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INTEGRATIVE REVIEW ARTICLE

STRESS AND CORTISOL RELATIONSHIP IN POLICE FORCES: BIBLIOMETRIC ANALYSIS WITH APPLICABILITY OF THE SOPHIE PROGRAM RELAÇÃO ESTRESSE E CORTISOL NAS FORÇAS POLICIAIS: ANÁLISE BIBLIOMÉTRICA COM APLICABILIDADE DO PROGRAMA SOPHIE RELACIÓN ESTRÉS Y CORTISOL EN LAS FUERZAS POLICIALES: ANÁLISIS BIBLIOMÉTRICO CON APLICABILIDAD DEL PROGRAMA SOPHIE

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ABSTRACT

Objective: to analyze the scientific evidences about the relationship between stress and cortisol in the police forces. **Method:** bibliometric analysis performed in 34 articles available online, from 2005 to 2015, on the basis of SCOPUS data, Science Direct, Web of Science, PubMed Central® (PMC), CINAHL and the Cochrane Library, selected through the Sophie Program and analyzed by simple descriptive statistics. **Results:** there was a predominance of quantitative research, level of evidence four, with emphasis on the journal Biological Psychiatry in the interdisciplinary area, with the United States of America / USA being the most published country. It was found predominance of the English language and qualis CAPES or Impact Factor equivalent to A1. **Conclusion:** few countries investigate the association of stress and cortisol in police officers. From this study, we suggest future research about work stress in police, including interventions for the control of work stress. **Descriptors:** Stress; Occupational Health; Qualitative Research; Bibliometrics; Nursing.

RESUMO

Objetivo: analisar as evidências científicas acerca da relação estresse e cortisol nas forças policiais. **Método:** análise bibliométrica realizada em 34 artigos disponíveis on-line, no período de 2005 a 2015, nas bases dados SCOPUS, Science Direct, Web of Science, PubMed Central® (PMC), CINAHL e Biblioteca Cochrane, selecionados por meio do Programa Sophie e analisados pela estatística descritiva simples. **Resultados:** houve predomínio de pesquisas quantitativas, nível de evidência quatro, com destaque ao periódico Biological Psychiatry na área interdisciplinar, sendo os Estados Unidos da América/EUA o país que mais publicou. Constatou-se predomínio da língua inglesa e qualis CAPES ou Fator de impacto equivalente a A1. **Conclusão:** poucos países pesquisam a associação de estresse e cortisol em policiais. A partir deste estudo, sugerem-se pesquisas futuras acerca do estresse laboral em policiais, incluindo intervenções para o controle de estresse laboral. **Descritores:** Estresse; Saúde do Trabalhador; Pesquisa Qualitativa; Bibliometria; Enfermagem.

RESUMEN

Objetivo: analizar las evidencias científicas acerca de la relación estrés y cortisol en las fuerzas policiales. **Método:** análisis bibliométrico realizado en 34 artículos disponibles online, en el período de 2005 a 2015, en las bases datos SCOPUS, Science Direct, Web of Science, PubMed Central® (PMC), CINAHL y Biblioteca Cochrane, seleccionados a través del Programa Sophie y analizados por la estadística descriptiva simple. **Resultados:** hubo predominio de investigaciones cuantitativas, nivel de evidencia cuatro, con destaque al periódico Biological Psychiatry en el área interdisciplinaria, siendo los Estados Unidos de América / EE.UU. el país que más publicó. Se constató predominio de la lengua inglesa y qualis CAPES o Factor de impacto equivalente a A1. **Conclusión:** pocos países investigan la asociación de estrés y cortisol en policías. A partir de este estudio, se sugieren investigaciones futuras acerca del estrés laboral en policías, incluyendo intervenciones para el control de estrés laboral. **Descriptor:** Estrés; Salud Laboral; Investigación Cualitativa; Bibliometría; Enfermería.

