institution.

CONCLUSION

Depression was the most common research topic in psychiatric research in Finland. Other frequently researched disorders were schizophrenia, substance abuse and anxiety. These findings balance well with the estimated prevalence and severity of mental disorders globally and in Finland. Tampere University was particularly invested in substance abuse research, The University of Helsinki in sleep and genetics and The University of Oulu in schizophrenia research. These findings may help scholars to find interesting

research fields and to build relevant collaborations. Most publication forums were ranked as level 1 in the JUFO rating system and eleven articles were published in the top 6 journals (ranked by IF) in the field of psychiatry. JCR and Web of Science data implied that Finland was less contributive in the top psychiatry journals than other Nordic countries, which is discrepant with the high societal impact of mental disorders in Finland. Future research should include more detailed comparison of different years, specialties and countries, to clarify the picture of the relative impact of psychiatric research in Finland. Meanwhile, the impact of psychiatric research should be enhanced by optimizing education, resources and collaboration.

The ICD-10 Classification of Mental and Behavioural Disorders		Articles	Most prevalent issue (Articles)
F00-09	Organic, including symptomatic, mental disorders	2	Dementia (2)
F10-19	Mental and behavioral disorders due to psychoactive substance use *	44	Smoking (15)
F20-29	Schizophrenia, schizotypal and delusional disorders	42	Schizophrenia (28)
F30-39	Mood [affective] disorders **	75	Depression (62)
F40-48	Neurotic, stress-related and somatoform disorders	36	Anxiety (27)
F50-59	Behavioral syndromes associated with physiological disturbances and physical factors ***	35	Sleep (23)
F60-69	Disorders of adult personality and behavior	17	Gambling (7)
F70-79	Mental retardation	0	0
F80-89	Disorders of psychological development	24	Autism spectrum disorders (18)
F90-98	Behavioral and emotional disorders with onset usually occurring in childhood and adolescence	21	ADHD (14)
F99	Unspecified mental disorder	0	0
* Including articles that cover substance use on a more general level			
** Including articles about subclinical depression and suicide or familicide			
*** Including articles related to non-pathological sleep			
Methodological approach-based categorization			
		Articles	
	Genetics	44	
	Molecular biology	28	
	Imaging	32	
	Psychopharmacology	25	

Table 1. Categories by subject and research method

University	Number of articles	Number of articles per 1,000,000 inhabitants
University of Helsinki	181	84
University of Turku	100	115
Tampere University	82	91
University of Eastern Finland	83	103
University of Oulu	74	100

Table 2. Research productivity in the five Finnish universities with medical faculties

Institution	Number of articles
National Institute for Health and Welfare	92
Helsinki University Hospital	88
Turku University Hospital	64
Oulu University Hospital	57
Tampere University Hospital	46
Kuopio University Hospital	40
University of Jyväskylä	24
Finnish Institute of Occupational Health	19
Folkhälsan Research Center	18
Aalto University	12
Åbo Akademi University	10

Table 3. Research productivity of other significant Finnish research institutions in the field of psychiatry in 2019

University	JFO-ratings		
	3	2	1
University of Helsinki	12,9	14,8	53,6
University of Turku	19,5	27,6	65,5
University of Eastern Finland	14,8	21,0	65,5
Tampere University	10,0	14,4	66,6
University of Oulu	10,8	25,7	63,5

Table 4. The number of articles on each JFO rating level per 1,000,000 inhabitants (of each university's specific catchment area) from Finnish universities with medical faculties in 2019

Institution	JFO-rating level							
	3		2		1		0	
	N	%	N	%	N	%	N	%
University of Helsinki	28	15,5 %	32	17,7 %	116	64,1 %	4	2,2 %
University of Turku	17	17,0 %	24	24,0 %	57	57,0 %	1	1,0 %
National Institute for Health and Welfare	17	18,5 %	24	26,1 %	48	52,2 %	3	3,3 %
University of Eastern Finland	12	14,5 %	17	20,5 %	53	63,9 %	1	1,2 %
Tampere University	9	11,0 %	13	15,9 %	60	73,2 %	0	0,0 %
University of Oulu	8	10,8 %	19	25,7 %	47	63,5 %	0	0,0 %
University of Jyväskylä	3	12,5 %	2	8,3 %	18	75,0 %	0	0,0 %
Finnish Institute of Occupational Health	2	10,5 %	3	15,8 %	14	73,7 %	0	0,0 %
Folkhälsan Research Center	2	11,1 %	2	11,1 %	14	77,8 %	0	0,0 %
Aalto University	1	8,3 %	2	16,7 %	9	75,0 %	0	0,0 %
Åbo Akademi University	1	10,0 %	2	20,0 %	7	70,0 %	0	0,0 %
Helsinki University Hospital	10	11,4 %	10	11,4 %	65	73,9 %	2	2,3 %
Turku University Hospital	14	21,9 %	10	15,6 %	38	59,4 %	2	3,1 %
Oulu University Hospital	5	8,8 %	16	28,1 %	35	61,4 %	1	1,8 %
Tampere University Hospital	4	8,7 %	9	19,6 %	33	71,7 %	0	0,0 %
Kuopio University Hospital	4	10,0 %	5	12,5 %	30	75,0 %	1	2,5 %

