CSP CADERNOS DE SAÚDE PÚBLICA
REPORTS IN PUBLIC HEALTH

ENSAIO
ESSAY

The multidimensional construct of precarious work, the future of work, and workers' health

O construto multidimensional trabalho precário, o futuro do trabalho e a saúde de trabalhadoras(es)

El constructo multidimensional trabajo precario, el futuro del trabajo y la salud de trabajadoras(es)

Rita de Cássia Pereira Fernandes [1,2]

doi: 10.1590/0102-311XEN100522

Abstract

This essay aims to discuss the flexibilization of work, which has been accentuated during the COVID-19 pandemic, leading to an expansion of precarious work. Additionally, the essay seeks to explore theoretical models and methodological challenges for the study of precarious work, its dimensions, and its effects on workers' health. The health and economic crisis has heightened the social vulnerability of workers, introduced by the global flexibilization and the Brazilian Labor Reform. The setbacks materialize in precarious work, a multidimensional construct that encompasses the characteristics of this flexibilization in its three dimensions: (1) unstable work relationships resulting from insecure hiring, temporary contracts, involuntary part-time work, and outsourcing; (2) inadequate and unstable income; and (3) insufficient rights and protection, with reduced collective representation of workers, resulting in low power to react to degrading working conditions, lack of social security, and setbacks in regulatory support for labor safety. Repercussions of precarious work on health – work accidents, musculoskeletal and mental disorders – are evidenced in epidemiological studies, highlighting the theoretical and methodological limitations that still exist. The conclusion is that if the current bases of social protection and work insertion for workers are maintained, the future will see an expansion of precarious work. Thus, highlighting the causal relationships between precarious work and health is a contemporary challenge of the research and public policy agenda that is imposed upon society, with a focus on workers' health services.

Occupational Risks; Social Protection in Health; Occupational Health; Occupational Accidents; Mental Disorders

Correspondence
R. C. P. Fernandes
Programa de Pós-graduação em Saúde, Ambiente e Trabalho, Faculdade de Medicina da Bahia, Universidade Federal da Bahia.
Largo do Terreiro de Jesus s/n, Salvador, BA 40026-010, Brasil.
ritafernandes@ufba.br

[1] Faculdade de Medicina da Bahia, Universidade Federal da Bahia, Salvador, Brasil.
[2] Programa de Pós-graduação em Saúde Coletiva, Universidade Federal da Bahia, Salvador, Brasil.

Introduction

Previous health crises of a pandemic dimension had deep socioeconomic effects, with unequal health impact that caused more infection and death among extreme poor people. During the COVID-19 pandemic, existing inequalities were enhanced, especially in periphery countries and in poor areas of core countries, notably in the world of work, with the post-pandemic period marked by precarious work [1,2,3].

In the United States, inequalities have increased in the pandemic and have become very explicit in the world of work. Latin Americans, African-Americans, and black people had higher proportions of unemployment during the pandemic when compared to white people. Unemployment in December 2019 was already distinct among the ethnic groups and, during the pandemic, it reached its highest peak in May 2020, with an increase of 13 percentage points in unemployment among Latin Americans and 10 percentage points for other ethnic groups. Also, in late 2020, it showed a slower recovery, with 9.9% and 9.3% of unemployment among black people and African-Americans and Latin Americans, respectively, when compared to 6% among white people and 5.9% among Asians. Black people, African-Americans, and Latin Americans were also the least eligible for remote work during the pandemic, given their predominance in occupations of low and medium qualification, with physically demanding and in-person work [4].

As another relevant marker of the situation of social exclusion and unprotected work, the socioeconomic position of immigrants worldwide was emblematic of the expansion of inequalities in the pandemic. Immigrants are usually more vulnerable to forced dismissals, temporary agreements, and low wages when compared to non-immigrants in the same occupation and of the same age, gender, and education. Also, they are ineligible for social benefits, such as paid sick leave, and during the pandemic, were excluded from the possibility of remote work, as part of the biosecurity measures [5].

In Latin America and the Caribbean, the pandemic caused a reduction in employment, with major decline in female participation in the labor market and even more disadvantages in informal than formal work. These impacts in the region will not be easily resolved and will require a long period of recovery [6].

Inequalities in Latin America and the Caribbean, which already affected poor women in particular before the pandemic, have increased. According to the United Nations Development Programme (UNDP) [2], unemployment among women in 2019 was 59% higher than among men from the second lowest income quintile, and their participation in the labor market was 42% lower than male participation in the poorest quintile. Regarding the informal sector, men and women of lowest income in Latin America and the Caribbean are significantly inserted in this type of economy, which represents about 80% of people in the poorest quintile [2].

In Brazil, the expansion of inequalities during the pandemic caused variations in individual labor income in the period from the fourth quarter of 2019 to the second quarter of 2021, reaching -21.49% among 50% of extreme poor population, while among 10% of the richest population, this variation was -7.17% [7].