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INTRODUCTION

As a mechanism for coping with everyday challenges in search of success or meeting the demands and parameters imposed by contemporary society and work, the human organism tries to maintain the homeostatic balance from psychic and physiological devices, a state known as stress¹, a "psychological reaction" to "stimuli that can lead to physical, mental and/or chemical changes to the organism."²

Stress manifests itself, initially, through physiological signs and symptoms such as excessive sweating, tachycardia, muscle tension, gastrointestinal problems, hypertension, bruxism, hyperactivity, pressure disorders, nausea, among others.³

The body responds daily, to positive and negative stimuli, internal or external, which can be considered as sources of triggering stress with activation. At the same time, and then simultaneously activation of the sympathetic system occurs to reestablish its equilibrium. However, when the individual is constantly exposed to stressful situations, in a continuous alert phase, the body's homeostasis is impaired, causing the body systems to remain mobilized to compensate for this state, constituting a risk factor for several pathologies, those that affect the cardiovascular system.²

As a chemical response to the stressor event, the body secretes some steroid hormones, known as glucocorticoids, such as cortisol, that is closely related to the stress process. It acts as a catabolizer for glucose, fats, and tissue proteins to supply and get energy from stressful situations. In adults, cortisol values remain in balance with the circadian rhythm, being at higher levels in the morning and decreasing throughout the day.⁴ However, chronic stress prolongs the elevation of cortisol levels throughout the day causing negative effects on to health.⁵

Regarding the health of the worker, regarding the occupational stress, that involves the work processes, it can be considered as situations that threaten the professional satisfaction, his physical and mental health, suffered by the worker in the working environment.⁶ The authors reinforce that the stressors are capable of harming the interaction of the professional with the work environment, as well as with the work colleagues.

Among the various classes of workers, among those with the greatest risk of illness and death, are the police. The illness, in the police, is considered superior to that of other

professional classes, due to the internal relations, the work overload and the character of the activities that carry out.⁷

Police are exposed to influences from many factors that can lead to extreme stress, physical fatigue and emotional imbalance leading these professionals to act on impulse, during times of crisis and difficult situations, and compromise the effectiveness and performance of professional exercise, and the population to potential hazards.⁸

In view of the above, the following guiding question emerged: What is the bibliometric profile of the scientific production about the relationship between stress and cortisol in police forces using the Sophie program?

OBJECTIVE

- To analyze the scientific evidence on the relationship between stress and cortisol in police forces.

METHOD

Bibliometric study, using the quantitative analysis of publications to subsidize the formulation of scientific and technological research. The bibliometric analysis aims to contribute to the identification of progress in scientific production in a given text and period, representing studies in the different areas of knowledge, as well as promoting the development of increasingly reliable parameters for evaluation of literature behavior.⁹⁻¹⁰

In addition, the Sophie Program was used as a search tool, which is presented on the Internet site of Brazilian nationality, duly registered at the Information and Coordination Nucleus of the BR Place (NIC BR), on 08/18/2014, whose domain name is "programasophie.com.br", whose purpose is to serve as a tool for conducting scientific research in the modality of integrative review.

In the Sophie Program, texts published between January 2005 and December 2015 were considered; available in Portuguese, English and Spanish; national and international publications in the form of a scientific article (experience reports, integrative literature reviews, original articles); available online, in complete copy, free of charge; that deal with the relationship between stress and cortisol in police officers. The exclusion criteria were based on animal studies and texts in which the stress and cortisol relationship in police officers was not found (fugue of the topic), confirming the

total of articles located in the databases and imported to Sophie.

For the development of this research, six stages were used: the identification of the theme and the selection of the research question for the elaboration of the integrative review; the establishment of criteria for inclusion and exclusion of studies; the definition of information to be extracted from the selected studies; the evaluation of the studies included in the review; the interpretation of the results and the presentation of the synthesis of knowledge, 11 with the identification of the relationship between stress and cortisol in police officers.

Inclusion criteria were those published between January 2005 and December 2015; available in Portuguese, English and Spanish; national and international publications in the form of a scientific article (experience reports, integrative literature reviews, original articles); available online, in complete copy, free of charge; that deal with the relationship between stress and salivary cortisol in police officers.

The exclusion criteria were based on the works of conclusion of course, monographs, theses and dissertations; duplicate articles; publication format such as book / book chapters; conference proceedings and summaries; research reports, letters, editorials, reviews; government publications; animal studies; and the texts in which were not found relation stress and cortisol in police (flight of the subject).

To answer the guiding question (What is the bibliometric profile of the scientific production about the stress and cortisol relationship in the police forces using the Sophie program?), The Health Sciences Descriptors (HSD) were used: Stress, Police, Cortisol, using the Operator Boolean "AND".