Table 5. The number (N) of articles on each level in the JUF0 rating system and their share (%) of the total number of articles from each institution

Journal	USA	Germany	Sweden	Denmark	Norway	Finland	Iceland
World Psychiatry	50	15	6	8	0	1	0
Lancet Psychiatry	102	28	21	22	10	4	1
JAMA Psychiatry	296	51	66	45	22	18	3
Psychotherapy and Psychosomatics	35	36	6	7	3	0	0
American Journal of Psychiatry	307	35	31	14	9	6	3
Molecular Psychiatry	480	109	65	23	24	17	6
Total number of contributions	1270	274	195	119	68	46	13
Total number; GDP adj. (per billion US\$)	0,06	0,07	0,35	0,33	0,16	0,17	0,50
Total number; Population adj. (per million inhabitants)	3,9	3,3	19,2	20,5	12,8	8,3	36,9

Table 6. The number of contributions (articles and reviews) in the top 6 psychiatry journals ranked by impact factor during 2016-2019 from selected countries. The adjustments are made with GDP and population data from 2018

The number of articles in the field of psychiatry from Finnish universities with medical faculties in 2019

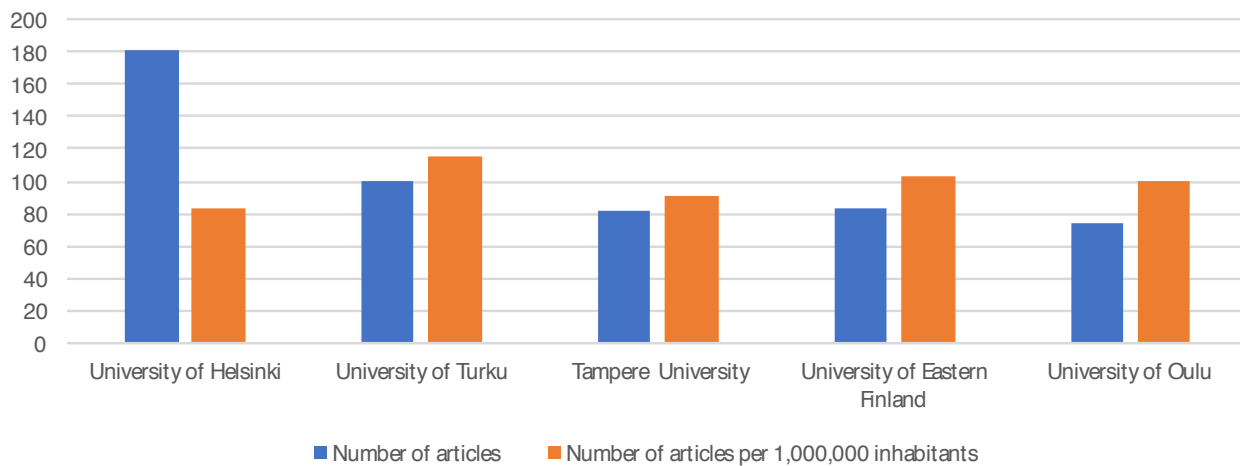


Figure 1. Research productivity (adjusted and non-adjusted) in Finnish universities with medical faculties

The distribution of articles (N=415) to each JUF0-rating level

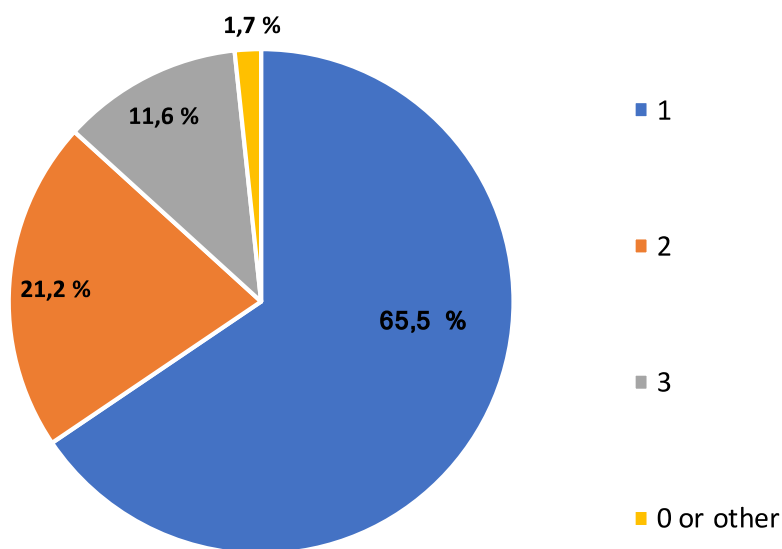


Figure 2. JUF0 ratings of the publication forums of articles with contributions from Finland in the field of psychiatry in 2019

