Chapter 11
Working Conditions and Effort-Reward Imbalance in Latin America

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11.1 Introduction

According to the World Health Organization (2007), both globalization and recent changes in the nature of work are probably worsening work related stress issues in Latin America. When this WHO document was published in 2007, very few studies on work stress in Latin-American countries had been carried out and no mandatory rules or risk standards had been implemented to promote good practices at the workplace against psychosocial risk exposure. However, a recent study showed that occupational health and safety priorities in the region have changed during the last decade pointing to the need to monitor psychosocial hazards and to address work-related stress, violence, harassment, unhealthy behaviors, and other workplace hazards (Kortume and Leka 2014).

The Pan American Health Organization (2015) asserts that the labor force in the Americas is made up of 484 million people, almost half of the total population. The organization also affirms that Latin America and the Caribbean contribute 62.3 % of the labor force in the region, equivalent to more than 300 million people many of them "exposed to dangerous work conditions ranging from exposure to chemical agents, to physical and biological dangers, ergonomic and psychological stressors, and unsafe conditions" (pp. 1).

In the context of economic globalization, Effort-Reward Imbalance (ERI) at work has been used as an indicator of psychosocial work-related stress in many

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countries around the world. Research using the ERI model and questionnaire in Latin America could help us understand how economic globalization and the changing working conditions are affecting workers' health in this part of the world. It could also help clarify whether economic, social and cultural characteristics of the region modify the impact of ERI on occupational health.

To contextualize the description and analysis of studies undertaken in Latin America that look into some health conditions and their relationship to ERI, this chapter first introduces a brief description of the work conditions to which workers in this subcontinent have been subject to over the last 8–10 years. We have considered it pertinent to highlight data that may serve as indirect indicators of effort and rewards. In addition, we consider it is interesting to offer a brief overview of health conditions in the sub region in order to allow readers to observe how such conditions are beginning to acquire a similar pattern to the one observed in developed countries, whereby chronic and stress-related diseases have been documented and how they are becoming increasingly associated with morbidity and mortality in the working-age population.

According to the above, the goals of this chapter are to:

(a) Provide a short general characterization of the labor market and working conditions in Latin America (in particular those related to the concepts of effort and reward), of existing legislation and regulations associated with psychosocial risk and stress, supplemented by some core data on health and wellbeing of people of working age.
(b) Undertake a systematic review and characterization of the studies published with samples from Latin America, which have assessed work stress using the ERI model. In addition to describing the prevalence of ERI as reported in the papers, and its association with the health of Latin American workers, in this chapter we undertake a critical analysis of published studies in order to identify their strengths and weaknesses, and offer suggestions for future research on the topic, in particular as far as based on the Effort-Reward Imbalance model.

11.2 Working Conditions and Employment in Latin America

Even though the information on the particular working conditions in this region is scarce, its link to the economic situation offers an approach to understanding such conditions. In this sense, the history of the changes of economic indicators in Latin America (rises and falls) is becoming increasingly similar to the patterns seen in the global economy. This is due to the fusion of the global financial markets and growing globalization in general, even though it is clear that indicators of economic growth have been lower than those of industrialized economies, especially since the 1980s. Weller (2011) mentions that during the first decade of 2000 and especially between 2003 and 2004 strong economic growth was reported that seemed to benefit the region, opening a path to a more favorable context for job creation and better

job quality, at the same time as it tried to re-regulate the labor market. However, the financial crisis of 2008–2009 interrupted this process of improvement, causing a decline in the indicators, whereby some of them, such as the unemployment rate, went back to levels similar to those present in the 1990s.

Weller (2011) describes four types of employment exclusion in the region: during the 1980s, exclusion from the labor market (e.g., lack of female incorporation) and from productive employment (lack of jobs in highly productive sectors) prevails, thus increasing urban informal employment; beginning in the 1990s and up until now, exclusion from employment (e.g., typical unemployment) and from good quality employment (e.g., precarious work) has expanded.

