

Workers' health in Brazil: graduate research

ABSTRACT

OBJECTIVE: To study trends of dissertation and thesis production in workers' health in Brazil.

METHODS: Observation units were dissertations and theses developed by Brazilian researchers in national and foreign graduate programs. Theses and dissertations were identified in previously compiled works, LILACS and Capes database. Search keywords were workers' health, ergonomics, occupational hygiene, toxicology, and occupational health.

RESULTS: There were identified 1,025 documents. Of them, seven were published before 1970, 31 were published in 1970s, 121 in 1980s, 533 in 1990s, and 333 between 2000 and 2004. An exponential growth of studies during the study period was observed with a corresponding factor approximately equal to 4 in each decade. The majority of studies addresses major public health issues like musculoskeletal diseases, mental health, and occupational risks for health workers. It was noticeable the small number of studies on unemployment, occupational cancer, and primary sector and construction industry workers, known as a risk group for fatal work-related injuries.

CONCLUSIONS: The growth of public and collective health graduate programs was a major factor for increasing research on workers' health in Brazil in recent years. Despite increasing academic studies in this area of knowledge there are some persisting gaps persist that need to be narrowed in the near future.

KEYWORDS: Occupational health. Review literature. Education, graduate. Research. Academic dissertations.

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Received: 5/11/2006

INTRODUCTION

The relationship between work and sickness is recognized as important part of human life and culture. The use of means for preventing work-related injuries has been described as early as in the Bible, in Deuteronomy XXII:8: where window sills are recommended when building up constructions to prevent falls. However, when addressing the knowledge on workers' health is impossible not to mention the Ramazzini's seminal work⁷⁰ developed from the end of the 17th century and beginning of the 18th century, which constitutes a valuable piece on occupational diseases, and first suggested the inclusion of specific questions on occupation into the clinical history, anticipating approaches to prevent and treat diseases, such as musculoskeletal conditions, still prevalent. However, the prevention of work-related injuries and other health problems became known only after the emergence of the social medicine paradigm in the 19th century, which allowed the recognition of working conditions as a major determinant of life conditions,⁷⁵ an association masterly illustrated by Engels in his study on the daily life of workers in England.³⁰ Knowledge on this subject has flourished in the 20th century, not only driven by the scientific development of medicine and public health but also by the advances of the so-called technology fields such as safety engineering, occupational hygiene, toxicology and ergonomics. It led to the occupational health model creation in consonance with public and collective health paradigm.

The first descriptions and documentations of workers' health conditions in Brazil date from the 19th century³³ but only much later it was a matter of research in medical schools. Former theses on occupational medicine in academic settings were developed in the old forensic medicine chairs, whose scientific interests included studies of occupational risks, work conditions and injuries. However, theses and dissertations focusing major national workers' health problems flourished only after the exponential growth of graduate programs in Brazil in 1990s. Few studies have addressed the academic production such as the list published by Mendes,⁵⁸ and the Mendes & Waissman's⁵⁷ review study on occupational health history in Brazil. Kirchoff,⁴³ in her doctoral thesis, outlined the evolution of the scientific production on workers' health but her data was limited to the period between 1990 and 1994. So far, little is known on the quantitative evolution and contents of thesis and dissertation developed on workers' health. The present study aims a further understanding of the pathway of Brazilian researchers' academic production in workers' health up to 2004.

METHODS

The scope of the present study was the academic production in workers' health focusing on theses and dissertations developed by Brazilian researchers in Brazilian and foreign academic institutions. Documents were selected from several literature sources, such as the catalogue of theses and dissertations registered from 1950 to 2002 by Mendes.^{57,58} This author has searched references of them in private files, libraries and records from academic and health research institutions across the country. He was helped by researchers and graduate professors who provided him with lists of theses and dissertations references from each graduate program in the field of collective health, toxicology, ergonomics and engineering in Brazil. In addition, a search was carried out in the LILACS database (Latin American and Caribbean Literature on Health Sciences) and the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (Capes - Coordination for the Improvement of Higher Education Personnel) thesis catalogue for the period between 2003 and 2004. As the query on 2005 data showed a small number of entries, suggestive of incomplete data update, the end of the study period was thus defined as the year 2004. Although the list of theses and dissertations published by Mendes⁵⁸ is limited to citation data, the analysis of the contents was possible since the abstracts were made available. The subject of each thesis and dissertation was identified by its title and abstract and classified in groups to facilitate the analysis. Given the large amount of material available, detailed examination was limited to the most common research subjects or to subjects representing historical landmarks of trends and innovations. Duplicated references were manually identified and excluded. Some references not related to workers' health were also excluded.

