SCIENTIFIC PUBLICATIONS AND RESEARCH GROUPS ON ALCOHOL CONSUMPTION AND RELATED PROBLEMS WORLDWIDE: AUTHORSHIP ANALYSIS OF PAPERS INDEXED IN PUBMED AND SCOPUS DATABASES (2005-2009)

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ABSTRACT

Background: The research of alcohol-consumption-related problems is a multidisciplinary field. The aim of this study is to analyze the worldwide scientific production in the area of alcohol-drinking & alcohol-related problems from 2005-2009.

Methods: *A Medline* and *Scopus* search on alcohol (alcohol-drinking & alcohol-related problems) published from 2005-2009 was carried out. Using bibliometric indicators, the distribution of the publications was determined within the journals that publish said articles, specialty of the journal (broad subject terms), article type, language of the publication, and country where the journal is published. Also, authorship characteristics were assessed (collaboration index and number of authors who have published more than nine documents). The existing research groups were also determined.

Results: 24,100 documents on alcohol, published in 3,862 journals, and authored by 69,640 authors were retrieved from Medline and *Scopus* for between the years 2005-2009. The collaboration index of the articles was 4.83±3.7. The number of consolidated research groups in the field was identified as 383, with 1,933 authors. Documents on alcohol were published mainly in journals covering the field of "Substance-Related Disorders", 23.18%, followed by "Medicine", 8.7%, "Psychiatry", 6.17%, and "Gastroenterology", 5.25%.

Conclusions: Research on alcohol is a consolidated field, with an average of 4,820 documents published each year between 2005 and 2009 in *Medline* and *Scopus*. Alcohol related publications have a marked multidisciplinary nature. Collaboration was common among alcohol researchers. There is an underrepresentation of alcohol related publications in languages other than English and from developing countries, in *Medline* and *Scopus* databases.

Key Words: alcohol-drinking; alcohol-related problems; bibliometrics; periodicals as topic/statistics & numerical data.

INTRODUCTION

The consumption of alcohol is globally one of the main social and public health problems. The World Health Organization estimates that 4% of world mortality is directly attributable to alcohol. There is a causal relationship between alcohol consumption and more than 60 different types of illness, besides the fact that alcohol consumption is frequently related with numerous problems, such as traffic accidents, antisocial behavior, low performance at work, abuse in the family, suicides, violence, crimes, homicides, and delinquency (Room et al., 2005; WHO, 2011).

The wide variety of problems associated with alcohol consumption makes it a health and social policy priority. This implies that research into problems associated with alcohol consumption is multidisciplinary in nature. This field of research deals in numerous specialties found in both the sphere of social sciences and health sciences including: basic research studies, epidemiological studies, preventive and public health policy studies, clinical trials, and studies in patient treatment (Edwards, 2002).

In recent decades, the study of addictions has become consolidated as a field, characterized by notable scientific activity and the appearance of numerous generalized and specialized scientific journals in different pathologies or addictive behaviors, such as gambling or smoking (Babor, 1993; Babor et al., 2008; Edwards et al., 1997). The importance of the bibliography in addictions is similarly reflected in the consolidation of the field under the term “substance abuse” (ISI Web of Knowledge, http://portal.isiknowledge.com/) which is used as a subject category in multidisciplinary databases and through the appearance of numerous specialized databases and compilations of bibliographic resources.

However due to the complex, multidisciplinary nature of the field, and in particular that of alcohol and alcoholism, numerous studies have been published in journals of various biomedical and clinical specialties as well as in journals of a general or multidisciplinary nature. Therefore, we believe that it is highly relevant and, furthermore, of the utmost interest to analyze the development of scientific research in this field. By examining the number of articles over time in a specific field, we can provide information about the research capacity and whether research has progressed. On the other hand, the analysis of collaboration patterns informs us about the number of authors involved in research activities and how scientists interact between them.

The aim of this study is to analyze the worldwide scientific production of research on alcohol (alcohol-drinking & alcohol-related problems) between 2005-2009 by : i) determining the distribution of the publications within the publishing journals, journal specialty (broad subject terms), article type, and language; ii) looking at authorship characteristics, such as number of authors per article, number of authors who have published more than nine documents, authors that have produced only an article; iii) identifying the main publishing authors and the established research groups that exist in this field. We compare these results with earlier studies of research done in the field of alcohol-related disorders and in the areas of biomedicine and public health to create a complete picture of the development of research in the field.

MATERIAL AND METHODS

Identification of the document population under study

The bibliographic databases *Medline* (http://www.ncbi.nlm.nih.gov/pubmed) and *Scopus* were chosen for this study. The *Medline* database is produced by the National Library of Medicine and, due to its wide coverage and representativeness, is the main database for scientific literature in the areas of biomedicine and other related disciplines worldwide. The fact that it is freely accessible should also be noted. Furthermore, the *Medline* database uses a sophisticated search instrument, the *Medical Subject Headings* (MeSH) thesaurus (http://www.ncbi.nlm.nih.gov/mesh). With the MeSH is a controlled vocabulary that allows the contents of the collected documents to be accurately characterized and which permits search files to be created in accordance with the object under study allowing for a more comprehensive analysis of the literature. The *Scopus* database is produced by Elsevier Inc. It is an international, comprehensive database that broadly covers the social science and non-English journals, besides including all bibliographic references from the *Medline* database.

In the present study, a query search was carried out under the MeSH terms: *Alcohol-Related Disorders* and *Alcohol Drinking*. These are generic terms that include numerous specific descriptors in the search process.

The descriptor *Alcohol-Related Disorders* (http://www.nlm.nih.gov/cgi/mesh/2011/MB_cgi?mode=&index=18535&field=entry&HM=&II=&PA=&form=&input=) includes documents that deal with "disorders related to or resulting from abuse or misuse of alcohol". The category encapsulates:

- “Alcohol-Induced Disorders”:
    - “Alcohol-Induced Disorders, Nervous System” (Alcohol Amnesic Disorder - Korsakoff Syndrome, Alcohol Withdrawal Delirium, Alcohol Withdrawal Seizures, Alcoholic Neuropathy.
    - “Cardiomyopathy, Alcoholic”,
    - “Fetal Alcohol Syndrome”,
    - “Liver Diseases, Alcoholic” (Fatty Liver, Alcoholic; Hepatitis, Alcoholic; Liver Cirrhosis, Alcoholic),
    - “Pancreatitis, Alcoholic”
    - “Psychoses, Alcoholic”.
- “Alcoholic Intoxication”:
- “Alcoholism”
- “Wernicke Encephalopathy”.