In agreement with these ideas, a report from the International Labor Organization (ILO) in 2012 for the Latin American region (International Labor Organization 2012) concluded that despite the apparent economic growth, there are still important shortcomings in available decent work as a result of precarious employment, including income insecurity, a decline in social protection, and high labor turnover. More recently, the report on work in Latin America and the Caribbean (International Labor Organization 2014) describes that the situation is marked by a deceleration of economic growth, where uncertainty and concern prevail. More vulnerable groups have worse working conditions. Indeed, the unemployment rate is 30 % higher for women, and youths aged between 15 and 24 face unemployment rates that are two to four times greater than those of adults. The urban unemployment rate reaches an annual average of 6.1 % for Latin America and the Caribbean, representing 15 million people unemployed, only counting urban areas. It is important to note that Guatemala, Panama and Brazil have the lowest unemployment rates, whereas the Bahamas, Jamaica and Belize have the highest, with no great changes over the past few years (Fig. 11.1).

The report of the ILO (2014) recognizes that global crises affect this region in a particular manner, and that there are problems beyond that of unemployment. These problems include that of employment quality, when we consider that there are 130 million people working in informal employment, which generally implies precarious working conditions with no kind of social protection. As is well known, the average rate of informal workers in the whole region is of 47.7 %, although there seem to be substantial differences between countries. For example, countries such as Honduras, Bolivia or Peru approach a 70 % rate, whereas Chile, Venezuela and Argentina have between 40 % and 50 %: all highly alarming rates (International Labor Organization 2012).

In the report about Decent Work in the Americas (ILO 2006), the ILO points out that the labor market structure in Latin America is typically fragmented. For example, almost a third of the total labor market is found in the rural areas, whereas 50 % of the total is taken up by independent and domestic workers, unpaid family workers, or salaried workers in micro companies (with up to five staff) who tend to represent the greatest concentration of poverty, informality and the lack of decent work.

On the other hand, although informal work seems to be a particular factor of precariousness that characterizes the labor force in Latin America, formal work also

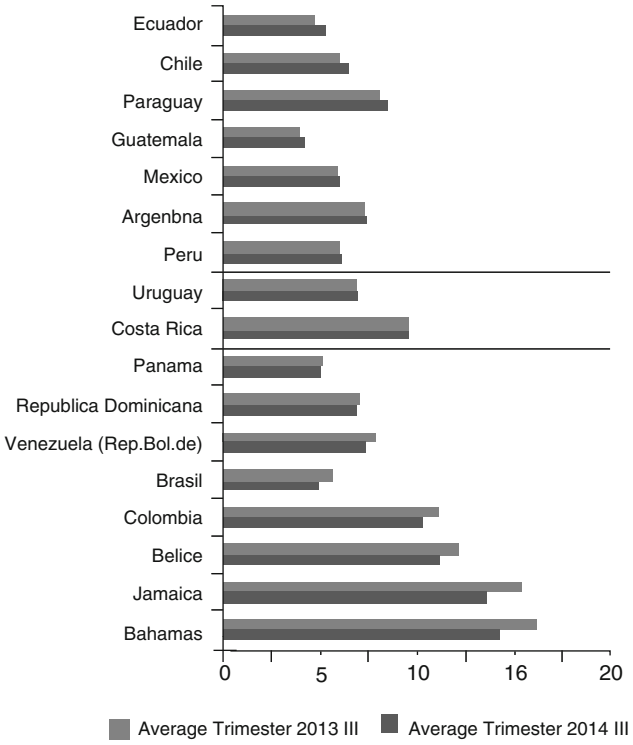


Fig. 11.1 Percentage of urban unemployment in Latin American countries between January 2013 and September 2014 (Source: ILO 2014)

has a number of very particular characteristics if we analyze the productive models and work organization systems typical to the region. For example, whereas developed countries have gradually abandoned the inherent forms of deeply entrenched hierarchical and rigid division of labor, known as Taylorism, and mass production has been transformed by means of automation and technological and communications advances into hugely flexible models of labor known as Toyotism, Total Quality Management, etc., in Latin America work organization systems continue to follow the old style Taylorist-Fordist tradition. They do, however, coexist with practices pertaining to labor flexibility and Toyotism models of the developed world which cannot fully materialize due to the technological lag in Latin America. This fosters types of particular mixed productive experiences that determine employment quality in the region (Rodríguez and Mendoza 2007), a combination that also establishes a mixture of stressful demands within each system, leading to psychosocial exposures that may be unique to Latin America and require further study.