RESULTS AND DISCUSSION

In the Mendes⁵⁸ catalogue there were identified 864 theses and dissertations between 1950 and 2002. A duplicate and three documents whose subjects were out of the scope of this study were excluded, remaining 860 for analysis. From Capes and LILACS database, after duplicate documents were excluded, 158 documents from 2003 and 2004 remained and added to the study. A total of 1,018 theses and dissertations were examined in this study. It was not possible to identify all documents produced before 1950 because they were not included in any available database. From 1950 to 1970 seven theses and dissertations were found and 31 during the 1970s. In 1980s the amount of these documents increased four times, reaching a total of 121 documents. This exponential trend re-

mained throughout the following decade (n=533) and apparently remains unchanged during the present decade, although only part of the data were available as for the first five years (n=333). This sustained increment reflects the growth of graduate programs in collective health and the increasing interest of most graduate students on workers' health. Formal research groups registered in the *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq - National Council for Scientific and Technological Development) also show an increase of main stream research on workers' health from 2000 to 2004. Besides the positive impact of graduate courses, well established research programs and high qualified faculties and researchers are also key elements to understand the increasing amount and quality of theses and dissertations on this subject-matter.

Historical background

The history of knowledge on the relations between work and health can be appreciated through theses and dissertations, especially in those periods when research studies were rarely published in journals. Mendes & Waissman⁵⁷ (2003), in their pioneer literature review on the historical background of work-related diseases in Brazil, reported that the earliest theses showed negative results. In the author's words "there was not found any case of illness in this factory that could be described as peculiar,"⁵⁹ despite the plausible presence of occupational exposures in the studied industry of cigars and sniff tobacco factories in the city of Rio de Janeiro. Another study³⁶ investigated the health status of workers and residents in a neighboring area of an animal-fat processing plant that produce candles and soap because it was hypothesized that health problems could possibly arise from the fetid odor released, which was consistent with the miasma theory, popular at that time. It should be highlighted the advanced perspective underlying this study by taking into consideration the simultaneous occupational and environmental impact of a given industry. However, as in the previous study, no evidence of occupational diseases was found.

These mentioned studies have introduced in Brazil the discussion on the relationship between living and working conditions, assimilating ideas that were under debate in Europe at that time, and that gave origin to the social medicine. In Brazil, consolidated abolitionist movements were the expression of major humanistic aspirations in Latin America, and some studies sought to depict life conditions of enslaved black populations including their working conditions.³³

Mendes & Waissman⁵⁷ (2003) recognized the key role

of Júlio Afrânio Peixoto in establishing the foundations of the knowledge on workers' health when he took office at the chair of forensic medicine in both medical and law schools in Rio de Janeiro in the beginning of last century. From his dedication to studies of occupational risks and related accidents and diseases, many publications were released. It was also reported that, in 1922, Leonídio Ribeiro wrote his associate professor thesis on hernia and work-related injuries, as part of studies on forensic medicine developed in Rio de Janeiro. A similar process occurred in São Paulo, where, also as part of academic activities of the chair of forensic medicine, important compendiums such as "Tratado sobre acidentes de trabalho" (The work-related injuries), were developed by Afrânio Peixoto, Flaminio Fávero, and Leonídio Ribeiro.⁶⁷

Later, in 1934, the first reports of inspections in workplaces whose reports started to be presented in national and international meetings, and published in journals such as the *Boletim do Departamento Nacional de Pesquisa Mineral* (DNPM - Bulletin of the National Department of Mineral Research) by the Brazilian Ministry of Mines and Energy.¹⁵ Physicians working for the Brazilian Ministry of Labor were also involved in pioneer studies on workers' health as well as investigators of Oswaldo Cruz Institute Division of Industrial Hygiene in the 1940s.³³

In their review, Mendes & Waissman⁵⁷ (2003) acknowledged a DNPM's study as one of the first epidemiological studies on workers' health in Brazil. Approximately 1,009 gold miner workers were examined and prevalences of silicosis of 11.82% and of tuberculosis of 8.7% were estimated. The author could make a causal occupational inference comparing populations with similar socioeconomic status.¹⁵ The observed association between silicosis and tuberculosis, previously described by LaDou,⁴⁶ had a great impact in Brazil and was widely disseminated in scientific meetings at that time.