The descriptor *Alcohol Drinking* considers “behaviors associated with the ingesting of alcoholic beverages, including social drinking” (http://www.nlm.nih.gov/cgi/mesh/2011/MB_cgi?mode=&index=407&field=entry&HM=&II=&PA=&form=&input=).

Similar terms have been used in previous studies to identify alcohol research in the *Medline* database by using MeSH terms (Hughes and Oliveto, 1990; Shakeshaft et al., 1997). Studies have also used these terms with other databases by means of keywords searched in the title and abstract fields, often in combination with keywords such as “alcohol,” “abuse” or “disorder” (Rajendram et al., 2005).

The searches were carried out in April 2010 – December 2011 using the *PubMed* platform (*Medline*) and SciVerse platform (*Scopus*) and were limited to the chronological period 2005-2009.

Standardization of the bibliographic information

A relational database was generated with the bibliographic information from the retrieved documents after the removal of duplicate references. The database was then subjected to a process of standardization based on the authors' names, as sometimes an author may have published differing names. This often occurs because an author maybe identified by one or two surnames, one first name or more than one, or due to the use of hyphens to separate names, or simple errors in the indexing process.

In order to characterize the contributions from the different biomedical specialties and fields, the subject headings of the journals included in the *National Library of Medicine Catalog* (http://www.ncbi.nlm.nih.gov/nlmcatalog) were identified. The catalog includes 129 broad subject terms (http://wwwcf.nlm.nih.gov/serials/journals/index.cfm). For example, the journal Alcoholism Clinical and Experimental Research was included within the broad subject term "Substance-Related Disorders" (http://www.ncbi.nlm.nih.gov/nlmcatalog/7707242).

Analysis of the scientific production and identification of research groups

The distribution of the publications by journal and document typology (journal article, review, letter, editorial, other document typologies (such as news, congresses, interviews, etc.), language of the publication, as well as by specialties (broad subject terms) in *Medline*

bibliographic references was analyzed. Regarding the authors, some widely used bibliometric indicators were calculated: the number of authors who have published more than nine documents, the number of authors who have published only one document and the collaboration index or index of authors' names per document (Sánchez-Carbonell et al., 2005).

An algorithm, which evaluates the *collaboration threshold* or *intensity* between pairs of authors who have jointly authored at least one document and the necessary minimum number of authors linked to each other in order to consider them a research group, was implemented and executed in order to identify research groups. In this sense, a research group was considered to exist when two or more authors had jointly authored five or more documents over the study period. Furthermore, this algorithm was also executed using different collaboration intensities (range ≥1 and ≥10) in order to carry out comparative analyses between the different collaboration thresholds. The main research groups were identified using the Fruchterman Reingold algorithm, which was executed with the network analysis and visualization program *Pajek* (http://pajek.imfm.si/doku.php). *Pajek* provided an indication of the position the authors who have published more than nine documents occupy within the groups.

RESULTS

We retrieved 24,100 documents from the period 2005-2009, under the *Medical Subject Headings* of *alcohol-related problems* and *alcohol-drinking*. 19,989 were from *Medline* and 4,111 from *Scopus* database of which 18,771 (77.89%) were journal articles, 3,174 (13.17%) reviews, 856 (3.55%) letters, 555 (2.3%) editorials, and 744 (3.09%) other document typologies (such as news, congresses or interviews). The documents were published in 3,862 different journals. Of these, 54 journals (1.4%) published more than 49 documents each, which is of 30.13% (n=7,262) of the total publications; 441 journals (11.41%) published between 10 to 49 documents each, 35.84% (n=8,637) of the total publications; and, 3,367 journals (87.18%) published between 1 to 9 documents, 34.03% (n=8,201) of the total publications. Table 1 shows the list of the 54 journals that have published more than 49 alcohol related documents between 2005 and 2009. 9.67% (n=1,816) of the journal articles analyzed were authored by a single author, 13.35% (n=2,507) by two authors, 15.63% (n=2,934) by three, 15.91% (n=2,987) by four, 13,02% (2,445) by five, 9,97% (n=1,872) by six and 22.43% (n=4,210) by more than six.

The journals from the *Medline* database were assigned 111 different broad subject terms. *Substance-Related Disorders* stands out as the subject term most assigned making up 23.18% of the total documents (n=4,632) published in 33 journals. This is followed by *Medicine*, which is assigned to 8.7% of the total documents (n=1,739) published in 237 journals, the *British Medical Journal* and the *Lancet* being the most productive within this category. *Psychiatry* is the third most assigned, 6.17% of then total documents (n=1,234) found in 132 journals, followed by *Gastroenterology*, with 5.25% of the total documents (n=1,049) in 72 journals; *Public Health*, 4.3% of the documents (n=859) 120 journals; and *Neurology*, 4.15%

of the documents (n=829) in188 journals. Another 14 subject terms (*Psychology*, *Behavioral Sciences*, *Neoplasms*, *Pediatrics*, *Epidemiology*, *Psychopharmacology*, *Nursing*, *Nutritional Sciences*, *Traumatology*, *Pharmacology*, *Health Services*, *Dentistry*, *Vascular Diseases* and *Internal Medicine*) accounted for just over 1% of documents each, which together totals 23.94% of all documents (Table 2). The final 24.3% of documents were distributed amongst the remaining 91 broad subject terms-.

As for the language of publication, 85.49% of the documents (n=20,603) were published in English; 2.81% (n=678) in German; 2.32% (n=559) in Spanish; and 2.14% (n=516) in French. Of the 4,111 documents exclusively found in the *Scopus* database, 64.85% of the documents (n=2,666) were published in English; 9.34% (n=384) in German; 5.98% (n=246) in Spanish; 5.32% (n=219) in French; 4.13% (n=170) in Chinese; and 2.26% (n=93) in Portuguese.

We identified 62,240 authors, responsible for 104,874 different names. 1.45% (n=902) of these authors published more than nine documents, and 77.04% (n=47,952) of the authors used a single name form when publishing. Table 3 shows the list of the 82 most productive authors (> 29 works), their affiliation, the number of documents published, the number of journals in which they have published, the journal in which they have published the greatest number of documents, and the collaboration index of each one. The great majority of authors who have authored over 29 documents (n=69 out of 82, 84.15%) have published more than 70% of their scientific production in the form of original articles, of which on average 20.89% were published in the most prolific journal.