This essay, which is based on reflections and criticisms from the perspective of epidemiology in occupational health, highlights the fact that social inequalities in the world of work increased with the health and economic crisis, creating bigger challenges for periphery countries and more vulnerable groups in core countries.

The first section of the essay addresses the elements that contribute to a slow and difficult recovery of social indicators regarding job insertion for vulnerable groups in the post-pandemic period. These elements highlight the expansion of inequalities in the workplace in a periphery country (Brazil) with the growth of informality and its impact on working conditions and the health of workers.

The second section discusses that deterioration in the world of work contributes to precarious work, a multidimensional construct that involves the characteristics resulting from the flexibilization of work relations. Theoretical models and methodological challenges for the studies on precarious work are presented considering its effects on the health of workers.

The third section analyzes the epidemiological evidence of precarious work. Impacts such as occupational accidents, musculoskeletal disorders, and mental disorders are discussed, highlighting the theoretical and methodological limitations. The section of final considerations observes the chal-

lenges posed by precarious work, concluding that, if the current conditions of workers without social and work protection persist, precarious work will expand in the future.

Elements of the pre-pandemic world of work to be considered after the pandemic in Brazil

The World Bank shows elements that support the slow recovery of the world of work. The scarring effect of the crisis is the long-term impact of job loss, which has a stronger persistent burden on less qualified workers, with less education, associated with worse conditions of labor market (re-)entry after the crisis, when a disproportionate reduction in access to employment experience and growing informality are expected [8].

These characteristics can be observed in the trajectory of occupations in Brazil, which fell sharply from March to September 2020 and has recovered since September 2020, with informal work reaching 41.1% of the employed population in the third quarter of 2021 and a drop in real average income. Informality keeps growing in the country, when comparing the first quarter of 2022 to the first quarter of 2021 [9].

The situation among workers during the pandemic in Brazil reflects and expands the situation prior to the pandemic of inequalities in labor market participation and inequities in occupational exposure to factors of illness and death.

In this perspective, the situation of urban cleaning workers in Salvador (Bahia State) is used as an example, which shows this context in which in-person provision of an essential service was maintained throughout the pandemic. To minimally characterize this category in the pre-pandemic period, some indicators can be described that show their social vulnerability, based on studies conducted with a population of 624 male workers. The short length of employment deserves special attention, with a median of 26.5 months and 35 months for drivers and garbage collectors, respectively. Of these workers, garbage collectors present the lowest level of education (≤ basic education: 75%). These are predominantly young (mean age < 32 years), black (65%), and brown (30%) people, that is, 95% self-declared blacks [10].

Institutional and systematic racism is observed, expressed in the exposure to occupational risks, predominantly among black and brown people. Black people are more exposed to arduous physical work, handling loads and using strength, with inadequate posture, and are highly subjected to psychosocial stressors [11]. Despite the short length of employment in urban cleaning, workers who remain in this occupation for longer time have a higher prevalence of multisite pain, especially associated with load handling [12].

Considering the predominance of black workers with low education in services of low or medium qualification, we can easily say these workers were not inclined to remote work, and instead provided essential services like urban cleaning, which was a strategic activity for maintaining life in society during the pandemic, although often an invisible job. Despite the negative impacts of remote work on the health of workers, due to the conditions in which it was established for many other professional categories, what we see here is an indicator of inequality in the access to social distancing as a biosafety procedure by vulnerable social groups.

The conditions of the post-pandemic period in the world of work in Brazil were mediated by core elements that characterize the start of the pandemic in the country. In March 2020, the world of work experienced a deep crisis, marked by significant deregulation, including the Brazilian Labor Reform, instituted by *Law n. 13,467*, of July 2017 [13]. Although legally implemented in 2017, the Brazilian Labor Reform was preceded by setbacks in the work protection, for instance, the law that allows the outsourcing of core activities (*Law n. 13,429*, of 2017 [14]), legitimizing the inequality of health and safety conditions of outsourced workers.

The Brazilian Labor Reform came along with significant changes in the world of work, always associated with changes in the dynamics of the capitalist mode of production. The flexibilization of labor relations was expanding worldwide, in a scenario where *"the main priorities for employers were to obtain wage flexibility, to ease constraints on hiring and firing, and to relax employment protection policies"* [15] (p. 231).

In this perspective, the first axis of Brazilian Labor Reform, according to Krein & Colombi [16], concerns the expanded flexibility of employment agreements and, consequently, of working hours and remuneration. Important elements of this axis are unlimited outsourcing and expansion of temporary job agreements. A new type of hiring emerges – the intermittent agreement, which is considered as emblematic and assumed as precarious work [16].

These authors [16] identify a second Brazilian Labor Reform axis, which is fragilization of public institutions, inspection of compliance with rules in the workplace, and organization of workers. The prevalence of bargained over legislated rights may result in non-enforcement of law, including workers subjected to imposed conditions, given that effective individual bargaining between a worker and an employer is not probable, since they have highly unequal powers.