Maeno & Carmo⁵⁰ (2005) reviewed historical aspects of workers' protection policies in Brazil and underlined the critical role of some authors like Bernardo Bedrikow. In 1950s, in partnership with the *Serviço Social da Indústria* (SESI - Social Service of the Industry), Bedrikow¹⁴ coordinated a large survey on access and delivery of medical care and occupational hygiene services in the city of São Paulo. From an industry census database, 2,137 companies were selected which corresponds to 72,782 workers. Occupational exposures and occupational or work-related diseases and health care provided or available to this population were all assessed. Bedrikow called attention to the clinical care nature of the health services provided, the lack

Table - Distribution of theses and dissertations on workers' health in Brazil between 1970 and 2004 by subject and publication period.

Subjects	Publication period (1970–2004)									
	Total		1970-1979		1980-1989		1990-1999		2000-2004	
	N=1,018	100.0%	N=31	3.0%	N=121	11.9%	N=533	52.4%	N=333	32.7%
Ergonomics and musculoskeletal diseases	141	13.9	3	9.7	10	8.3	82	15.4	46	13.8
Workers' health profile and risks	96	9.4	1	3.2	18	14.9	50	9.4	27	8.1
Policies, intervention programs, social inequalities	126	12.4	0	0.0	16	13.2	58	10.9	52	15.6
Noise and hearing loss	54	5.3	2	6.5	4	3.3	30	5.6	18	5.4
Health providers	106	10.4	0	—	8	6.6	47	8.8	51	15.3
Work-related injuries and violence	50	4.9	5	16.1	3	2.5	21	3.9	21	6.3
Occupational exposures	50	4.9	3	9.7	7	5.8	26	4.9	14	4.2
Silicosis and other occupational respiratory diseases	22	2.2	3	9.7	7	5.8	12	2.3	0	—
Mental health and work	55	5.4	0	—	4	3.3	23	4.3	28	8.4
Pesticides and their health effects	26	2.6	1	3.2	3	2.5	22	4.1	0	—
Lead and lead intoxication	16	1.6	4	12.9	6	5.0	6	1.1	0	—
Gender, woman and work	18	1.8	0	—	2	1.7	16	3.0	0	—
Workers' health services	24	2.4	2	6.5	4	3.3	13	2.4	5	1.5
Benzene and solvents	11	1.1	1	3.2	2	1.7	8	1.5	0	—
Rural work	18	1.8	1	3.2	5	4.1	9	1.7	3	0.9
Nutrition and work	7	0.7	2	6.5	1	0.8	4	0.8	0	—
Biological risks and infectious diseases	19	1.9	0	—	3	2.5	7	1.3	9	2.7
Environment and work	17	1.7	0	—	2	1.7	12	2.3	3	0.9
Mercury	11	1.1	1	3.2	0	0.0	10	1.9	0	—
Rights and workers, law	12	1.2	0	—	2	1.7	10	1.9	0	—
Shift work and night work	14	1.4	0	—	2	1.7	8	1.5	4	1.2
Absenteeism and retirement	6	0.6	0	—	2	1.7	1	0.2	3	0.9
Child and adolescent labor	8	0.8	0	—	1	0.8	4	0.8	3	0.9
Occupational cancer	6	0.6	0	—	1	0.8	5	0.9	0	—
Other diseases	35	3.4	0	—	1	0.8	17	3.2	17	5.1
Other subjects	70	6.9	2	6.5	7	5.8	32	6.0	29	8.7

of a preventive orientation, and a poor facilities infrastructure as well. In 1950s, occupational medicine was introduced in medical school programs⁵⁷ and there were major scientific meetings in this field of study that certainly had stimulated former observational studies developed as academic theses.