The collaboration index is 4.35 ± 3.56 (mean ± SD) for the entire set of documents analyzed and 4.83 ± 3.7 if only original articles are taken into consideration. 15.67% (n=3,777) of the

documents analyzed were authored by a single author, 15.88% (n=3,827) by two authors, 15.58% (n=3,754) by three, 14.4% (n=3,471) by four, 11.3% (2,723) by five, 8.41% (2,028) by six, and 18.75% (4,520) by more than six (range 7-217; mean 9.41 ± DS 4.99). The documents published in journals from the fields of *Genetics* (Collaboration Index 7.99), *Neoplasms* (7.79), *Transplantation* (6.81), *Epidemiology* (6.32), and *Endocrinology* (6.03) have a greater degree of collaboration between authors, much higher than the average for the whole set of documents (4.66). The collaboration index of original articles in Substance-Related Disorders journals was 4.51.

Applying a threshold of 5 or more documents written in collaboration, we identified 383 research groups, made up of 1,933 authors. The largest group is made up of 309 authors, either linked to each other directly or through intermediaries. The next two largest groups are made up of 133 and 47 authors respectively. Twelve groups are made up of between 11 and 30 authors, and 368 groups are made up of between 2 and 9 researchers. Figure 1 shows the 3 largest groups as well as the groups in which any of the 82 authors with the highest productivity (> 29 works) have participated. The largest group (309 authors) is dominated by authors linked to institutions in the USA, though it does contain a subgroup of 4 German authors. The second largest group (133 authors) is dominated by European authors (Italian, French and Danish). The third largest group (43 authors) presents a more international character, with authors from the USA, Switzerland, the Netherlands, Australia and Canada. The 18 remaining groups, smaller in size, have a marked national character: 11 groups led by authors linked to institutions in the USA; three groups from Germany; and one group from each Austria, Australia, Japan and The Netherlands. Table 4 shows the groups identified by applying different collaboration thresholds or intensities.

DISCUSSION

The current study shows that research on alcohol (alcohol-drinking & alcohol-related problems) is a consolidated field, with about 4,820 documents published each year on average between 2005 and 2009 in *Medline*. Alcohol related publications have a marked multidisciplinary nature; only 1 out of 4 documents are published in journals focused on specific substance-related disorders. Most of articles are published in collaboration within various authors resulting in a collaboration index score of 4.3, and there is a tendency for increased number of participating authors in alcohol specific publications. Collaboration was common among researchers in the field of alcohol with 383 research groups being identified that share at least 5 publications on alcohol. In 9 out of 10 publications found in *Medline,* and in 6.5 out of 10 cases in *Scopus*, were write in English. *Scopus* included 20.51% additional references about alcohol-related disorders than did *Medline*. We also identified and analyzed the contents of 71.08% of documents published in journals specialized in substance-related disorders listed in the second edition of Publishing Addiction Science, as well as documents published in journals from specialties and fields outside of alcohol related research.

The research on alcohol consumption has been continuously increasing over the past few decades. A previous study, which analyzed publications on alcohol-related disorders indexed in *Medline* and *PsycInfo* databases, determined that 3,975 alcohol related documents were published on average each year between 1988 and 1989 (Sanson-Fisher, 2008). Another study found the number of articles on alcohol and substance abuse included in the PsycInfo database in the period 1976-2000 to be 29,986, increasing from 676 in 1976 to 1,783 in 2000 (Sánchez-Carbonell et al., 2005). Furthermore, in the period 1992-2003, 22,593 documents related to alcohol consumption were identified in the multidisciplinary databases Science

Citation Index and Social Sciences Citation Index, with an annual average of 1,918 articles in the period 2000-2003 (Rajendram et al., 2005). These values far below the annual average of documents observed in the present study, carried out in databases with wider coverage. A study from 1997, in which 35 English edited journals in the field of addictions were identified, estimated that around 1,700 works were published annually (Arciniega and Miller, 1997). In our study, the 13 journals which we identified as having the greatest number of published documents on alcohol research, all in the field of addictions, had more than double the number of articles on alcohol alone than in comparison to these previous studies. In fact, the number of publications about alcohol-related disorders that we identified is quite similar to the publications identified about tobacco use in the field of addiction as well as the number of publications in other fields, such as physical activity or public health (Falagas et al, 2006; Sanson-Fisher, 2008). The increasing output of scientific production in the field of alcohol research and its relatively high-level of output in comparison to research into other addictive substances reflect the existence of strong scientific activity and the maturity of the field.

Besides our findings that a significant level of articles are being produced in journals that specialized in the field of "Substance Related Abuse", we also found a notable level of dispersion of documents published in journals from numerous specialties and fields. We found that an important part of publications on alcohol and alcohol related disorders were published in journals of medicine, psychiatry, gastroenterology, public health and neurology. This evidences the fact that alcohol drinking and alcohol-related problems is a multidisciplinary field of study in which professionals from very diverse spheres participate. It also underscores that research in the area of alcohol drinking and alcohol-related problems is conducted in many different areas of research (basic, clinical or epidemiological studies,

etc), as well as the relationship between alcohol consumption and many disorders and their social consequences.

The present study also enabled us to confirm the increasing tendency for publications to have a collaborative authorship. A previous study, which analyzed publications on therapeutic communities indexed in Medline during the period 1987-1992, determined that 61% of the documents were authored by two or more authors (Nieminen and Isohanni., 1997). This figure rose to 68% in a study of the European scientific production on alcohol and substance abuse carried out using the PsycInfo database over the period 1976-2000 (Sánchez-Carbonell et al., 2005). In our study, we found that 84% of the identified documents were collaboratively authored.

The increasing tendency for the publication of collaborative work can also be seen in the journal level. As an example, that the collaboration index score of the Journal of Studies on Alcohol and Drugs is 4.51, which is a notable increase from the index score of 3.13 observed in the period 1990-91 (Howard and Walker, 1996). Our results show an average collaboration index score of 4.8 for journal articles published between 2005-2009, although the specialized medical journals, such as Neoplasms or Gastroenterology, tend to have higher score than journals from the fields of psychosocial or public health. The collaboration index score in Substance-Related Disorders journals (4.5) is similar to those observed in journals that specialize in the psychosocial or public health fields, such as Public Health (4.3) or Behavioral Sciences (4.2). This similarity between the fields reveals that Substance-Related Disorders has a strong social component.