The discussions promoted by Benach et al. [15] are directly related to the Brazilian scenario addressed above: flexible agreements present characteristics of precarious work, with limited safe work practices that are imposed by economic pressures. In addition, flaws in the labor regulatory process weaken and limit access to labor rights. According to the authors, flexible work and precarious work have similarities such as short-term job agreements, job instability, and limited protection, a context in which workers have reduced control over remuneration and working hours. Such weakened power of workers is seen in the institution of individual, and not collective, bargaining, resulting in the inability to react to unacceptable work practices and, therefore, the inability to exercise labor rights [15,16].

The effects of precarious work on the health of workers will be the result of increased exposure to deteriorated working conditions [15]. In this sense, this essay uses deteriorated working conditions to refer to the following factors: physical dimension of work regarding body demands (such as inadequate postures and load handling; exposure to noise, extreme temperature, chemical agents, biological agents such as the coronavirus; and exposure to machinery and equipment in inadequate operating condition); the cognitive dimension (regarding demands of high concentration, attention and memory use, combined with decision making in adverse and low-control conditions); and the psychosocial or organizational dimension (which includes reduced number of workers to fulfill work demands, poor social support, lack of training to perform tasks, long hours under work intensification per unit of time, not allowing a break for rest and recovery of body and psychic structures). In addition, the psychosocial or organizational dimension also includes work relations, relationships between workers and immediate managers or business owners, under which the right to decent work is exercised or becomes an obstacle [6,15].

The employment law and the *Brazilian Consolidated Labor Laws* (CLT) have become important instruments of this protection system in Brazil, especially considering the regulations defined in the Labor Law of a relationship between unequal workers, under the paradigm of insufficiency of workers [17]. The definition of working hours prevented workers from going beyond their physiological limits in the course of a daily work, limiting strenuous working hours that imply extreme occupational exposure.

In addition to Labor Law, the labor protection system includes Social Security – an insurance against occupational illnesses and accidents that provides workers with paid leave, but which is not granted to workers performing precarious and informal work and who are on the margins of this system. Also important in this system are the collective organizations that represent workers – the labor unions – as opposed to the individualized worker support. In addition, the Work Environment Surveillance of the Brazilian Unified National Health System (SUS), the inspection of the Brazilian Ministry of Labor and the Brazilian Public Labor Prosecutor Office – with its Terms of Conduct Adjustment for collective protection – and the public universities comprise a labor protection system. This protection system is expected to orchestrate social actions to ensure good working and health conditions for workers.

Considering the social bases under which working conditions are structured, the important changes resulting from the flexibilization process, globally caused by capitalism and locally by the Brazilian Labor Reform, are understood as determinants of the morbidity and mortality of workers due to their exposure to precarious work.

Precarious work: multidimensionality of the theoretical and methodological construct

The expansion of vulnerabilities in and after the pandemic is linked with the generation of poverty and precarious work, with a strong impact on workers, their families and communities. In this essay, precarious work is defined according to the International Labor Organization (ILO) [18] (p. 27): "*work performed in the formal and informal economy and is characterized by variable levels and degrees of objective (legal status) and subjective (feeling) characteristics of uncertainty and insecurity. Although a precarious job can have many faces, it is usually defined by uncertainty as to the duration of employment, multiple possible employers or a disguised or ambiguous employment relationship, a lack of access to social protection and benefits usually associated with employment, low pay, and substantial legal and practical obstacles to joining a trade union and bargaining collectively*".

Considering this ILO concept, this essay assumes that precarious work may occur in occupations of the formal and informal economy. In this sense, the formal sector includes registered employees, military personnel, statutory public servants, registered domestic workers, employers with six or more employees; and the informal sector includes employees and domestic workers without a formal agreement, self-employed workers, own-use production workers, own-use construction workers, unpaid workers, employers with up to five employees [19].

Then, the concept of precarious work found in the reviewed literature, particularly in English, was incorporated in this essay along with the definition of whether or not it has a formal employment relationship, i.e., precarious work is the situation defined by the ILO [18] and its updated version [20].

The significant changes in the nature of employment and work introduced in the 1970s by capitalism characterize the growth of flexible labor relations, with the emergence of job insecurity, instability, and erosion of working conditions [15]. Therefore, since 1970s we have seen a progressive reduction of employment in its more traditional scheme, characterizing the Taylorist-Fordist wage work and giving rise to productive restructuring of capitalism, in post-Fordism era, with the flexible accumulation or Toyotism and, in 2009, the spread of the platform economy as the ultimate expression of the flexibilization of work relations and precariousness [15,16].