Thematic analysis of theses and dissertations

The oldest thesis identified in the present study was developed by Mocellin⁶² (1951), submitted to the *Faculdade de Medicina do Paraná* (State of Paraná School of Medicine), and addressed prevention of occupational noise-induced hearing loss. From 1950 to the 1970s most theses dealt with infectious diseases, such as leptospirosis in sewage workers,⁵¹ tuberculosis associated to work-related risks and occupational diseases developed to the *Faculdade de Direito do Vale do Paraíba* (Law School) in 1966;²⁰ and the study on the prevalence of toxoplasmosis according to occupational groups.³⁸ A dissertation presented to the *Faculdade de Saúde Pública da Universidade de São Paulo* (FSP-USP)³⁹ compared urine coproporphyrin in battery workers of factories covered by preventive actions and those who had not. This is one of the first scientific approaches for evaluating workers' health programs.

The Table shows the distribution of theses and dissertations by conclusion period from 1970 to 2004. In 1970s, work-related injuries was the most common

subject studied (n=5, 16.1%), focusing themes as injuries in small size firms,⁵⁶ and naval construction.²⁸ From dissertations developed abroad, one described occupational injury cases recorded in Brasil¹⁸ and was submitted at the University of London in 1977; a second one focused on the sociological conception of work-related injuries and was submitted at *École des Hautes Études en Sciences Sociales* in Paris in 1978.²⁹ Unlike the preceding period, concern about work-related infectious diseases was seen in only one thesis on Chagas' disease in rural workers that was submitted at the *Faculdade de Medicina da Universidade Federal de Minas Gerais* (UFMG).³²

The pioneer role of the FSP-USP became evident as it accounted for one third of the dissertation and theses concluded in occupational health in the 1970s (n=10), extensive to the USP overall (n=17, 55%). The participation of the *Coordenação dos Programas de Pós-Graduação em Engenharia da Universidade Federal do Rio de Janeiro* (COPPE - Federal University of Rio de Janeiro Coordination of Graduate Programs in Engineering) was also noticeable for contributing with three dissertations, all of them covering subjects related to ergonomics.^{60,83,88} The *Faculdade de Medicina da Universidade Federal da Bahia* (UFBA), also contributed expressively with two dissertations on lead poisoning.^{23,85}

The researchers' concern about non-industrial workers such as garbage workers,⁸¹ and drivers,¹⁹ has be-

come evident as well as their interests about health problems now recognized of great magnitude and relevance such as silicosis and exposures to chemicals, either metals like mercury and lead, or organic compounds such as pentachlorophenol, benzene and DDT. The influence of the French school of sociology of work is evident in Dwyer's²⁹ (1978) thesis on the social concept of work-related injuries.

In the 1980s there was a four-time increase in the number of theses and dissertations (121) compared to the previous decade (Table). Whereas in the 1970s most studies were of epidemiological or quantitative nature, in 1980s studies started to deal with theoretical issues or the social or political contextualization and integration of research themes (n=16; 13.2%). This approach is exemplified by Possas⁶⁸ (1980), Goldbaum³⁷ (1981), Murolo Filho⁶⁴ (1981), Costa²⁷ (1982), Lacaz⁴⁴ (1983), Fachini³¹ (1986) and Sevá Filho⁷⁸ (1988) dissertations and theses, among others. A few qualitative studies on workers' perception^{17,24} and the first studies on gender, work and health^{1,47} were also conducted during this decade. A dissertation addressed child labor in agriculture in the state of São Paulo⁵ anticipating a subject-matter that became a priority only in the first years of this new millennium. In addition, the first study on occupational health care was developed in this period. Early studies were developed at nursing schools^{6,84} and mainly addressed nurse's practice and training in occupational health. The first dissertation³⁴ addressing health care workers was developed at that time, a subject that became the most studied in theses and dissertations focusing one single professional group in the 1980s (n=8) and 1990s (n=47), and accounted for 18% of all thesis and dissertation concluded in the present decade. Teachers was also a subject of study in 1980s though still limited to nursing teachers.⁵⁴