Evidently, the employment quality indicators link up directly to the concepts pertaining to the effort/reward model, and are reflected in issues such as work overtime, long work hours, salaries, and job insecurity, among others. There are some data available that provide a complementary picture of such working conditions in

Latin American countries. For example, according to data from the Organization for Economic Cooperation and Development (2015), the three Latin American countries that are members of this organization have the longest working days of all. Mexico, in first place with 2228 h; Costa Rica in second place, with 2216 h; and Chile in fourth place, with 1990 h, whereas respective numbers in Western modern economies are substantially lower (e.g. USA 1789, Japan 1729, Sweden 1609, or Germany 1371 h). Similarly, a global survey on the percentage of workers that work overtime shows Peru as top of the list, with more than 50 % of its labor force working 48 h of overtime a week, whereas Argentina and Mexico present around 30 % (International Labor Organization 2007).

The above demonstrates not only that it is no longer the Asians that work the longest hours (please note that not all Latin American countries are included in the OECD's comparative studies), but also that globalization has encouraged developed countries to export work processes with particular demands to Latin America. For example, since 2010, Mexico occupies first place in terms of average hours worked per year, at the same time as the Mexican government highlights a significant economic growth in the industry (Expansión 2013).

With respect to wages, the trend is exactly the opposite of that for hours worked. The comparative study of salaries in countries that have been members of the OECD since 2013 shows that Mexico and Chile pay the lowest hourly rate (OECD 2015). As for 2013 hourly minimal wages in US Dollars are 0.62 and 2.32 respectively, compared e.g. to 3.02 in Turkey, 4.93 in Spain or up to 15.61 in Australia. This trend has come about in recent years and is consistent with other international surveys in which more Latin American countries take part. For example, a global salaries survey (adjusted by parity and purchasing power) applied by the International Labor Organization in 72 countries, shows that a number of Latin American countries, in particular Argentina, Chile, Brazil, Colombia and Mexico, pay wages that are located far below the median of the distribution of average global wage across the countries which is 1480 US Dollars per month (BBC 2012).

As for fundamental labor rights in Latin America, there are huge uncovered gaps in terms of freedom of union association and collective negotiation, forced labor, child labor and discrimination. For example, the region is host, according to the ILO, to 5.7 % of the global cases of complaint over freedom of union association, 29 % of the cases regarding layoffs against freedom of union association, 10 % of forced labor, 5.1 % of global child labor, and higher rates of gender or ethnic discrimination (ILO 2006).

Finally, although the global numbers of work accidents have diminished in general, there are only two exceptions: China and Latin America, where the number of fatal work accidents increased between 1998 and 2001. Workers with less protection tend to work in micro-enterprises, the informal economy and sectors such as agriculture, fishing, mining and construction (ILO 2006). In 2006 7.6 million work accidents were reported in the region, representing an area of opportunity for improvement with regards to working conditions in Latin America and the Caribbean (see Fig. 11.2).

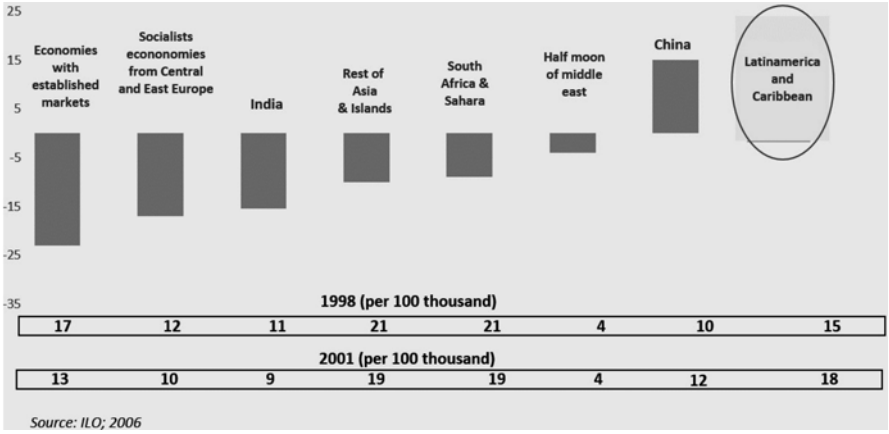


Fig. 11.2 Evolution of fatal work accidents in the world in the 1998–2001 period (percentage variation) (Source: ILO 2006)

In accordance with the above, the conclusions of a report recently published by the Organizacion Panamericana de la Salud-OPS (Pan American Health Organization-PAHO) point out that the conditions of employment (salary, unemployment, social protection, among others) and work (dangers and risks in the workplace)—both considered social determinants of health—have been transformed over the past 15 years due to the changes that have taken place in the world of work, increasing the multiple inequities in terms of workers' health in Latin America (Organización Panamericana de la Salud [OPS], 2013).