The restructuring and downsizing of organizations in the 1990s and 2000s, which promoted major changes in labor relations, reduction of labor rights and job protection, are clearly seen and have become a social challenge, particularly in periphery countries [15,21]. Studies associating these changes with harmful effects on health have been conducted in several fields with different methodological approaches and will be highlighted in this essay [22,23,24].

During the pandemic, the expansion of the platform economy, an economic and social phenomenon that represents a great challenge for the future of work, caused unprecedented levels of deregulation of work relations in periphery or semi-periphery countries, such as Brazil, a process already observed before the pandemic. Such expansion occurred with "*high work precariousness* [mediated by digital platforms – Latin America and the Caribbean]*, characterized by work and wage instability, a significant proportion of unpaid time, long working hours, absence of socio-occupational protection, and lack of dialogue and representation options*" [6] (p. 5-6).

A multicenter study, coordinated by the Oxford University (United Kingdom), with participation from Brazil, showed precarious conditions of worker insertion in the platform economy, in the activity of delivering goods: "*the annual Fairwork Brazil scoring provides evidence that platform workers, as in many countries around the world, face unfair working conditions, and suffer without protections*" [25] (p. 2).

The number of people employed in the goods delivery sector in Brazil significantly increased during the pandemic, reflecting the expansion of the food delivery app industry. For example, a growth of 76.8% was reported in the period from the first quarter of 2016 to the second quarter of 2017; however, the peak of expansion occurred during the pandemic. In late 2020, an increase of 750% was observed, reaching 979.8% in the second quarter of 2021 [26]. Although different estimates were issued considering goods delivery app workers or professional motorcyclists without a formal agreement, Lapa [27], in a study that analyzes data from *Brazilian National Household Sample Survey – COVID-19* (PNAD-COVID19), reported 678,527 self-employed delivery workers in November 2020 in the country.

In 2016, a research program to address precarious work was proposed in the *International Journal of Epidemiology*; it aimed to "*establishing a compelling program that expands our understanding of health-related employment precariousness and the evaluation of policy programs*" [23] (p. 233). During the pandemic, and in the post-pandemic period, this program was updated and imposed, given the current conditions of increasing vulnerabilities of workers. Therefore, addressing precarious work that considers the new schemes of insertion in the platform economy and the traditional insertion in the market is a current challenge for experts who study the employment and health of workers.

In this sense, theoretical and methodological challenges have mobilized researchers with an interest in studying the construct of precarious work. Although knowledge has been produced in the last two decades about the health effects related to precarious work, the use of this construct is still restricted, based on isolated dimensions. Also, the various definitions of precarious work make it difficult to understand its magnitude in different social contexts and countries [15,22]. However, the theoretical knowledge of the multidimensionality of precarious work is promising, as well as the propositions for the methodological operationalization of construct measurement and production of epidemiological evidence.

In this perspective, a "*conceptual model relating precarious work, health, and quality of life*" is proposed by Benach et al. [15,23], which is structured as macro, meso and micro levels of determination of health and quality of life. At the distal pole of precarious work determination are the political powers of the market (corporations, institutions, trade unions), government (political parties), and society (social movements, non-governmental organizations, and civil society organizations). This distal pole promotes the labor market regulation (with its regulatory framework, and health and security legislation) and the welfare state (social policies and health policies, social benefits, environmental and consumer protection, and conditions for equity).

The labor market regulation and the existence or not of the welfare state will determine whether work is stable and protected or precarious work and its correlates, with informal work and unemployment. In this model, the authors admit that precarious work will affect the state of health and quality of life, whose proximal determinants will be, on the one hand, working conditions and, on the other hand, living conditions with deprivation of material resources (income, home). The authors also include social and family networks in the determination of protected or precarious work, attributing a minor role to them in this determination [15,23].

Another theoretical proposal to approach precarious work, by Bodin et al. [22], finds support in the model proposed by Benach et al. [15]. The authors report a gap regarding a common definition of precarious work and, consequently, regarding the empirical evidence of its role in health, which they consider as a high priority issue in the research program. For these authors, the multidimensional nature of precarious work is based on unfavorable characteristics found in the same job, such as levels of remuneration and non-monetary benefits, rights and representation in the workplace, duration and type of employment agreement. Also, they highlight the necessary interdisciplinary perspective to establish a common definition of the construct [22].

An important contribution is the systematic review by Kreshpaj et al. [20], which identified the various definitions of precarious work in the literature, with an important contribution to the debate, and constituted an emerging systematic review design, as it incorporated quantitative and qualitative studies. The authors [20] admit – and this is an unusual behavior among epidemiologists – the importance of interdisciplinary approaches for a better understanding of precarious work, its dimensions and sub-dimensions, as also observed by Bodin et al. [22].

The identification of three main dimensions of precarious work should guide the research, expanding the empirical results regarding precarious work and health. The dimensions of precarious work, according to Kreshpaj et al. [20], are: unstable and insecure work relations, inadequate or insufficient income, and insufficient rights and work protection.