The increase in collaboration can be attributed to factors including the inherent characteristics of the scientific system itself, which supports interaction between different fields and the development of bigger research projects through the benefits of productivity and citation. The collaboration index scores may also reflect the tendency in clinical science to list all of the research assistants, lab technicians and institutional officials who may not be scientists as authors thus accounting for the large amount of "collaboration" in these areas, though the actual number of real collaborators is small. This unjustified authorship, and its connection to the rise in collaboration, maybe due to the pressure to have publications (Fanelli, 2010; Kwok, 2005).

Scientific journals tend to bring together a nucleus of researchers who habitually publish in them. This does not mean, though, that these researchers tend to solely publish in a given journal. Our research shows that the scientific production of these researchers is distributed among a wide range of journals, both from their own specialty and from other related fields. Interestingly, we found that the most prolific authors publish in many journals, some of them outside the addiction field. This indicates a transdisciplinary nature to several studies and is a sign of success in the scientific performance as well as in international collaboration (Abramo et al., 2011). Thus, searches on a theme in a database such as Medline, and starting from such a control instrument of terminologies as MeSH, offer accurate results when identifying the scientific development of a field (Lowe and Barnett, 1994) beyond the searches carried out using a list of journals specialized in the field.

Independent of their institutional attachment, researchers who work in the same field, or who are dealing with the same scientific problem, often establish relationships of an informal nature with each other. This type of relationship sometimes acquires a formal character when

cooperation is established in order to develop research together, creating groups that are identifiable through the analysis of co-authorships. This is because the publication of results is an essential aspect in the scientific research process, ensuring the validation of the results and the dissemination and recognition of the work. The identification of the research groups in a particular journal, discipline, or country allows such aspects as structure, intensity of the relationship, and size of the research community to be determined. Yet, it must also be recognized that scientific journals serve a wider community of readers and professionals, a community that is sometimes called the "invisible college" (Edwards, 2006a, 2006b).

The network analysis that we carried to identify collaborative groups shows the existence of a large number of groups in the field of alcohol and the position occupied by the main researchers (> 29 works) in those groups. The larger of these collaborative groups are formed through the linking of researchers either directly or through intermediaries and must be seen as artifacts of the network analysis, which offers a general overview of collaboration structure in the field. The linkage to others through more than one researcher does not necessarily indicate an interaction between researchers, and some studies have pointed out that social interaction occurs more often through a short chain of contacts (Watts and Strogatz 1998). Yet, in our study we found that the most productive authors are those who have established a greater number of collaborative relationships with other authors, those who occupy central positions in their respective groups, and those who take on the role of intermediary.

The network analysis also reveals a marked national character of the collaborative groups of researchers. The authors of the same nationality have a tendency to be linked to each other directly and form the central nucleus linking different subgroups. American and European

researchers dominate these collaborative networks, which is also reflected in their dominance in the research environment and knowledge production as a whole.

Several studies have called attention to the lack of international representation, development, and diffusion of science being produced in developing countries. This is especially true in the fields of alcohol and alcohol-related problems research. Not a single author out of the 82 authors identified who have published more than 29 documents comes from a developing country. Our findings are confirmed by a study of publications on alcohol cited in the Science Citation Index and Social Sciences Citation Index databases in the period 1992-2003 showed that only 8% of publications came from countries outside of the USA, Canada, Western Europe, Australia, New Zealand, and Japan (Rajendram et al., 2005). Similarly, another study found that less than 10% of the documents published in Addiction in 1995 came from developing countries (Babor et al., 1996).Yet, alcohol-related problems are of great for developing countries, with 87% of the burden associated with this addictive behavior being carried by these areas (Obot, 2005; Rajendram et al., 2005). The lack of published research from these countries is concerning not only because of the under-representation of scientific output, but also because it shows a lack of research being conducted that addresses the concerns of places where the problems related to alcohol are most acute. It should be said that neither of the two journals from the addictions field edited in developing countries (African Journal of Drug and Alcohol Studies in Nigeria and the Jornal Brasileiro de Dependências Químicas in Brazil), are indexed in Medline (Babor et al., 2008).

The citation databases themselves have a significant language bias towards English. This is a reflection of the hegemonic nature of English as the language used to disseminate of scientific knowledge, especially in the field of biomedicine and basic research. The percentage of

articles written in English in *Pubmed* was 89.3% in the period between 1997-2006 (Valkimadi et al., 2009) and 90% in 2000 (Loria and Arroyo, 2005). These percentages are slightly above the 85.5% of publications on alcohol research written in English that we identified in our search of *Medline*. This is in sharp contrast to the 35% of documents written in other languages that we found in *Scopus* database, and demonstrates the English-centric nature of *Medline*. However, the fact that *Scopus*, which includes the most of the non-English language journals (indexing 12 non-English journal in comparison to Medline indexing 1 and ISI Web Knowledge indexing 2), is not a free access resource must be taken into account. This means that researchers, especially those from developing countries, may have limited access to non-English citations due to not having access to the *Scopus* database.

Ultimately, the lack of published documents in languages other than English could generate an important bias with respect to the diffusion of and access to knowledge in non-English-speaking countries. This in turn could cause, for instance, a selection of journals with respect to such criteria as academic profitability or that the professionals in the field cannot access publications referring to their geographical sphere published in foreign journals (Babor, 2006; Calafat, 2006; Edwards and Savva, 2002; Valderrama et al., 2004). An example of this can be found in how researchers choose to publish their findings. Some studies that have analyzed the publications on substance abuse in non-English-speaking countries have found that parts of research are published in journals of the language of the country while other part in journals in English. Thus, 39.2% of the works published by Spanish researchers on Substance Abuse in the period 1999-2004 were published in English language journals and edited in other countries, namely the USA and the UK. Practically the same percentage (39.3%) was observed with documents published by Portuguese researchers in the period 2002-2006 (González Alcaide et al., 2006; 2009).

These studies (González Alcaide et al., 2006; 2009) also show how research groups can be differentiated based on the language they tend to publish in. Research groups who tend to send their publications to national journals that publish in the language of the country are mainly clinical researchers from organizations whose predominant activity focuses on social welfare and not so much on the research itself and psychosocial researchers, who are more closely aligned with the geographic and cultural sphere of the community in which the research is carried out. On the other hand, research groups that habitually publish their research in English language journals are mainly aligned with universities and research centers that carry out basic research (González Alcaide, 2006; 2009; Mann, 2001).