11.3 Progress in Legislation for Psychosocial Risk and Stress in Latin America

Despite the aforementioned areas of opportunity, all the mandatory labor laws or regulations in Latin America indubitably include the right to dignified work (which is free of health risks). Moreover, over the past 10 years, much progress has been observed in the regulations and legislation in the specific topic of the psychosocial risk of stress and the organization of work. The growing body of research on the topic of psychosocial risk in the international arena, together with the research undertaken in the Latin America region, as well as the changes in the policies and recommendations made by worldwide organizations such as the International Labor Organization (ILO) and the World Health Organization (WHO), may have had important influences on this progress.

Basically, the regulations have evolved in two ways. On the one hand, there are those regarding health and safety hazards, which as well as physical and chemical risks, and which finally also include psychosocial risks in some cases. On the other

hand, independent regulations now refer to the risks associated with psychological harassment at work (bullying). In particular, the latter has enjoyed the greatest legislative progress, not just because there seem to be more laws on the topic having been implemented in more countries, but also because the criteria for determining such harassment and its prevention seem increasingly more widely disseminated. For example, there are countries which have no legislation concerning psychosocial risk in general, but where they do have laws on harassment at work (Table 11.1).

Insofar as the regulations identified, these have a marked focus towards prevention and vigilance against psychological risk factors at work. Also the most common risks that appear among these regulations are the different types of job demands, control, participation or autonomy at work, interpersonal relationships among workmates and supervisors, leadership, organizational justice, rewards or recognition, work-family balance, and job security, among others. The theoretical base to which some of these regulations allude (for example, in Colombia and Mexico), point directly to the demand/control model or the effort/reward imbalance model as its conceptual base, although dimensions from other theoretical models and some that are not part of any of the models are also incorporated.

11.4 Health and Well-being in the Latin-American Region

Given that the relationship between income inequality and psychiatric disorders has been documented in both developed and developing countries (Wilkinson and Pickett 2006; Patel and Kleinman 2003), to describe the general health conditions in the Latin American region, we consider it pertinent to offer data on psychiatric/mental disorders. It is also important to describe not just some data on these disorders among the Latin American population, but also some of the other health indicators that could be related to the current labor market and its new stressful demands such as: cardiovascular diseases, other non-communicable diseases (chronic degenerative conditions), as well as mortality in general (Kivimäki et al. 2012; Landsbergis et al. 2013; Leka and Jain 2010; WHO 2003).

To begin with, it is worth pointing out that even though Latin America is not the world's poorest region, it is one of the least equitable, most unjust, and it has the most unequal distribution of wealth, which clearly leads to a bad "distribution" of health (CEPAL 2015). Using the historic register of the "Gini index" as an indicator of global inequality, some analyses point out that with the exception of some African countries and China, in general, the American continent seems to be the most unequal, especially Latin American countries and the United States (Hillebrand 2009; Ginni Coefficient 2015; Quandl 2015). Insofar as mental health, the World Mental Health (WMH) Survey Initiative, by the World Health Organization, reports studies in which highly unequal countries as measured by the GINI index such as Colombia, Mexico, and the United States show a prevalence of mental disorders that is among the highest of the 14 countries studied in 4 continents (17.8 %, 12.2 % and 26.3 % respectively). However, it is interesting to point out that some less

Table 11.1 Laws, articles and decrees related to psychosocial factors in Latin America