As a tool for searching the bibliographies, the following databases were used: SCOPUS (Elsevier); Science Direct (Elsevier); Web of Science - Main Collection (Thomson Reuters Scientific); PubMed Central® (PMC); Cumulative Index to Nursing and Allied Health Literature (CINAHL, Ebsco) and Cochrane Library: BVS (Bireme) which includes: Medical Literature Analysis and Retrieval System online (MEDLINE); Scientific Electronic Library Online (SciELO); Latin American and Caribbean Literature in Health Sciences (LILACS); Nursing Database (BDENF).

The first stage occurred from the following moments: search of the works in cited database; importation of the articles into the Sophie Program and, by means of this, the definition of the inclusion and exclusion

criteria; individual reading of the titles and abstracts of all the works found with the association of the selected descriptors; organization of the articles in folders identified according to the inclusion and exclusion criteria respectively; review of the selected studies.

In the second stage, two researchers independently read the articles, and the works excluded by both were removed from the following stages, while the works included in the inclusion criteria integrated the basis of this integrative review.

In order to contemplate the ethical aspects, the authorship of the researched articles was assured by citing, and referencing the articles according to the norms of the Brazilian Association of Technical Norms (BATN).

An integrative review protocol was developed for this study, considering the human resources involved and the participation of each researcher; guiding question of the study; objectives and design of the study; inclusion and exclusion criteria; search strategies of the manuscripts with descriptors and databases to be searched; detailed description of the search, selection and organization of selected studies; analysis and dissemination of results. This protocol was validated by two researchers in the area of worker health.

After the validation of the protocol, the researchers searched the databases, applying the inclusion and exclusion criteria, resulting in 1,320 articles, which were imported into the Sophie program.

In the sequence, a folder was created in the Sophie program identified as "stress and cortisol in police", reapplied the inclusion criteria and defined the exclusion criteria, confirming selected articles (N-1,320), thus distributed: VHL (n-32); Scopus (n-43); Science Direct (n-749); PubMed (n-437); CINAHL (n-6) and Web of Science (n-53).

The authors independently read the titles and abstracts, separating them into folders in the Sophie program identified: Association stress and cortisol in police officers (n-37); Theme Escape (n-853); Duplicate articles (n-165); Language Leak (n-7); Minutes and event / congress summary (n-56); Chapter of book (n-110); Study with police animals (n-94).

The researchers read the articles selected in full and discarded three papers because they did not present an association between stress and cortisol in police officers. The articles included in this bibliometric analysis (n-34) had their data transcribed for the

"Form for recording information extracted and analysis of articles", which includes data of identification of publication; methodological characteristics; level of evidence and results. The analysis of the results was done by the technique of Content Analysis to identify the association between stress and salivary cortisol in police officers. In order to contemplate the ethical aspects, the authorship of the researched articles was assured, through citation and reference of the authors.

RESULTS AND DISCUSSION

Bibliometrics is constituted by a set of laws and empirical principles that contribute to establish the theoretical foundations of information science encompassing all the studies that try to quantify the processes of written communication. It can be affirmed that it favors the visualization of researches in the most diverse areas analyzing the quantitative aspects of the production, dissemination and use of the registered information. These studies quantify, describe, and provide prognoses related to the written communication process.¹²

Thus, based on bibliometrics, when analyzing the quantitative aspects involving the findings in the databases that presented periodicals with information about the relationship between stress and cortisol from the final sample of the study, which consisted of 34 articles related to the focus of the study. research, an article (2.94%) was found in the VHL database; 13 (38.24%) in SCOPUS; four (11.76%) in Science Direct; seven (20.59%) in PubMed; two (5.88%), CINAHL and seven (20.59), in the Web of Science.

Scientific journals in Brazil are classified from QUALIS periodicals, a model created by the Coordination of Improvement of Higher Level Personnel (CAPES) used in the dissemination of the intellectual production of *Stricto sensu* graduate programs (masters and doctorates) in the country. At present, CAPES evaluates its journals from the classification in seven strata: A1, A2, B1, B2, B3, B4, B5 and C, where the stratum A1 is assigned the highest weight (100) and, to stratum C, the lowest value (zero). The importance of the classification of journals in QUALIS / CAPES as influential on where the researcher should publish their studies is emphasized.¹³

Thus, in the classification by QUALIS, based on the stratification of quality of intellectual productions used by CAPES, it was verified that, of the articles selected for this study, ¹¹

of them were published in journals identified as QUALIS CAPES A1;¹⁴⁻²⁴ two articles with periodicals in the category QUALIS CAPES A2;²⁵⁻²⁶ five identified as QUALIS CAPES B1;²⁷⁻³¹ and two in QUALIS B2.³²⁻³³