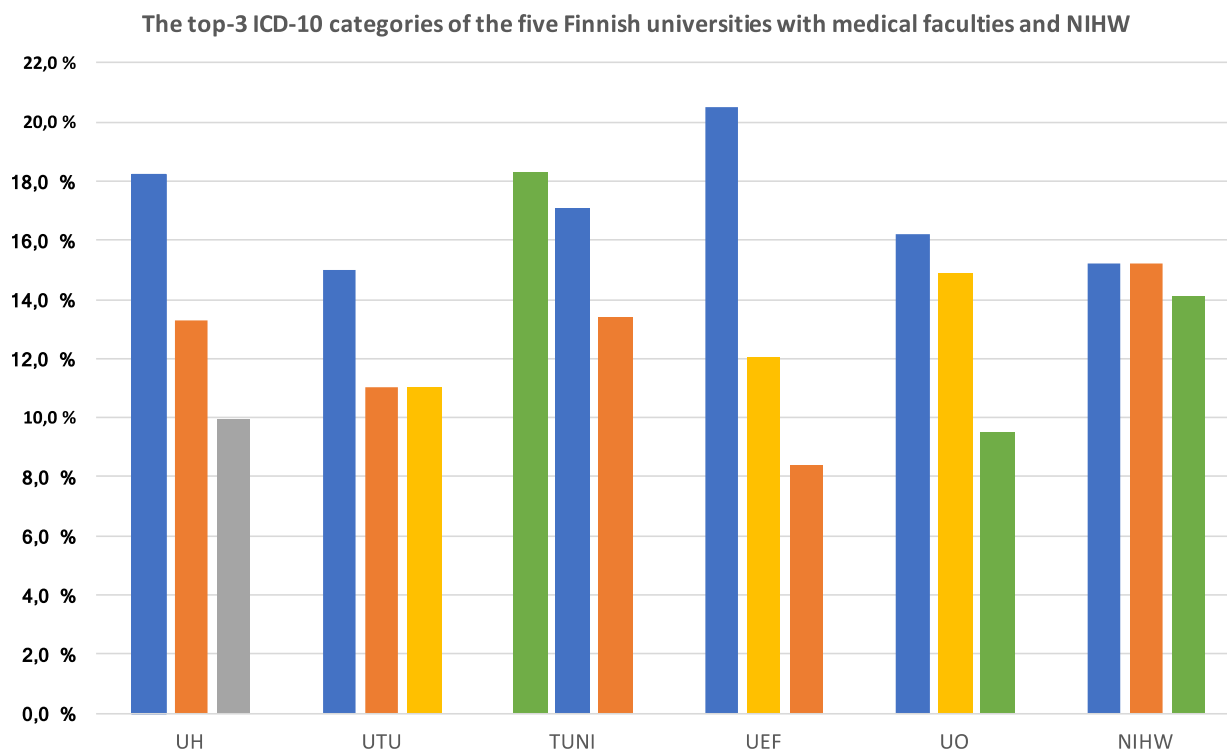
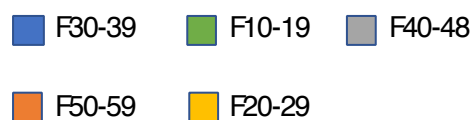


Figure 3. The top 3 ICD-10 categories of Finnish research institutions in the field of psychiatry in 2019 (% of the total number of articles in the field of psychiatry in each institution)



UH= University of Helsinki
 UTU= University of Turku
 TUNI= Tampere University
 UEF= University of Eastern Finland
 UO= University of Oulu
 NIHW= National Institute for Health and Welfare

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References:

1. OECD/European Union (2018), *Health at a Glance: Europe 2018: State of Health in the EU Cycle*, OECD Publishing, Paris/ European Union, Brussels
2. Çatal B, Akman YE, Şükür E, Azboy İ. *Worldwide arthroplasty research productivity and contribution of Turkey*. Acta Orthop Traumatol Turc. 2018;52(5):376-381
3. Igoumenou A, Ebmeier K, Roberts N, Fazel S. *Geographic trends of scientific output and citation practices in psychiatry*. BMC psychiatry 2014;14(1):332.
4. Zhang J, Chen X, Gao X, Yang H, Zhen Z, Li Q, et al. *Worldwide research productivity in the field of psychiatry*. Int J Ment Health Syst 2017;11(1):20.
5. Patel V, Sumathipala A. *International representation in psychiatric literature: survey of six leading journals*. Br J Psychiatry 2001; 178:406-9
6. Liang Z, Luo X, Gong F, Bao, H, Qian H, Jia Z, Li G. *Worldwide research productivity in the field of arthroscopy: A bibliometric analysis*. Arthroscopy. 2015; 31(8):1452-7
7. Zhao X, Ye R, Zhao L, Lin Y, Huang W, He X, Lian F, Tong X. *Worldwide research productivity in the field of endocrinology and metabolism- a bibliometric analysis*. Endokrynol Pol 2015;66(5):434-42
8. Koskinen J, Isohanni M, Paajala H, Jääskeläinen E, Nieminen P, Koponen H, Tienari P, Miettunen J. *How to use bibliometric methods in evaluation of scientific research? An example from Finnish schizophrenia research*. Nord J Psychiatry 2008;62(2):136-43
9. Miettunen, J., Haapea, M., Björnholm, L., Huhtaniska, S., Juola, T., Kinnunen, L., Lehtiniemi, H., Lieslehto, J., Rautio, N., & Nordström, T. (2019). *Psychiatric research in the Northern Finland Birth Cohort 1986 - a systematic review*. Int J Circumpolar Health, 78(1), 1571382.
10. Association of Finnish Municipalities: https://www.kuntaliitto.fi/sites/default/files/media/file/Ervat_Sairaanhoitopiirit2019.pdf. Accessed 20.3.2020.

11. Publication forum (JUFO) website: <https://www.julkaisufoorumi.fi/en/publication-forum>. Accessed 10.3.2020.
12. InCites Journal Citation Reports: <https://jcr.clarivate.com>. Accessed 17.4.2020
13. World Bank Open Data: <https://data.worldbank.org/> . Accessed 16.5.2020.
14. Statistics Finland: http://www.tilastokeskus.fi/til/vamuu/2019/12/vamuu_2019_12_2020-01-23_tie_001_fi.html. Accessed 24.3.2020
15. United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019: Highlights (ST/ESA/SER.A/423): https://population.un.org/wpp/Publications/Files/WPP2019_Highlights.pdf
16. The University of Helsinki annual review 2018: https://www.helsinki.fi/sites/default/files/atoms/files/helsingin_yliopiston_toimintakertomus_2018_0.pdf. Accessed 10.3.2020
17. The University of Turku annual review 2018: https://www.utu.fi/sites/default/files/public%3A//media/file/UTU_Toimintakertomus_ja_tilinpaaos_2018.pdf. Accessed 10.3.2020
18. The University of Oulu annual review 2018: <https://www oulu.fi/sites/default/files/content/Vuosikertomus%202018.pdf>. Accessed 10.3.2020
19. The University of Eastern Finland annual review 2018: <https://www.uef.fi/documents/10184/1493051/Tilinp%C3%A4%C3%A4t%C3%B6s+2018+painoversio.pdf/6c8c9738-b36e-4992-98b6-325cc8c8b8c8>. Accessed 10.3.2020
20. Tampere University annual review 2018: https://www.tuni.fi/sites/default/files/2019-06/tay_tilinpaaos_2018_tilintarkastettu_optimized.pdf. Accessed 10.3.2020
21. Auranen O., Leino Y., Poropudas O., Pölonen J (2013). *Julkaisufoorumi-luokitus ja viittausindeksit tieteellisten julkaisujen laadun mittareina*. Web of Science-aineistoon perustuva vertailu.
22. Seglen, P.O. *Why the impact factor of journals should not be used for evaluating research*. BMJ. 1997; 314, 498–502.
23. Ingwersen, P. *Visibility and impact of research in Psychiatry for North European countries in EU, US and world contexts*. Scientometrics. 2002; 54, 131-144
24. Finnish Institute for Health and Welfare: <https://thl.fi/fi/web/mielenterveys/mielenterveyshairiot/mielialahairiot>. Accessed 10.3.2020.
25. GBD 2017 Disease and Injury Incidence and Prevalence Collaborators: Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2018 Nov 10;392(10159):1789-1858.
26. Löhönen, J., Isohanni, M., Nieminen, P., & Miettunen, J. *Coverage of the bibliographic databases in mental health research*. Nord J Psychiatry. 2010; 64(3), 181-188