It can also be noted that, differently from the 1970s when most studies focused on one specific disease, injury or a particular group of workers in a firm, the scope of workers' health changed in the 1980s and evolved to large analytical categories, such as absenteeism or even social inequalities, sometimes using sophisticated epidemiological analysis as seen in the Rummel⁷⁶ (1987) study. Rummel addressed the healthy worker effect as an evidence of social exclusion, earlier regarded as only a methodological artifact. Also, in this same decade, theses and dissertations on workers' health were developed in schools not related to the health field, such as the *Faculdade de Arquitetura e Urbanismo* (School of Architecture and Urbanism)^{40,53} and *Instituto de Geociências* (Institute of Geosciences) at the *Universidade Estadual de Campinas* (Unicamp).⁷⁸

The number of dissertations and theses continues its exponential growth. In the 1990s, it reached a total of 533, 18 times the number seen in the two previous decades. In 1991, a dissertation highlighted the underreporting of work-related injuries,¹¹ followed by several studies on the information systems or even the nurse's perception of reasons for occupational diseases and accidents underreporting.⁶⁵ Following the pathway opened in the previous decade, studies on transmissible diseases and work have gained a macrosocial dimension when dealing with, for instance, the relationship between malaria and the process of land use in Rondônia,¹⁶ or the so-called enhanced chemical accidents.³⁵ There were also several studies on the involvement of workers' organizations, such as unions, in workers' health.^{4,42,45,55,74,82,90} It can also be noted increased number of studies on work-related chronic conditions, such as mental diseases, arterial hypertension, cardiovascular risks, musculoskeletal symptoms and diseases, and in the embryo development characteristics from pregnant workers. Rehabilitation of injured workers, still a challenge in occupational health in Brazil and worldwide, was taken as the subject of a dissertation.⁸⁶ Studies on health providers were also increasing, especially those focusing on nursing practice, mostly carried out in nursing schools but also in graduate programs in collective health. Several aspects have been explored: job turnover,⁶ biological and chemical risks, work-related injuries, musculoskeletal symptoms,² hepatitis B,¹² but mainly stress and psychiatric disorders,^{52,61,72} among others.

Between 2000 and 2004, a total of 360 theses and dissertations was found, lower than expected given the trend of previous decades. This can indicate a delay in the update of databases utilized in this study or terminological changes in the classification. In general, study contents follow the same trend seen earlier. The great focus of research was health care workers s, especially nurses common diseases, such as mental health problems, musculoskeletal symptoms and diseases, ergonomics, biological and chemical risks and needle stick-related injuries. Based on few studies developed in the past decade, research on technology advances, computerized work and work management^{7,10,13,41,63} as well as environment-based management systems have multiplied.^{3,87}

Poor working conditions, informal job contracts and outsourcing^{8,77} have also proliferated as subject-matter taken by these studies. Research on occupational dentistry especially involving the relationship between exposures at work environment and oral health^{48,79,80,89} has been developed following the first research conducted in 1998.⁹ Two studies were identified that evaluate work-related injuries into the perspective of urban

violence,^{21,49} an approach influenced by the increasing violence and its impact into workers' daily life, that leads this issue to be recognized as a public health priority. Among other social aspects scarcely explored in previous decades, a thesis dealing with racism and racial discrimination in workers' health was identified. Preliminary studies, however, had addressed jobs where Black prevails such as housekeeping and construction.²⁵ In addition, it could be noted studies focusing on management systems of workers' health integrated to environment services following recent recommendations by the International Work Organization and the World Health Organization.^{69,73}

Besides the identified exponential growth, some time trends of contents could be noted throughout the study period: there was an absolute and relative increase of theses and dissertations on musculoskeletal diseases (around 50%), mental diseases (100%), especially among health care workers (72%, data elsewhere), and other conditions or outcomes such as obesity, fatigue, aging, and vocal disorders, among others, rarely described in former decades. It is worth mentioning the decreased absolute and relative frequencies of theses and dissertations on injuries and silicosis, which are severe common occupational health outcomes. Noise and hearing loss, which have been addressed since 1950s when the first thesis was developed, remained the focus of studies at a stable proportion in spite of being a common disabling problem, especially in the manufacturing industries.

It can also be noted that in the present decade there is a better regional distribution of theses and dissertations throughout Brazil with increased proportional participation of Midwestern, Northern and Northeastern states and consequently an increased number of institutions developing research projects. Also most publications have been developed in public institutions.