Some journals are not classified by QUALIS, so this is a categorization made only here in Brazil. Thus, important information for the analysis of scientific production is the impact of scientific publications. The impact factor demonstrates the number of times articles in a journal are cited. The citations, in general, imply that a more cited work should have greater relevance or greater impact for the area in which it is inserted. This is measured by the Institute for Scientific Information (ISI), where pre-determined criteria are required and updated annually.¹²

No articles were published in periodicals with impact factor referring to A1. Three articles were published in journals with impact factor equivalent to A2.³⁴⁻³⁶ five were published in journals with impact factor equivalent to B1³⁷⁻⁴¹ and six articles were equivalent to journals in journals B2.⁴²⁻⁴⁷

The articles included in this review were duly referenced and are presented in figure 1 in ascending chronological order.

Ano	Author (s)	Level of evidence	Journal	Qualis/ fat. Impac	Title	Databases
2005	Otte, Neylan, Pole, Metzler, Best, Henn-Haase, Yehuda, Marmar15	4	Biological Psychiatry	A1	Association between childhood trauma and catecholamine response to psychological stress in police academy recruits	PubMed Central
2005	Neylan, Brunet, Pole, Best, Metzler, Yehuda, Marmar21	4	Psychoneuro endocrino-logy	A1	PTSD symptoms predict waking salivary cortisol levels in police officers	Scopus
2006	Lindauer, Olff, Meijel, Carlier, Gersons17	4	Biological Psychiatry	A1	Cortisol, learning, memory, and attention in relation to smaller hippocampal volume in police officers with posttraumatic stress disorder	Scopus
2006	Zefferino, Facciorusso, Lasalvia, Narciso, Nuzzaco, Lucchini, L'Abbate45	4	Giornale Italiano di Medicina del Lavoro ed Ergonomia	0,12 = B2	Salivary markers of work stress in an emergency team of urban police (1^ o step)	Scopus
2006	Violanti, Burchfiel, Miller, Andrew, Dorn, Wactawski-Wende, Beighley, Pierino, Joseph, Vena, Sharp, Trevisan33	3	Annals of Epidemiology	B2	The buffalo cardio-metabolic occupational police stress (BCOPS) pilot study: methods and participant characteristics	Scopus
2007	Regehr, LeBlanc, Jelley, Barath, Daciuk35	6	The Canadian Journal of Psychiatry	2,952= A2	Previous trauma exposure and PTSD symptoms as predictors of subjective and biological response to stress	Scopus
2007	Fekedulegn, Andrew, Burchfiel, Violanti,Hartley, Charles, Miller34	2	Psychosomat ic Medicine	3,698= A2	Area under the curve and other summary indicators of repeated waking cortisol measurements	Scopus
2007	Violanti, Andrew, Burchfiel, Hartley, Charles, Miller43	4	An International Journal of Police Strategies & Management	0,761= B2	Post-traumatic stress symptoms and cortisol patterns among police officers	Web of Science
2008	Regehr, LeBlanc, Jelley, Barath37	4	Stress and Health	1,926= B1	Acute stress and performance in police recruits	Scopus
2009	Arnetz, Nevedal, Lumley, B ackman, Lublin46	4	Journal of Police and Criminal Psychology	0,88= B2	Trauma resilience training for police: Psychophysiological and performance effects	Scopus
2009	Violanti, Burchfiel, Fekedulegn, Andrew, Dorn, Hartley, Charles, Miller25	4	Psychiatry Research	A2	Cortisol patterns and brachial artery reactivity in a high stress environment	Scopus
2009	McCraty, Atkinson, Lipsenthal, Arguelles38	4	Applied psychophysio logy and biofeedback	1,481= B1	New hope for correctional officers: an innovative program for reducing stress and health risks	Web of Science
2009	Rademaker, Kleber, Geuze, Vermetten29	6	Biological Psychology	B1	Personality dimensions harm avoidance and self-directedness predict the cortisol awakening response in military men	Science Direct
2009	Morgan, Rasmusson, Pietrzak, Coric, Southwick22	4	Biological Psychiatry	A1	Relationships among plasma dehydroepiandrosterone and dehydroepiandrosterone sulfate, cortisol, symptoms of dissociation, and objective performance in humans exposed to underwater navigation stress	Science Direct