Attempts are made to support and catalyze research in developing countries and to overcome the lack of international visibility of publications from non-English-speaking countries. The International Society of Addiction Journal Editors (ISAJE) have attempted to address this problem, together with other problems such as complying with the ethical criteria that should govern the scientific publications in this field, through such initiatives as the Publishing Addiction Research Internationally (PARINT) Project. PARINT provides the research community with different resources to facilitate the publication process (http://www.parint.org/). Similarly, several editors of the main journals in the field favor publications with international authorship, especially those from developing countries, by not rejecting works from non-English-speaking countries on purely linguistic grounds (Babor et al., 1996; Stenius and Savva, 2003).

The current study it is not exempt from limitations. First, we must mention that the two databases used for search, *Medline* and *Scopus*, do not cover all publications worldwide,

specially among non-speaking countries and the fact that we have analyzed journals included in *Medline* and *Scopus* databases during the study period, therefore the search did not include all journals which publish on this topic. Secondly, we have used alcohol-drinking and alcohol-related problems as the MeSH's for searching for documents, which possibly could have lead to missing some publications in the field. Thirdly, we measured the level of multidisciplinarity based on the number of publications in journals that are classified in different fields or specialties. A more accurate analysis may have been to conduct a content analysis of the articles. Finally, limited comparisons between the outputs of different studies can be made because of the different methodologies used by each study.

Future studies should focus on expanding the research begun in this study by identifying the main centers and networks of institutional collaboration in the field worldwide. They should also delve further into the evolution of the participation in alcohol related research by studying the signature countries where the research is carried out in order to determine geographical contributions to the field. Future researchers should also analyze the impact of the publications on the field of addictions and their relationship with other fields through studying the citation patterns of publications, as has been done for other fields such as tobacco addiction (Byrne and Chapman, 2005; De Granda et al., 2009).

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Figure Legend

Figure 1. Main research groups and most productive authors in works on alcoholism in the *Medline* and *Scopus* databases (2005-2009).

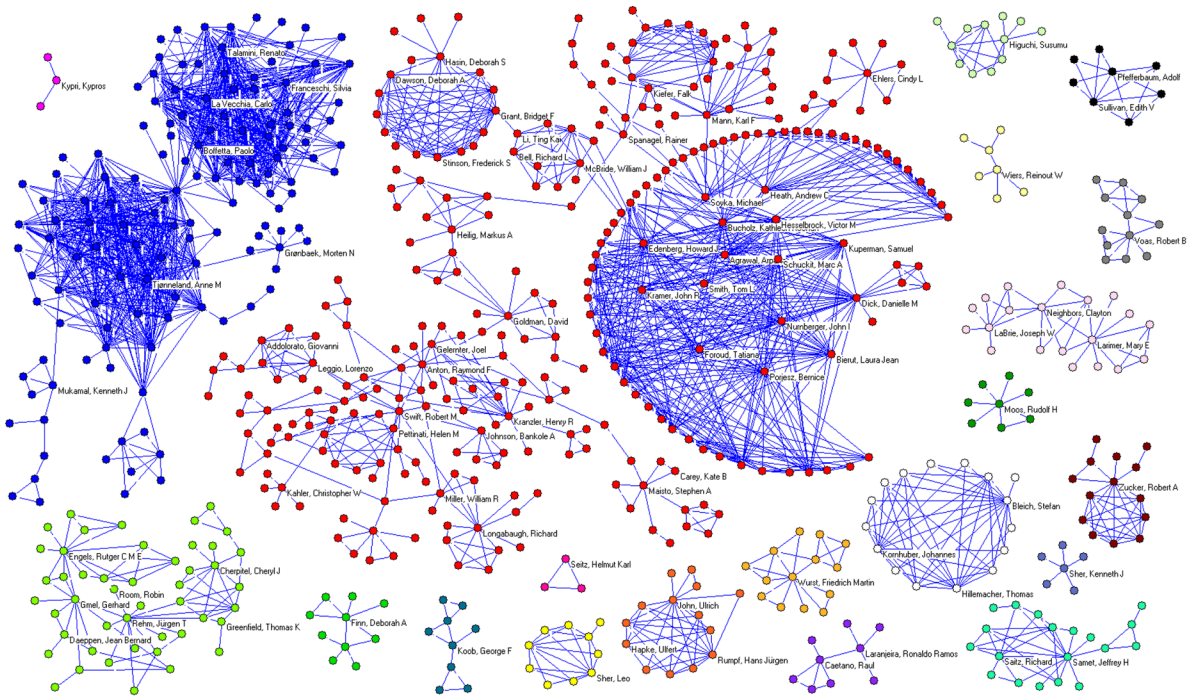

Table 1. Most productive journals (>49 works) on alcohol-related disorders and alcohol drinking from the *Medline* and *Scopus* databases (2005-2009).