Under the first dimension – unstable and insecure work relations – four sub-dimensions were identified in the literature: insecure contractual relationship, temporary agreement, underemployment, multiple contracts [20].

Studies compare direct agreements with employers, outsourcing contracts, through employment agencies, or self-employment. Also, agreements through third parties are not, in general, a free choice – on the contrary, they are often the only possible choice of employment. Studies also show

that outsourcing is associated with negative experiences, with unfavorable outcomes for the health of workers [15,20,28].

Guarantee of health protection, prevention of work-related diseases, and surveillance of the conditions in which workers perform their activities are some elements that have been weakened or eliminated in the process of worker hiring through third parties. This way, workers submitted to health risk conditions in the workplace, who are not directly subordinated to the service receiver, are in a less favorable position when compared to non-outsourced workers in the same workplace. Vulnerability in health and security of the outsourced workforce is found in current epidemiology literature, which shows a higher occurrence of occupational accidents among outsourced workers [29,30].

Studies contrast temporary agreement with permanent agreement or contracts for an indefinite period. Temporary work includes on-demand, intermittent, seasonal contracts of varied duration; in this case, the perception of insecurity can be linked with uncertainties regarding the contract duration and the expectation regarding its renewal, i.e., according to evidence, negative experiences and the effects on health and safety are consequently associated with the unpredictability of contract renewal for workers in recurrent temporary work agreement [20].

Despite the evidence of the effect of temporary contract on the health of workers, some methodological gaps have not been eliminated regarding the definition of such exposure. Occupational accidents, symptoms of depression, psychological stress, and musculoskeletal problems have been associated with temporary work or the unpredictability of work relations [15,20,28,29,30].

Full-time work is contrasted with part-time work, another sub-dimension of precarious work. Studies show relevant discussion about its effect on health, which can vary with the social and economic context. In favorable situations of labor market insertion, when part-time work is voluntary, it can be associated with positive experiences. However, negative experiences result from involuntary part-time work, when this is the only job option available, often to avoid unemployment, with submission to degraded conditions. Therefore, the effect of part-time work on health can be altered by social organization and labor market regimes, which determine it as voluntary or involuntary [28,29,31].

Although there are many different ways of measuring "multiple contracts", which make it difficult to synthesize evidence, studies indicate precarious work associated with situations involving multiple contracts, with increased health risks, specifically for occupational accidents [20,29].

The second dimension of precarious work found in the literature – inadequate income – was measured or defined in many different ways in the studies, but it constitutes a consistent dimension of the construct, identified as unstable or inconsistent income [20]. It can be associated with damage to health and poor living conditions of workers and their vulnerable families. The centrality of this dimension should be noted, given the fact that insufficient income, in a situation of job instability, defines social and work vulnerability. Then, the existence of intermittent or informal work in areas of artistic production or technical areas of high specialization, which involve high but unstable remuneration, is distinguished from the situation of workers in precarious employment, who earn a minimum amount for survival.

The third dimension of precarious work – insufficient rights and work protection – is expressed through four sub-dimensions found in the literature [18]. The lack of collective representation of workers is the first relevant sub-dimension, given the vulnerability of non-union workers to arbitrary dismissals, among other disadvantages. The second sub-dimension is the lack of social security, which implies the absence of work or government benefits to workers; the third sub-dimension is insufficient or absent work safety regulations, standards, and policies; and the fourth sub-dimension refers to the low power of workers to exercise their work-related rights and refuse inadequate conditions and demand better working conditions [20]. Also, the lack of rights and protection is particularly significant among informal workers, given their under-representation among union members, as indicated by Kreshpaj et al. [20].

These are the dimensions and sub-dimensions of the multidimensional construct of precarious work, based on scientific evidence from quantitative and qualitative studies [20].

Then, a theoretical advance defines the multidimensionality of precarious work, but methodological challenges are still observed in knowledge production. The construct operationalization through isolated dimensions predominates in empirical studies, which use the insufficient income dimension, or the temporary contract or underemployment sub-dimensions, to define precarious

work and investigate health outcomes associated with it. However, more recently studies have investigated precarious work and its multidimensionality.

There is consensus about the necessary interdisciplinarity and international cooperation for studies on precarious work, given the insubordination of this construct to reductionist approaches based on a single disciplinary field using methods that are not linked with studies of socioeconomic and cultural contexts and scenarios [15,20,22,23].

Epidemiological evidence: precarious work and health of workers

The health effects of production restructuring and downsizing of organizations in the last years of the 20th century and the first years of the 21st century, are reviewed in social epidemiology studies by Benach et al. [15]. The main findings of longitudinal studies show increasing morbidity among workers with anticipated feelings of unemployment insecurity when compared to workers with anticipated feelings of full retirement. Among workers who survive downsizing, morbidity is linked with continuous insecurity, loss of control over work, and overload due to reduced workforce [15].