2010	Witteveen, Huizink, Slottje, Bramsen, Smid,Ploeg16	4	Psychoneuro endocrino-logy	A1	Associations of cortisol with posttraumatic stress symptoms and negative life events: A study of police officers and firefighters	Science Direct
2010	Groer, Murphy, Bunnell, Salomon, Eepoel, Rankin, White, Bykowski32	4	Journal of Occupational and Environment al Medicine	B2	Salivary measures of stress and immunity in police officers engaged in simulated critical incident scenarios	CINAHL
2011	<u>Zuiden, Kavelaars, Rademaker, Vermetten, Heijnen, Geuze</u> 14	4	<u>Journal of Psychiatric Research</u>	A1	A prospective study on personality and the cortisol awakening response to predict posttraumatic stress symptoms in response to military deployment	Science Direct
2011	Inslicht, Otte, McCaslin, Apfel, Henn-Haase, Metzler, Yehuda, Neylan, Marmar18	4	Biological Psychiatry	A1	Cortisol awakening response prospectively predicts peritraumatic and acute stress reactions in police officers	PubMed Central
2011	Rosati, Sancini, Tomei, Andreozzi, Scimitto, Schifano, Ponticiello, Fiaschetti, Tomei39	4	International Journal of Environment al Health Research	1,582= B1	Plasma cortisol concentrations and lifestyle in a population of outdoor workers	Web of Science
2011	Apfel, Otte, Inslicht, McCaslin, Henn-Haase, Metzler, Makotkine, Yehuda, Neylan, Marmar20	4	Journal of Psychiatric Research	A1	Pretraumatic prolonged elevation of salivary MHPG predicts peritraumatic distress and symptoms of post-traumatic stress disorder	PubMed Central
2011	Wirth, Burch, Violanti, Burchfiel, Fekedulegn, Andrew, Zhang, Miller, Hébert, Vena30	4	Chronobiolog y International	B1	Shiftwork duration and the awakening cortisol response among police officers	Scopus
2012	Akinola, Mendes26	6	Behavioral Neuroscience	2,882= A2	Stress-induced cortisol facilitates threat-related decision making among police officers	BVS Bireme)
2012	Austin-Ketch, Violanti, Fekedulegn, Andrew, Burchfield, Hartley42	4	Journal of Addictions Nursing	0,48= B2	Addictions and the criminal justice system, what happens on the other side? Post-traumatic stress symptoms and cortisol measures in a police cohort	CINAHL
2012	Fekedulegn, Burchfiel, Violanti, Hartley, Charles, Andrew, Miller28	4	Industrial Health	B1	Associations of long-term shift work with waking salivary cortisol concentration and patterns among police officers	PubMed Central
2013	Arnetz, Arble, Backman, Lynch, Lublin27	4	International Archives of Occupational and Environment al Health	B1	Assessment of a prevention program for work-related stress among urban police officers	PubMed Central
2013	Pineles, Rasmusson, Yehuda, Lasko, Macklin, Pitman, Orr40	4	Anxiety, Stress & Coping	1,596= B1	Predicting emotional responses to potentially traumatic events from pre-exposure waking cortisol levels: a longitudinal study of police and firefighters	Web of Science
2013	Regehr, LeBlanc, Barath, Balch, Birze44	4	Police Practice and Research	0,33= B2	Predictors of physiological stress and psychological distress in police communicators	Scopus
2013	Wahbeh, Oken36	4	Journal of Traumatic Stress	2,624= A2	Salivary cortisol lower in posttraumatic stress disorder	PubMed Central
2013	Bos, Taris, Scheppink, Haan, Verster23	4	Frontiers in Behavioral Neuroscience	A1	Salivary cortisol and alpha-amylase levels during an assessment procedure correlate differently with risk-taking measures in	Web of Science