Journal	Articles	Editorials	Reviews	Letters	Other documents	Total
Alcoholism, Clinical and Experimental Research	907	0	45	5	67	1,024
Addiction (Abingdon, England)	384	50	41	29	15	519
Addictive Behaviors	470	1	13	0	0	484
Alcohol and Alcoholism (Oxford, Oxfordshire)	414	4	40	11	4	473
Drug and Alcohol Dependence	351	4	6	0	0	361
Journal of Studies on Alcohol and Drugs	287	1	3	0	0	291
Journal of Studies on Alcohol*	189	7	19	6	0	221
Alcohol (Fayetteville, N.Y.)	187	2	20	0	6	215
Psychology of Addictive Behaviors	174	0	1	0	0	175
Substance Use & Misuse	164	0	8	1	0	173
Drug and Alcohol Review	97	8	27	2	1	135
Journal of Substance Abuse Treatment	117	0	11	0	0	128
The American Journal on Addictions	109	1	6	9	0	125
Psychopharmacology	105	0	4	7	2	118
Alcoholism Treatment Quarterly**	52	12	46	0	2	112
BMJ (Clinical Research ed.)	34	15	9	15	37	110
BMC Public Health	98	0	6	1	0	105
The American Journal of Drug and Alcohol Abuse	94	0	2	1	0	97
Accident; Analysis and Prevention	95	0	1	0	0	96
World Journal of Gastroenterology	65	1	28	1	0	95
International Journal of Cancer	82	0	1	3	0	86
Sucht**	35	18	18	3	11	85
Journal of American College Health	79	2	1	1	0	83
American Journal of Epidemiology	75	0	3	3	1	82
Japanese Journal of Alcohol Studies & Drug Dependence	56	0	24	0	2	82
Addiction Biology	55	3	22	0	0	80
Cancer Epidemiology, Biomarkers & Prevention	71	0	1	2	0	74
World Chinese Journal of Digestology**	57	0	16	0	0	73
BMC Genetics	71	0	0	0	0	71
Pharmacology, Biochemistry, and Behavior	62	0	8	0	0	70
Biological Psychiatry	68	0	0	2	0	70
Journal of Substance Use**	59	3	6	1	0	69
Journal of Gastroenterology and Hepatology	29	4	28		5	66
Lancet	22	7	4	25	8	66
The Journal of Adolescent Health	63	1	2	0	0	66
The Journal of Clinical Psychiatry	51	0	7	6	1	65
Journal of Hepatology	53	2	2	7	0	64
Adicciones***	42	5	15	0	2	64
Neuropsychopharmacology	63	0	0	0	0	63
Psychiatry Research	56	0	1	1	0	58
The Journal of Trauma	52	0	4	1	1	58
International Journal of Epidemiology	51	1	1	3	2	58
Hepatology Research**	46	3	6	2	0	57
Pediatrics	40	2	8	4	2	56
Substance Abuse	45	3	7	1	0	56
Gastroenterology	45	5	0	5	0	55
The American Journal of Psychiatry	41	3	2	9	0	55
Journal of Affective Disorders	51	0	3	0	0	54
American Journal of Public Health	50	1	1	2	0	54

Hepatology (Baltimore, Md.)	36	3	6	9	0	54
European Addiction Research	53	0	1	0	0	54
Transplantation Proceedings	53	0	0	0	0	53
Archives of General Psychiatry	47	0	1	5	0	53
The American Journal of Clinical Nutrition	46	3	2	0	0	51

* Continued by Journal of Studies on Alcohol and Drugs since 2007. ** Journals not currently indexed in Pubmed. *** Journal indexed in Pubmed since 1997.

Table 2. Distribution by specialties (>1% of documents) of the journals that have published works on alcohol-related disorders and alcohol drinking from the *Medline* database (2005-2009).

Specialty/field	**Number of journals**	**CI (orig. arts.)**	**Number of documents**	**% of documents**
Substance-Related Disorders	33	4.51	4632.5	23.18
Medicine	237	3.92	1739.92	8.7
Psychiatry	132	5.36	1234.25	6.17
Gastroenterology	72	6.76	1049.83	5.25
Public Health	120	4.29	859.5	4.3
Neurology	188	5.36	829.58	4.15
Psychology	110	3.96	595.92	2.98
Behavioral Sciences	57	4.16	526.25	2.63
Neoplasms	82	8.33	456.67	2.28
Pediatrics	82	4.15	441	2.21
Epidemiology	31	6.54	397.33	1.99
Psychopharmacology	19	5.25	384.5	1.92
Nursing	125	2.52	332.5	1.66
Nutritional Sciences	63	6.28	299.83	1.5
Traumatology	22	3.95	266.5	1.33
Pharmacology	94	4.84	237.83	1.19
Health Services	64	3.48	227	1.13
Dentistry	77	4.36	218.83	1.09
Vascular Diseases	60	6.51	200.92	1
Internal Medicine	19	6.28	200.67	1

CI: Collaboration index (mean number of authors per paper)

Table 3. Most productive authors (>29 works) on alcohol-related disorders and alcohol drinking from the *Medline* and *Scopus* databases (2005-2009).

Author	Affiliation	N documents	N docs (orig. arts.)	N different journals	Journal/s in which the largest number of documents published	N docs.	CI±SD	CI±SD (orig. arts.)
Schuckit, Marc A	University of California, San Diego, USA	80	72	27	Alcoholism, Clinical and Experimental Research	22	9.7±5.76	10.29±5.67
Rehm, Jürgen T	University of Toronto, Canada	79	57	41	Addiction (Abingdon, England)	16	4.35±2.13	4.84±2.14
Mann, Karl F	Universität Heidelberg, Germany	73	51	40	Alcoholism, Clinical and Experimental Research	8	7.16±5.46	8.49±5.53
Soyka, Michael	Ludwig-Maximilians University, Germany	70	50	40	Fortschritte der Neurologie-Psychiatrie	7	5.71±5.69	6.82±5.94
Bucholz, Kathleen Keenan	Washington University in St. Louis, USA	68	64	21	Alcoholism, Clinical and Experimental Research	15	9.63±4.46	9.61±4.51
Grant, Bridget F	National Institute on Alcohol Abuse and Alcoholism, USA	65	63	14	Drug and Alcohol Dependence	15	5.6±3.1	5.59±3.1
Kranzler, Henry R	University of Connecticut Health Center, USA	64	55	28	Alcoholism, Clinical and Experimental Research	12	6.51±3.5	7.04±3.33
Sher, Leo	Columbia University, USA	59	31	18	International Journal of Adolescent Medicine and Health	21	3.68±2.97	5.42±3.05
Grønbaek, Morten N	National Institute of Public Health, Denmark	58	53	39	Addiction (Abingdon, England)	5	5.07±1.68	5.32±1.46
Hesselbrock, Victor M	University of Connecticut Health Center, USA	55	50	24	Alcoholism, Clinical and Experimental Research	11	11.24±5.59	11.74±5.53
Gmel, Gerhard	Swiss Institute for the Prevention of Alcohol and Drug Problems, Switzerland	54	50	31	Addiction (Abingdon, England)	7	4.57±2.15	4.66±2.21
Neighbors, Clayton	University of Houston, USA	53	51	13	Journal of Studies on Alcohol and Drugs	14	4.77±1.7	4.78±1.66
Edenberg, Howard J	Indiana University School of Medicine, USA	53	48	26	Alcoholism, Clinical and Experimental Research	10	12.3±5.81	13.14±5.35
Bierut, Laura Jean	Washington University in St. Louis, USA	51	48	22	Alcoholism, Clinical and Experimental Research	13	11.51±6.57	12.02±6.42
Bleich, Stefan	Hannover Medical School, Germany	51	38	23	Alcoholism, Clinical and Experimental Research	8	6.78±2.64	7.31±1.69
John, Ulrich	University of Greifswald, Germany	50	48	28	Alcohol and Alcoholism (Oxford, Oxfordshire)	7	6.24±1.68	6.31±1.68
La Vecchia, Carlo	Mario Negri Institute for Pharmacological Research, Italy	49	37	22	International Journal of Cancer	8	10.52±10.74	12.65±11.56
Larimer, Mary E	University of Washington, USA	48	46	16	Addictive Behaviors	12	5.71±1.99	5.83±1.93
Hasin, Deborah S	Columbia University, USA	48	42	18	Drug and Alcohol Dependence	10	5.35±2.53	5.55±2.49
Rumpf, Hans Jürgen	Universität zu Lübeck, Germany	47	42	23	Sucht	8	5.66±2	6.02±1.7
Caetano, Raul	University of Texas School of Public Health, USA	47	36	20	Addiction (Abingdon, England)	9	4.17±3.78	3.83±1.38
Heath, Andrew C	Washington University in St. Louis, USA	47	46	21	Alcoholism, Clinical and Experimental Research	9	7.72±2.83	7.83±2.77
Anton, Raymond F	Medical University of South Carolina, USA	46	33	23	Alcoholism, Clinical and Experimental Research	13	7.5±6.5	7.33±4.38
Goldman, David	National Institute on Alcohol Abuse and Alcoholism, USA	46	37	21	Alcoholism, Clinical and Experimental Research	12	7.78±4.42	8.73±4.36
Saitz, Richard	Boston University School of Medicine, USA	45	39	29	Alcoholism, Clinical and Experimental Research	5	5.47±2.19	5.95±1.85