Country	Mandatory rule or regulation	Year	Topic included	References
Colombia	1010–2006	2006	Work harrasment	Congreso de Colombia. (2006). Ley 1010 de 2006. Recuperado de http://www.secretariasenado.gov.co/senado/basedoc/ley_1010_2006.html
	Resoluciòn 2646	2008	Psychosocial risks	Ministerio de la Protección Social. (2008). Resolución 002646 de 2008. Diario official 47059. Recuperado de http://www.alcaldiabogota.gov.co/sisjur/normas/Norma1.jsp?i=31607
Argentina	Ley No. 13168	2003	Work violence	Senado y Cámara de Diputados de la Proviencia de Buenos Aires. (2003). Ley 13168. Recuperado de http://www2.mp.gba.gov.ar/intranet/Legislacion/ley13168_violencialaboral.doc
Chile	La Ley 20.607	2012	Work harrasment	Dirección del Trabajo. (2012). Ley N°20.607. Diario Oficial. Recuperado de http://www.dt.gob.cl/consultas/1613/w3-article-99176.html
	Resolución 218	2013	Psychosocial risks assesment	Departamento de Salud Ocupacional del Instituto de Salud Pública de Chile. (2013). Resolución 2018. Biblioteca del Congreso Nacional de Chile. Recuperado de http://www.leychile.cl/Navegar/index_html?idNorma=1048620
Uruguay	Ley N° 18.561	2009	Work violence	Senado y Cámara de Representantes de la República Oriental del Uruguay. (2009). Ley N°18.561. *Publicada D.O. 21 set/009 – N° 27819*. Recuperado de http://www.parlamento.gub.uy/leyes/AccesoTextoLey.asp?Ley=18561&Anchor=
Puerto Rico	Proyecto	2014	Work harrasment	http://www.elnuevodia.com/negocios/consumo/nota/aboganporaprobaciondeleycontraacosolaboral-1792674/
Brasil	Ley 2.120 (Ubatuba)	2001	Work harrasment	Cámara Municipal de Ubatuba. (2001). Ley N° 2.120. Recuperado de http://www.assediomoral.org/spip.php?article227
	12.561 (Rio gde do sul)			Asamblea Legislativa de Rio Grande de Sul. (2006). Ley Complementaria 12.561. Recuperado de http://www.assediomoral.org/spip.php?article256

Venezuela	Art. 56.5 LOPCYMAT	2005	Psychosocial risks Work harrasment	Asamblea Nacional de la República Bolivariana de Venezuela. (2005). Ley Orgánica de Prevención, Condiciones y Medio Ambiente de Trabajo, Art. 56.5. Recuperado de http://www.medicinalaboraldevenezuela.com.ve/archivo/LOPCYMAT.pdf
Perú	Decreto: N° 005-2012-TR.Ley N° 29783	2012	Psychosocial risks	Ley de Seguridad y Salud en el Trabajo. (2012). Modificación del Reglamente de la Ley N°29783 por Decreto Supremol N° 005-2012-TR. Recuperado de http://www.mintra.gob.pe/normaCompletaSNIL.php?id=3601
México	Supreme court articles	2012	Work harrasment	Coordinación de Derechos Humanos y Asesoría de la Presidencia/Suprema Corte de Justicia de la Nación. (2012). Manual de Buenas Prácticas para Investigar y Sancionar el Acoso Laboral y/o el Acoso Sexual en la Suprema Corte de Justicia de la Nación. Recuperado de: https://www.scjn.gob.mx/Documents/MANUAL%20DE%20BUENAS%20PRACTICAS.pdf
	Occupational health mandatory rules	2013	Psychosocial risks	
	Official Mexican Norms (in progress)	2015	Psychosocial risks	Secretaría de Gobernación. (2014). Reglamento Federal de Salud y Seguridad en el Trabajo. Recuperado de http://www.dof.gob.mx/nota_detalle.php?codigo=5368114&fecha=13/11/2014

unequal countries like France and Holland, also present a high prevalence of such disorders (18.4 % and 14.8 %) (Demyttenaere et al. 2004; Kessler et al. 2009).

With respect to mental health, it is necessary to point out that in all Latin American countries, mental or neuropsychiatric disorders are the most prevalent. Depressive disorders have been increasing across the globe, so much so that the WHO forecasts that by 2020, they will be the second leading cause of sick leave after complications such as heart attacks, coronary insufficiency or strokes. Mental problems are also an important cause of disability that we know is stress-related (DeVries and Wilkerson 2003;WHO and ILO 2000; Stansfeld and Candy 2006). For instance, a recent study by Kohn and Rodríguez (2009) indicates that neuropsychiatric disorders make a substantial contribution to the total number of life years lost or lived with disability in all Latin American countries, with estimated percentages ranging from 15,1 % in Bolivia to 30,5 % in Chile.

There are also considerable differences in the main causes of mortality between Latin America and other regions of the world. Compared to other countries of the American continent with different development conditions, such as the United States and Canada, among working-age people, ischemic heart disease causes less deaths in Latin America than in Canada and the United States (8,96 % vs. 13.12 % respectively). However, chronic problems such as diabetes, cerebrovascular disease and hypertensive diseases cause more deaths in Latin America than in the USA and Canada (3.27 %, 3.51 %, and 2.18 % respectively) (PAHO 2012). In fact, a recent comparative study undertaken by the OECD on diabetes among adults aged 20–79, shows that the only two Latin American member countries of OECD (Mexico and Brazil) occupy first and second place with the highest prevalence (15.9 % and 10.4 % respectively). Similarly, these countries have a 10-year lower life expectancy at birth than developed countries (73 years). Moreover, Mexico, in particular, occupies second place in terms of obesity at international level, only second to the United States (OECD 2013). The same survey shows that when comparing ischemic heart disease between countries, although Mexico doesn't present the highest death rate for this cause, it does show the greatest percentage of change in the trend from 1990 to 2011, which means that this disease seems to be increasing significantly in the region (OECD 2013).