FINAL COMMENTS

In Brazil, the scientific knowledge in workers' health resulting from graduate theses and dissertations has started shyly in 1950s as part of the infectious disease research stream. It has geometrically grown in the following decades mostly driven by the development of graduate programs, showing during the following decade an exponential increase by a factor of four. First concentrated in the Southern and Southern regions, from 1990s it has spread to the Northeastern, Northern and Midwestern regions, including almost all Brazilian states.

Besides their growth and spread to all regions of Bra-

zil, the variety and groundbreaking subjects addressed by theses and dissertations on workers' health are remarkable as well as their approach to problems known to have significant public health impact. It is worth noticing that, besides more traditional aspects, the academic activity, from its very beginning, focused on themes of little visibility in the scientific literature such as occupational risks in small size firms,⁵⁶ garbage workers,⁸¹ prostitution²² and child labor.⁵ Also, in the 1980s, studies have been conducted on occupation and reproductive effects focusing women work,⁴⁷ and social participation in the health management and policies.⁶⁶ In the following decades, the Brazilian graduate studies covered a variety of subjects, always aware of problems regarded as public health priority. There appear to be differences in the priorities addressed by theses and dissertations and abstracts presented in scientific meetings, according to the review of Rego et al⁷² (2005). These authors found that the most common research issues were work-related diseases and injuries, and most frequently they comprised descriptive studies dealing with specific conditions such as intoxications, cumulative trauma and mental disorders. The occupational categories most often studied were health, education and agriculture.⁷¹

The studied dissertations and theses revealed some knowledge gaps as exemplified by the small number of epidemiological studies on occupational determinants of cancer. Throughout more than five decades only six theses and dissertations could be found on that subject, and no studies targeting cancer prevention, case record systems or the public health burden was identified. It is surprising considering the significance and magnitude of the Brazilian academic research on cancer. The lack of studies about workers from the primary sector, such as those engaged in agriculture and livestock, recognized as having high risk of severe health problems, is also remarkable. This could be explained by the fact that these workers are difficult to reach and there is a few funding sources and limited resources available for workers' health research in Brazil. At the same time it stresses the need for more attention from research support agencies and institutions in charge of policy development in the field of workers' health. Despite the relevance of construction due to the extended number of workers engaged in this activity and the burden of fatal work-related injuries related to this economic activity, few studies addressed this issue. Unemployment, known as causing numerous health problems, has not been studied in theses and dissertations, as well as the economic and social impact resulting from disease costs and the burden of occupational injuries. There were also very few studies on the evaluation of the effectiveness of prevention programs, especially of successful inter-

ventions, which seems to reflect some degree of hopelessness and skepticism in regard to the role of prevention, that may contribute to the pessimistic viewpoint pervading activities such as the training of workers' health professionals. One recognized successful policy in the field of workers' health is the prohibition of child and adolescent labor in high-risk occupations,* a subject not yet sufficiently addressed in recent theses and dissertations.

One limitation of the present study was the fact that it was mostly based on existing lists of theses and dissertations^{57,58} since it was not possible to carry out a comprehensive search and using a rigorous methodological approach to ensure the coverage of all eligible documents. Moreover, it was not possible to consider all keywords indicated in each thesis or dissertation, therefore the themes were classified and categorized by the author. The Capes database did not always provided complete information, especially the identification of the institution responsible for the study.

Since most scientific knowledge generated on workers' health is not published by indexed journals or made easily accessible, this study, besides the understanding of general research trends allows for an en-

hanced dissemination of this important research products. It is possible that the scientific knowledge on determinants of occupational diseases and work conditions has contributed to the declining trends of fatal work-related injuries and several occupational diseases almost worldwide.²⁶ In Brazil, despite the large number of academic studies on workers' health, it is remarkable that only recently, research has become well appraised and applied as evidence in the decision making processes of institutions engaged in policy development and program management. Greater integration between researchers and policy makers and managers is further needed in order to allow the use of knowledge for more appropriate action to improve the workplace and workers' environment health.

ACKNOWLEDGMENTS

The author thanks Dr. René Mendes, a retired tenured professor of Departamento de Medicina Preventiva e Social da Faculdade de Medicina da Universidade Federal de Minas Gerais, and chairman of the Associação Nacional de Medicina do Trabalho (National Association of Occupational Medicine), for making available the abstract of theses and dissertations from his personal collection.

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