					Journal of General Internal Medicine			
Sher, Kenneth J	University of Missouri, USA	45	38	17	Psychology of Addictive Behaviors	11	4.27±3.14	3.6±2.01
Moos, Rudolf H	Stanford School of Medicine, USA	45	41	15	Alcoholism, Clinical and Experimental Research Drug and Alcohol Dependence	7	3.22±1.14	3.22±0.96
Engels, Rutger C M E	Radboud University, The Netherlands	45	39	20	Addictive Behaviors	10	4.6±1.17	4.64±1.06
Samet, Jeffrey H	Boston University School of Medicine, USA	44	40	27	Journal of General Internal Medicine	5	6.43±2.38	6.62±2.19
Kornhuber, Johannes	Universitätsklinikum Erlangen (University of Erlangen), Germany	44	36	20	Alcoholism, Clinical and Experimental Research	8	7.36±2.2	7.47±1.48
Swift, Robert M	Brown University, USA	43	27	21	Alcoholism, Clinical and Experimental Research	11	7.42±5.09	9.52±5.13
Porjesz, Bernice	SUNY Health Sciences Center, USA	43	39	21	Alcoholism, Clinical and Experimental Research	6	12.65±6.48	13.64±5.94
Voas, Robert B	Pacific Institute for Research and Evaluation, USA	42	38	14	Traffic Injury Prevention	11	4.14±1.44	4.31±1.38
Room, Robin	University of Melbourne, Australia	42	26	19	Addiction (Abingdon, England)	14	3.12±2.57	3.31±2.87
Boffetta, Paolo	International Agency for Research on Cancer, France (since 2009 Mount Sinai School of Medicine, USA)	42	37	21	International Journal of Cancer	7	17.33±15.86	19.32±15.87
Mukamal, Kenneth J	Beth Israel Deaconess Medical Center (Harvard Medical School), USA	42	36	31	Alcoholism, Clinical and Experimental Research American Heart Journal Circulation	3	5.02±2.71	5.47±2.52
Maisto, Stephen A	Syracuse University, USA	42	36	17	Addictive Behaviors Journal of Consulting and Clinical Psychology Journal of Studies on Alcohol and Drugs	6	4.31±1.99	4.53±1.99
Hillemacher, Thomas	Hannover Medical School, Germany	42	31	19	Alcohol and Alcoholism (Oxford, Oxfordshire)	7	7.07±2.55	7.71±1.29
Nurnberger, John I	Indiana University School of Medicine, USA	41	41	19	Alcoholism, Clinical and Experimental Research	8	13.15±5.25	13.15±5.25
Laranjeira, Ronaldo Ramos	Universidade Federal de São Paulo, Brazil	41	30	20	Revista Brasileira de Psiquiatria (São Paulo, Brazil : 1999)	10	3.9±1.56	4.17±1.51
Sullivan, Edith V	Stanford University, USA	40	35	18	Alcoholism, Clinical and Experimental Research	10	5.12±2.76	5±2.21
Pfefferbaum, Adolf	Stanford School of Medicine, USA	40	36	17	Alcoholism, Clinical and Experimental Research	11	5.1±2.8	4.89±2.28
LaBrie, Joseph W	Loyola Marymount University, USA	40	40	11	Addictive Behaviors	19	3.67±1.25	3.67±1.25
Dick, Danielle M	Virginia Commonwealth University, USA	39	36	19	Alcoholism, Clinical and Experimental Research	11	11.46±5.48	12.17±5.08
Dawson, Deborah A	National Institute on Alcohol Abuse and Alcoholism, USA	38	38	11	The Journal of Clinical Psychiatry	8	6±2.85	6±2.85
Li, Ting Kai	National Institute on Alcohol Abuse and Alcoholism, USA	38	26	25	Alcoholism, Clinical and Experimental Research	9	4.89±2.75	5.61±2.68
Zucker, Robert A	University of Michigan Health System, USA	37	30	20	Alcoholism, Clinical and Experimental Research	7	5.78±3	5.77±2.99
Higuchi, Susumu	National Hospital Organization Kurihama Alcoholism Center, Japan	37	26	21	Psychiatria et Neurologia Japonica	8	6±3.14	7±2.86
Spanagel, Rainer	Central Institute of Mental Health, Germany	36	29	26	Addiction Biology	4	6.58±6.24	7.52±6.6
Stinson, Frederick S	National Institute on Alcohol Abuse and Alcoholism, USA	36	36	10	The Journal of Clinical Psychiatry	11	6.22±2.6	6.22±2.6
Wiers, Reinout W	Maastricht University, The Netherlands	36	32	17	Addictive Behaviors	9	4.14±1.82	3.97±1.77