					male and female police recruits	
2014	Galatzer-Levy, Steenkamp, Brown, Qian, Inslicht, Henn-Haase, Otte, Yehuda, Neylan, Marmar19	4	Journal of Psychiatric Research	A1	Cortisol response to an experimental stress paradigm prospectively predicts long-term distress and resilience trajectories in response to active police service	Scopus
2015	Strahler, Ziegert24	4	Psychoneuro endocrinology	A1	Psychobiological stress response to a simulated school shooting in police officers	Scienc Direct
2015	Tao, Zhang, Song, Tang, Liu41	4	International Journal of Environmental Research and Public Health	2,063= B1	Relationship Between Job Burnout and Neuroendocrine Indicators in Soldiers in the Xinjiang Arid Desert: A Cross-Sectional Study	PubMed Central
2015	Walvekar, Ambekar, Devaranavadagi47	4	Journal of Clinical and Diagnostic Research	0,30= B2	Study on serum cortisol and perceived stress scale in the police constables	PubMed Central
2016	Baughman, Andrew, Burchfiel, fekedulegn, Hartley, Violant, Miller31	4	American Journal of Human Biology	B1	High-protein meal challenge reveals the association between the salivary cortisol response and metabolic syndrome in police officers	PubMed Central

Figure 1. Distribution of articles on the association of stress and cortisol in police officers according to the year of publication, author (s), level of evidence, publication period, qualis / impact factor, title and database, Chapecó / Brazil, 2016.

Source: PubMed Central, Scopus, Web of Science, Science Direct, CINAHL, BVS (Bireme), Jan. 2005 / dez. 2015.

The studies included in the integrative review consisted of 31 quantitative surveys (91.17%), a qualitative survey (2.94%) and two mixed method studies (5.88%).

In relation to the strength of the evidence, an article (2.94%) with level of evidence two, one article (2.94%) with level of evidence was found three, 29 articles (85.30%) with level of evidence four, three articles (8.82%) with level of evidence six.

The scientific evidence can be classified hierarchically according to the methodological approach used in the studies. In this integrative review, the following level of evidence was used: 1 - evidence from a systematic review or meta-analysis of randomized controlled trials or from clinical guidelines based on systematic reviews of randomized controlled trials; 2 - evidence derived from at least one well-delineated

randomized controlled trial; 3 - evidence obtained from well-designed clinical trials without randomization; 4 - evidence from well-delineated cohort and case-control studies; 5 - evidence from a systematic review of descriptive and qualitative studies; 6 - evidence derived from a single descriptive or qualitative study and 7 - evidence derived from the opinion of authorities and / or expert committee reports.⁴⁸

When analyzing the characteristics of the articles in relation to the year of publication, it was identified that the years of 2009, 2011 and 2013 were the years of greatest publication with 46.66% (n = 14) of all publications^{18,20,22-23,25,27,29,30,36,38-40,44,46}, evidencing an increase in studies of this topic in recent years. Table 1 illustrates these results.

Table 1. Distribution of frequency and percentage of articles, second year of publication, Chapecó / SC, Brazil, 2016.

Year	n	%
2005	2	5.88
2006	3	8.82
2007	3	8.82
2008	1	2.94
2009	5	14.72
2010	2	5.88
2011	5	14.72
2012	3	8.82
2013	5	14.72
2014	1	2.94
2015	3	8.82
2016	1	2.94
Total	34	100.00

Source: PubMed Central, Scopus, Web of Science, Science Direct, CINAHL, BVS (Bireme), Jan. 2005 / dez. 2015.

The papers were published in 27 journals (Table 2), and Biological Psychiatry stood out with four papers.^{15,17-18,22} The Journal of Psychiatric Research^{19,20,37} and Psychoneuroendocrinology^{16,21,24} were evidenced three articles each. It was identified that most articles were published in

journals of the interdisciplinary areas (n = 11), Psychology (n = 4), Biological Sciences (n = 3) and Nursing (n = 2) and psychiatric (n = 2). However, publications were located in the areas of Pharmacy, Psychophysiology, Policing, Occupational Health and Medicine.

Table 2. Distribution of articles by area, frequency and percentage, according to the publication periodical, Chapecó / SC, Brazil, 2016.