Several health outcomes are found in these longitudinal studies: increase in the number of disease episodes; longer periods away from work; reduction of self-reported health status; increase in cardiovascular risk factors and acute cardiovascular events; more frequent use of health services; more musculoskeletal complaints; increased use of psychotropic drugs; and increase in the number of cases of sleep disorders, burnout, suicide, and early retirement [15].

More recently, epidemiological results about the effect of precarious work on health have become relevant because, although studies on isolated dimensions of precarious work predominate in the literature, they show that precarious work has been associated with physical and psychological outcomes regarding the health of workers. Impacts on the occurrence of occupational accidents, musculoskeletal disorders, and mental health are common topics analyzed in studies.

Precarious work and health impacts: occupational accidents, musculoskeletal disorders, and mental disorders

In Brazil, since the 1990s, with the production restructuring process observed particularly in the industrial sector, significant changes have affected the health of workers. Studies conducted with workers from the plastics industry in the 2000s in the metropolitan region of Salvador found a high prevalence of musculoskeletal disorders, with physical suffering expressed by pain, strongly associated with working conditions. These studies, conducted in 14 plastics factories, had access to these workers from the private world, who are usually inaccessible to researchers, but not access to population follow-up in the factories.

This obstacle may be the result of a scarcity of longitudinal studies analyzing workers in the private world in the country. Then, based on cross-sectional studies, precarious work was evident among these workers, who had reduced social benefits, job insecurity, short-term contracts, and low wages, as well as a significant disadvantage for female workers. Access to paid sick leave was not facilitated and return to work was not supported. Precarious work in that context was the only alternative to have an income [24,32,33,34].

These Brazilian studies on musculoskeletal disorders show results from a context of precarious work in late 1990s and early 21st century, right after the significant production restructuring process described by authors analyzing the sociology of work in Brazil, including Druck [21].

With the growth of the number of workers not in formal employment spaces – like factories and offices – a large portion of the workforce is forced to move to street spaces: street vendors, collectors of alternative urban transport, professional motorcyclists, and security guards are some of the occupations in precarious work spaces. An investigation on deaths characterized as occupational accidents in Salvador showed these victims were predominantly inserted in precarious work: 67% of deaths occurred on the streets and 60% were not of commuting people, that is, the street was their workplace. The findings showed absence of social and work protection: 61.5% of the fatal victims were workers without a formal and regular employment contract and with very low educational

level, 65% had completed elementary school, 47% were not linked with the Social Security system, and 44% had started working before 15 years of age. These data showed early or child employment, an indicator of social vulnerability, with a strong presence in the life of those who died while working. The median age at death was 38 years. As one of the dimensions of precarious work, low income was an important finding: 31.5% received up to one minimum wage in the region, and 48% received from one to three wages. Also, a high proportion (78%) of such deaths was of breadwinners, representing a strong impact on families [35].

Then, the flexibilization process that started in the 20th century, with emphasis on studies in the first decade and part of the second decade of the 21st century, expanded fast, associated with contemporary precarious work. Studies on precarious work and its association with accidents in the workplace have been conducted mainly in core countries – the United States and Western European countries [29].

"*Temporary contracts were by far the most common exposure studied in the included reports* (...) *can reflect job and economic insecurity, a lack of occupational experience and possibly also a lack of safety training and workplace introduction from the employer*" [29] (p. 347). Although temporary contracts may predominate among young people, with little work experience, which in itself can be a condition associated with accidents at work, the temporary contract seems to have an independent effect on the occurrence of accidents at work, as pointed out by Koranyi et al. [29]. Methodological issues emerge from studies that use temporary contracts, with challenges to be overcome, including the confounding role, which cannot always be controlled, of long, strenuous hours, causing physical and/or psychological fatigue, and which are associated with temporary work. Also, the association between a temporary contract and the existence of multiple contracts, which is also an independent risk for occupational accidents, should be further analyzed [29].

A consistently positive association was found among multiple employment contracts, outsourcing, and accidents at work [29,30]. Studies that investigated part-time jobs in the occurrence of occupational accidents promoted important discussions. Empirical findings, in theory, may suggest inconsistency between studies, as they show both a positive and negative association between part-time work and health; however, this is a promising discussion that is based on the context of either voluntary or involuntary part-time jobs [29,31].

A study on part-time work with nursing teams in Canada showed protection for occupational accidents – acute low back pain. However, in this sector, part-time work seems to be less determined by the precariousness of the labor market – involuntary part-time work – and more determined by the worker's choice, that is, voluntary part-time work. In this case, part-time work would allow more recovery time after handling the usual workload of this occupation, including moving patients, a critical task for acute low back pain, constituting a protection factor by reducing the daily working hours and exposure to work [36].

Regarding the lack of rights and protection and, particularly, of collective representation of workers, relevant epidemiological evidence is found. Studies report unionization associated with a higher occurrence of occupational accidents [37], but biases may be questioned in these cases [29].