Addolorato, Giovanni	Catholic University of Rome, Italy	36	17	24	Alcoholism, Clinical and Experimental Research	5	7.28±3.33	9.65±3.06
Kuperman, Samuel	University of Iowa Hospitals and Clinics, USA	36	33	15	Alcoholism, Clinical and Experimental Research	7	13.83±5.12	14.18±5.05
Koob, George F	The Scripps Research Institute, USA	36	26	21	Alcoholism, Clinical and Experimental Research	8	5.19±4	5.85±4.49
Kypri, Kypros	University of Newcastle, Australia	36	27	18	Addiction (Abingdon, England)	7	3.78±1.49	3.96±1.4
Franceschi, Silvia	International Agency for Research on Cancer, France	36	33	14	International Journal of Cancer	10	13.44±11.41	14.12±11.7
Pettinati, Helen M	University of Pennsylvania, Brazil	35	24	16	Alcoholism, Clinical and Experimental Research	6	6.11±3.84	7.17±3.97
Longabaugh, Richard	Brown University, USA	35	23	16	Journal of Studies on Alcohol	7	6.17±4.33	6.43±4.68
Ehlers, Cindy L	The Scripps Research Institute, USA	35	32	19	Alcohol (Fayetteville, N.Y.) Alcoholism, Clinical and Experimental Research	4	4.4±2.2	4.34±1.98
Hapke, Ulfert	University of Greifswald, Germany	35	34	19	Alcohol and Alcoholism (Oxford, Oxfordshire)	6	6.08±1.72	6.12±1.74
Kiefer, Falk	Central Institute of Mental Health, Germany	35	20	24	Addiction Biology Alcohol and Alcoholism (Oxford, Oxfordshire) Alcoholism, Clinical and Experimental Research Pharmacopsychiatry	3	5±4.69	6.45±5.62
McBride, William J	Indiana University School of Medicine, USA	34	31	14	Alcohol (Fayetteville, N.Y.) Alcoholism, Clinical and Experimental Research	8	7.47±2.13	7.61±2.14
Foroud, Tatiana	Indiana University School of Medicine, USA	34	32	14	Alcoholism, Clinical and Experimental Research	8	13.03±5.19	13.56±4.82
Greenfield, Thomas K	Public Health Institute, California, USA	34	30	15	Alcoholism, Clinical and Experimental Research	9	3.91±1.62	4.03±1.63
Heilig, Markus A	National Institute on Alcohol Abuse and Alcoholism, USA	34	29	20	Addiction Biology	4	7.85±5.56	7.86±4.04
Talamini, Renato	Università degli Studi di Padova, Italy	33	30	14	Cancer Epidemiology, Biomarkers & Prevention	10	17.39±13.58	18.57±13.7
Miller, William R	University of New Mexico, USA	33	18	19	Journal of Studies on Alcohol	6	5.18±3.92	6.17±4.6
Carey, Kate B	Syracuse University, USA	33	28	14	Psychology of Addictive Behaviors	8	3.45±1.6	3.39±1.66
Johnson, Bankole A	University of Virginia, USA	33	19	20	Alcoholism, Clinical and Experimental Research	9	7.24±6.64	7.47±5.12
Wurst, Friedrich Martin	Paracelsus Medical University, Austria	32	26	14	Alcoholism, Clinical and Experimental Research	7	8.5±5.36	7.5±1.92
Agrawal, Arpana	Washington University, USA	32	30	15	Alcoholism, Clinical and Experimental Research	7	8.16±4.95	8.47±4.95
Kramer, John R	University of Iowa Hospitals and Clinics, USA	32	30	13	Alcoholism, Clinical and Experimental Research	9	12.03±4.56	11.97±4.64
Kahler, Christopher W	Brown University, USA	32	30	16	Addictive Behaviors Alcoholism, Clinical and Experimental Research	4	5.94±3.05	5.6±2.36
Tjønneland, Anne M	Institute of Cancer Epidemiology, Denmark	31	31	20	European Journal of Clinical Nutrition	4	20.16±16.84	20.16±16.84
Cherpitel, Cheryl J	Alcohol Research Group (ARG), Public Health Institute, USA	31	27	19	Journal of Studies on Alcohol and Drugs	4	5.26±2.95	5.63±2.83
Daeppen, Jean Bernard	University of Lausanne, Switzerland	31	24	18	Revue Médicale Suisse	8	4.68±2.38	5.29±2.31
Leggio, Lorenzo	Catholic University of Rome, Italy (since 2007 Brown University Center for Alcohol and Addiction Studies, USA)	31	14	23	Alcoholism, Clinical and Experimental Research	6	6.35±2.96	7.93±3.27
Gelernter, Joel	Yale University, USA	31	29	15	Alcoholism, Clinical and Experimental Research	6	7.42±2.87	7.59±2.78

Seitz, Helmut Karl	University of Heidelberg, Germany	30	12	23	Alcoholism, Clinical and Experimental Research	7	5.1±3.71	8.17±3.61
Smith, Tom L	University of California, San Diego, USA	30	29	13	Alcoholism, Clinical and Experimental Research	9	6.33±3	6.21±2.97
Bell, Richard L	Indiana University School of Medicine, USA	30	24	11	Alcoholism, Clinical and Experimental Research	9	7.93±3.35	8.12±3.5
Finn, Deborah A	Oregon Health & Science University, USA	30	26	17	Alcoholism, Clinical and Experimental Research	9	6.57±3.38	6.61±3.59

N docs (orig. arts.): Number of documents counting only the documentary typology "journal article";
N different journals: Number of journals in which the author has published at least one document;
N docs: Number of documents in the journal in which the author has published the greatest number of documents;
CI±SD Collaboration Index ± Standard Deviation: mean number of authors per document;
CI±SD (orig. arts.) Collaboration Index ± Standard Deviation: mean number of authors per article.

Table 4. Research groups on alcoholism identified in the *Medline* and *Scopus* databases applying different collaboration thresholds (2005-2009).

Collaboration threshold	**Number of groups**	**Number of authors**	**Number of authors in largest group**
≥ 1	5,450	60,154	32,982
≥ 2	1,424	11,273	5,249
≥ 3	803	5,146	1,680
≥ 4	529	3,007	864
≥ 5	383	1,933	309
≥ 6	296	1,318	125
≥ 7	234	969	56
≥ 8	183	714	45
≥ 9	160	565	40
≥ 10	123	431	39