Journal	Area	n	%
Journal of Psychiatric Research	Interdisciplinary	3	8.84
Stress and Health	Psychiatry	1	2.94
Journal of Addictions Nursing	Nursing	1	2.94
<i>Psychosomatic Medicine</i>	Interdisciplinary	1	2.94
International Archives of Occupational Enviromental Health	Drugstore	1	2.94
Biological Psychiatry	Biological Sciences II	4	11.78
Psychoneuroendocrinology	Psychology	3	8.84
Industrial Health	Nursing	1	2.94
Psychiatry Research	Psychology	1	2.94
Applied psychophysiology and biofeedback	Interdisciplinary	1	2.94
Biological Psychology	Biological Sciences II	1	2.94
International Journal of Environmental Health Research	Psychology	1	2.94
An International Journal of Police Strategies & Management	Interdisciplinary	1	2.94
Anxiety Stress Coping	Psychophysiology	1	2.94
Police Practice and Research	Policing	1	2.94
The Canadian Journal of Psychiatry	Psychiatry	1	2.94
Frontiers in Behavioral Neuroscience	Interdisciplinary	1	2.94
Jounal of Traumatic Stress	Interdisciplinary	1	2.94
Giornale Italiano di Medicina del Lavoro ed Ergonomia	Occupational health	1	2.94
Journal of Occupational and Environmental Medicine	Biological Sciences II	1	2.94
Chronobiology International	Interdisciplinary	1	2.94
Behavioral Neuroscience	Interdisciplinary	1	2.94
Annals of Epidemiology	Medicine	1	2.94
Journal of Police and Criminal Psychology	Psychology	1	2.94
American Journal of Human Biology	Interdisciplinary	1	2.94
International Journal of Environmental Research and Public Health	Interdisciplinary	1	2.94
Journal of Clinical and diagnostic Research	Interdisciplinary	1	2.94
Total:		34	100%

Source: PubMed, Scopus, Web of Science, Science Direct, CINAHL, BVS, Jan. 2005 / dez. 2015.

Regarding geographic location, the United States of America (USA) is the country with the highest number of publications on police stress, with 22 articles (64.72%).^{15-22,25-28 , 30-}

^{34,36,38,40,42,43} followed by, Canada (8,82%),^{14,35,44} Italy (5,88%)^{39,45} and the Netherlands (5,88%).^{29,37} The countries Australia (2.94%),²³ Sweden (2.94%),⁴⁶ Germany (2.94%),²⁴ China

(2.94%)⁴¹ and India (2.94%)⁴⁷ had less publications, as shown in Figure 3. In Brazil, no studies were found that addressed stress and salivary cortisol in police officers. Regarding the language in which the papers were published, all were in English (100%).¹⁴⁻
⁴⁷ Table 3 illustrates these results.

In Brazil, a study showed that research on police stress is still incipient.⁴⁹ The National Policy for the Promotion of Workers' Health (PNPST) emphasizes the promotion of health and improvement of workers' quality of life, the prevention of accidents and damages arising out of, or related to, work.⁵⁰

Table 3. Distribution of the frequency and percentage of articles, according to the country of origin of the research, Chapecó / SC, Brazil, 2016.

Country	n	%
United States of America	22	64.72%
Canada	3	8.82%
Italy	2	5.88%
Holland	2	5.88%
Australia	1	2.94%
Sweden	1	2.94%
Germany	1	2.94%
China	1	2.94%
India	1	2.94%
Total	34	100%

Source: PubMed Central, Scopus, Web of Science, Science Direct, CINAHL, BVS (Bireme), Jan. 2005/10.

CONCLUSION

This research was able to respond to the proposed objective through bibliometric analysis with quantitative analysis using the Sophie program. It was concluded that this program may contribute to nature research presented in this study in other areas of knowledge, in addition to the area of health sciences.

Based on the results presented, it was concluded that, among the 34 articles published in the last ten years in the referred databases, the surveys indexed in the SCOPUS database were prevalent, so that it has a wider range of recognized journals international journals, it should also be noted that the international journals stand out in the sample presented.

Thus, the shortage of papers related to this subject in Brazil was observed, with the majority of publications focusing on North American countries. It is suggested that Brazilian researchers develop quality research on the topic addressed, so that they would bring important contributions to the health of the police worker, since they can signal the risk of psychic suffering of these professionals due to stress situations in work activities, and, thus, evidence that it is necessary to propose effective actions, the promotion of the health of this population.

The quality of the productions of the 34 articles selected to compose the study is also emphasized, so that all were classified very well by QUALIS CAPES or Impact Factor, bringing more authenticity and importance to this research and the data presented here.

In addition, it is necessary to arouse the interest of the scientific community in the development of research on the subject of workers' health and to adopt policies of encouragement and support to increasingly qualified production and publication, and to the editors of the periodicals, the improvement of the editions and the indexation in national and international bases.

It is hoped that the dissemination of the Sophie program may contribute to future bibliometric research, which can be considered an important technological method for the various areas of knowledge, by providing indicators of research and identification of trends.

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