Workers inserted in production processes with higher occupational risk may be those associated with unions, which influences the improvement of working conditions, with mitigation of risks as a result of union action. However, even with successful union actions, these risks, although mitigated, still exist in these processes. In these cases, a positive association between occupational accidents and being unionized may result from the uncontrolled confounding role of occupational risk in the production process [33].

In addition, union employees are usually better informed about the need to report an occupational accident and seek to exercise their rights, such as paid sick leave. Then, studies based on records of absence due to occupational accidents can support the hypothesis of a higher occurrence of occupational accidents among union members when these findings result from biases, participant information and/or selection and, among the latter, the healthy worker effect. In these cases, workers with serious accidents, away from work, were not analyzed in studies that only selected workers in full work activity [27].

In addition, precarious work presents obstacles to incident reporting so the results of studies may be inconsistent, showing a negative association between occupational accidents and precarious

work due to such underreporting. It can occur mainly with workers without access to paid sick leave, without a formal contract, given the situation of work insecurity that inhibits health complaints and incapacity for work, with workers fearing reprisals [29].

Occupational accidents are associated with precarious work, with studies that evaluated work career and not only the current work situation, in cross sections, or only in baseline cohorts. When comparing workers with a secure work career with workers in precarious work, these workers present twice the number of serious occupational accidents [38].

Also regarding the impact of precarious work on health, outcomes for the musculoskeletal system – the theme analyzed in downsizing phase studies mentioned above – have also been described in more recent studies. Temporary, daily, and part-time contract, when compared to permanent and full-time employment, was associated with a higher chance of musculoskeletal pain among salaried workers in South Korea. Also, multisite pain (pain in two or more body regions) predominated among precarious workers, indicating higher severity [39].

Recent longitudinal studies consistently report mental health outcomes resulting from precarious work, even when isolated dimensions of the construct are analyzed in these studies. It is possible to admit that, since the multidimensional definition of precarious work is relatively recent, epidemiological studies are still conducted with this limitation. Also, a larger part of this production is from core countries located in Western Europe – mostly Scandinavian countries – and in North America [28,40]. In this sense, the results must be analyzed with caution, given that any extrapolation must consider the social welfare and labor market regimes when expressing the effects of precarious work.

In addition, workers in precarious situations are less accessible by researchers and follow-up studies in longitudinal studies and, therefore, they are underrepresented. This situation applies to periphery or semi-periphery countries, whose conditions of labor market, social and work protection system, and low research funding cannot be well represented in contexts in high-income countries using an approach to low unemployment sectors [15,22,28].

Among these studies, there is consistent evidence that depression and anxiety are associated with precarious work, measured through its sub-dimension of temporary contract, which has been extensively investigated but isolated from the other dimensions of precarious work, leading to a variety of definitions that may refer to different aspects, not allowing comparisons. Just like part-time, the effect of temporary contract on mental health may also depend on its voluntary or involuntary character, the latter being associated with negative experiences and health effects [20,28].

However, important findings were obtained in longitudinal studies measuring more than one dimension of precarious work. They showed strong positive associations with effects on general mental health, symptoms of depression, psychological stress, and use of psychotropic drugs. Results of a meta-analysis show that workers exposed to precarious work are twice as likely to present these outcomes [28].

Regarding the methodological developments, a proposed scale has been validated to measure precarious work and its multidimensionality: the *Employment Precariousness Scale* (EPRES) was able to analyze, in a national study with workers in Chile (2020), a gradient of the impact on general health, mental health, and occupational injuries, according to exposure to low, medium and high score for work precariousness [40]. In 2021, using the EPRES validated in Sweden, a Swedish cross-sectional study also demonstrated a gradient of effect on general health and mental health determined by low, moderate, and high exposure to precarious work [41].

A cross-sectional study with Brazilian urban transport workers published in 2019 [42], was based on a theoretical model of precarious work multidimensionality and, although it did not use the EPRES [40], it used a proxy variable that sought equivalence with proposed multi-dimensions and showed a positive association between the highest work precariousness scores and the occurrence of common mental disorders, depression, sleep disorders, musculoskeletal pain, and absenteeism.

These studies help encourage the use of the multidimensional construct in epidemiological studies analyzing the health of workers, with promising results. These studies should incorporate a validated scale that enables the comparison of study results.

Final considerations

The COVID-19 pandemic undoubtedly highlighted inequalities in the world, causing its own impact on employment. Previous experiences with health and economic crises help measure the short- and long-term effects of this pandemic.

Precarious work is a central category when studying the expansion of inequalities in the post-pandemic period, given that precarious workers, in both formal and informal sectors, constituted a critically vulnerable group during the pandemic. Then, based on the evident growth of precarious work, which preceded the pandemic and expanded in the course of this health and economic crisis, it is possible to predict its growth in the post-pandemic period, given the current circumstances and trends.