Likewise, given that unhealthy lifestyle habits and work stress play an important role in their origin, non-communicable diseases may be a good indicator of the health of Latin American workers. As we can see in Table 11.2, the prevalence of non-communicable diseases, among them hypertension and type II diabetes in adults, varies notably between countries. Guatemala seems to be an extreme case in which all percentages are low, whereas Argentina, Chile, Mexico and Uruguay show higher statistics in general that are probably closer to those found in European and North American countries.

It is a well-known fact that not enough studies have been carried out to explain the difference in the prevalence of non-communicable diseases among Latin American countries and the rest of the world. We could speculate that the socially and culturally determined eating patterns may play a relevant role, given that Mexico, Argentina, Chile and Uruguay are among the countries that consume the

Table 11.2 Mortality according to age for all non-communicable diseases (NCD), percentage of deaths caused by them, and prevalence of hypertension and type II diabetes in Latin-American adults

	Normalized mortality rate according to age for all NCDs (per 100.000 inhabitants in 2008)		Percentage of deaths caused by NCD	Prevalence of hypertension in adults (percentage)		Prevalence of type II diabetes in adults (percentage)	
Countries	Men	Women		Men	Women	Men	Women
Central America							
Costa Rica	431	333	81	26	25	8	8
El Salvador	539	449	67	21	19	9	7
Guatemala	503	421	47	13	14	9	8
Mexico	543	412	78	32	31	20	
South America							
Argentina	613	366	80	32	33	8	10
Brazil	614	428	74	22	25	5	6
Chile	501	313	83	29	25	8	10
Colombia	438	351	66	28	19	3	2
Ecuador	434	336	65	43	35		
Peru	408	339	60	38	31		
Uruguay	651	378	87	33	31	6	5

Source: Adapted from Baldwin et al. (2013)

most calories per-capita in the region (Bermudez and and Tucker 2003). Despite the fact that it is not possible to make clear conclusions regarding the origin of such problems, these data are presented in this context because it is worth remembering that work stress has been associated not only with obesity but with unhealthy eating habits and low levels of physical activity as well as with both hypertension and type II diabetes (Roos et al. 2007; Devine et al. 2003; Kearney et al. 2004; Lowden et al. 2010).

11.5 Systematic Review: Studies Using the Effort-Reward Imbalance Model in Latin America

Within the context of the aforementioned precariousness of work conditions, over the last decade, some Latin American researchers have begun to think about the impact that these conditions could have on workers' health, especially in terms of chronic problems, mental health indicators or on their ability to work. We followed the method described below to characterize the studies that have used the ERI model and questionnaire to study work-related stress in workers in Latin America, and its impact on their health.

11.5.1 Methodological Strategy

The authors of this chapter followed two paths to identify the studies that could be included in this review. The first was to write to a number of Latin American colleagues that work in the field and ask them to send information on any studies they may have undertaken using the ERI model. The second, consisted in a literature search based on the following criteria:

1. Empirical studies published up to July 2015 in any peer-reviewed journal.
2. Studies undertaken involving populations from any of the Central or South American countries.
3. Studies that used the ERI model and its instrument for data gathering and interpretation.

The article search was undertaken using the following databases or indexes: Scielo, ISI, Redalyc, Scopus, Dialnet, Lilacs, Psicodoc, Pubmed. The key words used for the search were ERI, esfuerzo-recompensa, effort-reward imbalance, estrés laboral, job stress, factores psicosociales laborales, psychosocial working conditions, psychosocial risk factors.

The first search procedure allowed us to receive information on a large number of works, some of which are as yet unpublished, and others are in the process of being prepared for publication (for example, thesis work, and studies only presented at congresses). Our final decision was to limit ourselves, for this chapter, to articles that had been published in peer-reviewed journals or peer-reviewed chapters of books, in order to guarantee a minimum level of quality insofar as the studies we used. This decision also allowed us to be fair to all our colleagues, given that all those we did not contact directly or those that were not in the same networks as the colleagues we knew, would have otherwise had less chance of their work being identified.