The multidimensionality of the theoretical and methodological construct of precarious work must be addressed in order to contribute more effectively to the understanding of its impact on the health and life of workers. Theoretical models proposed in studies ensure important contributions that may promote advancement of empirical knowledge production. In this sense, epidemiological evidence that used other disciplinary fields as a theoretical source, in an interdisciplinary movement, has demonstrated the effect of precarious work on the health of workers, despite existing methodological challenges.

If current conditions persist, precarious work will expand in the future, with higher social exclusion and vulnerability in health for many occupational groups. Therefore, a priority measure would be updated research programs and policies to address the effects of precarious work on the health of workers, including their families and communities, considering the changes and what remains the same in the world of work.

The digital transformation of the economy and circumstances of workers in the platform economy can result in increased vulnerabilities, considering this new and expanded type of insertion has actually resulted in deep precariousness of working relations and conditions, with obvious impact on the health and life of workers.

Additional information

ORCID: Rita de Cássia Pereira Fernandes (0000-0002-3353-5365).

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Resumo

Este ensaio objetivou discutir a flexibilização do trabalho, acentuada no curso da pandemia de COVID-19, com ampliação do trabalho precário; e discutir modelos teóricos e desafios metodológicos para o estudo do trabalho precário, suas dimensões e os efeitos à saúde de trabalhadoras(es). A crise sanitária e econômica ampliou a vulnerabilidade social de trabalhadoras(es), já em curso em decorrência das mudanças trazidas pela flexibilização, globalmente, e pela Reforma Trabalhista brasileira. Os retrocessos se concretizam no trabalho precário, construto multidimensional que engloba as características dessa flexibilização, em suas três dimensões: (1) relações de trabalho instáveis, decorrentes de contratação insegura, contrato temporário, trabalho parcial involuntário, terceirização; (2) renda inadequada e instável; e (3) insuficiência de direitos e de proteção, com reduzida representação coletiva de trabalhadoras(es), que implica baixo poder de reação às condições aviltantes de trabalho, falta de seguridade social, e retrocessos no apoio regulatório em segurança laboral. Repercussões do trabalho precário na saúde – acidentes de trabalho, distúrbios musculoesqueléticos e transtornos mentais – são evidenciadas em estudos epidemiológicos, destacando-se as limitações teóricas e metodológicas ainda existentes. Conclui-se, que mantidas as bases atuais da inserção de trabalhadoras(es) sem proteção social e do trabalho, o futuro será de ampliação do trabalho precário. Destarte, evidenciar as relações causais entre trabalho precário e saúde é desafio contemporâneo da agenda de pesquisa e de políticas públicas que se impõe na sociedade, com destaque para serviços de saúde do trabalhador.

Trabalho Precário; Proteção Social em Saúde; Saúde do Trabalhador; Acidentes de Trabalho; Transtornos Mentais

Resumen

Este ensayo tuvo como objetivo discutir la flexibilización del trabajo, acentuada en el transcurso de la pandemia de la COVID-19, con la expansión del trabajo precario; y discutir modelos teóricos y desafíos metodológicos para el estudio del trabajo precario, sus dimensiones y los efectos sobre la salud de las trabajadoras(es). La crisis sanitaria y económica aumentó la vulnerabilidad social de los trabajadoras(es) ya en marcha, como resultado de los cambios provocados por la flexibilización, a nivel mundial, y por la Reforma Laboral brasileña. Los retrocesos se concretan en el trabajo precario, constructo multidimensional que engloba las características de esa flexibilización, en sus tres dimensiones: (1) relaciones laborales inestables, derivadas de contratación insegura, contrato temporal, trabajo parcial involuntario, tercerización; (2) ingresos inadecuados e inestables; y (3) insuficiencia de derechos y de protección, con reducida representación colectiva de trabajadoras(es), lo que implica un bajo poder de reacción ante condiciones de trabajo degradantes, falta de seguridad social y retrocesos en el apoyo normativo a la seguridad laboral. Las repercusiones del trabajo precario en la salud -accidentes de trabajo, trastornos musculoesqueléticos y trastornos mentales- se evidencian en estudios epidemiológicos, destacando las limitaciones teóricas y metodológicas que aún existen. Se concluye que de mantenerse las bases actuales para la inserción de trabajadoras(es) sin protección social y laboral, el futuro será de expansión del trabajo precario. Por lo tanto, evidenciar las relaciones causales entre trabajo precario y salud es desafío contemporáneo de la agenda de investigación y de políticas públicas que se impone en la sociedad, con destaque para servicios de salud del trabajador.

Riesgos Laborales; Protección Social en Salud; Salud Laboral; Accidentes de Trabajo; Trastornos Mentales

Submitted on 30/Mar/2022
Final version resubmitted on 06/Nov/2022
Approved on 16/Feb/2023