Following the second search procedure, the authors of this article first carried out an independent search and then, together, confirmed the coincidences in their results. This procedure brought to light a number of studies and it allowed us to affirm that almost all the articles published and sent by colleagues that responded to our invitation were included in our literature search. Two studies, despite having been published, were not identified in the search as they had been included in a peer-reviewed book but not included in the consulted databases. We decided to include these articles in our review.

One of the studies identified had used the ERI as a model to undertake and interpret a semi-structured interview, but it did not use the ERI questionnaire (Tejada and Gómez 2009). This work was excluded, as it was not comparable to any other study.

Once the articles to be used as the object of analysis had been identified and located, they were described using the following criteria:

(a) Studies' country of origin.
(b) Authors and publication information.

(c) Sociodemographic information of the sample, region of origin within the country, participation rate.
(d) Version of the questionnaire used.
(e) Psychometric information of the instrument.
(f) Other models or questionnaires on work stress used simultaneously.
(g) Study goal.
(h) Study design.
(i) Main results.
(j) Health outcome related to ERI model
(k) Discussion.
(l) Contextualization offered for having used the ERI model.

11.5.2 Results

The search identified 46 articles published between 2008 and 2015; however, we also found that some of the publications (of Brasil and Chile) refer to the same sample, but report different health outcomes in different papers. Origins of the studies were Brasil (17 studies/25 publications), Chile (6 studies/7 publications), México (6), Colombia (3), Venezuela (2), Cuba (1), Perú (1), multiple countries (1).

The studies, in general, had three goals: (a) to validate the questionnaire (19.57 %), (b) to describe the prevalence of effort-reward imbalance in a particular group of workers (6.52 %) or (c) to relate ERI with a health outcome (73.91 %).

The most relevant information from the nine studies whose central purpose was to assess the psychometric properties of the ERI questionnaire is presented in Table 11.3. It describes the origin and size of the samples and the average values found for the factors that make up the instrument. Despite the variability in the samples size, ranging from 100 to 3010, and despite the different occupations included, the internal consistency of the ERI scales reported in these studies are, on the whole, satisfactory and comparable with those reported by studies of ERI in other countries. The different validity indicators (construct, content and convergent) showed adequate adjustment indices in all cases.

As a convergent validity criterion we considered it interesting to describe the coincidence in the ERI scores with those of the instruments that measure closely related concepts. A good number of studies (n = 16) assessed in their samples simultaneously the ERI and the Job Content (JCQ) questionnaires. However, only the studies carried out in Colombia reported correlations between the Job Strain indicator and ERI, reporting values of between 0.2 and 0.6, significant in all cases, except for one. The remaining studies pointed out that the prediction capacity of the considered health variables increased when taking into account simultaneously effort-reward imbalance and Job Strain.

The over-commitment scale was not assessed in any of the studies as a moderating variable of the impact of effort-reward imbalance on health, as suggested in the original model. The studies that measured this factor described its prevalence in

Table 11.3 Description of validation studies

References	Language	Sample Size	Sex	Occupations studied	City of origin of the sample	Averages (SD) of ERI factors	Alphas	Other results	ERI Version
Chor et al. (2008)	Portuguese	89	Women 55 %, men 45 %	White collar workers, nurses and nurses assistants	Rio de Janeiro (Brazil)	Effort 13 (3.9)	0.68	The exploratory factorial structure -AFE-,was fairly consistent with the model's theoretical components with some minor exceptions such as the overlap between "effort" and "overcommitment" scales and an independent contributionof job insecurity	23 items
						Reward 45.7 (7.4)	0.78		
						Overcom. 13.8 (3.6)	0.78		
Griep et al. (2009)	Portuguese	1509	Women 86,5 %; men 13.5 %	Nurses and nurses assistants	Rio de Janeiro (Brazil)	Effort 12.8	0.73	With reference to corrected item-total correlations, adequate performance was observed for most items. Overall, fit indices (of Confirmatory factorial validity -CFA-) for the ERI questionnaire were adequate. For the overcommitment scale, the best adjustment of the model was obtained when correlated errors between items were considered. (worst loading item: "work overtime")	23 items
						Reward 45.2	0.76		
						Overcom. 13.6	0.75		
Silva et al. (2010)	Portuguese	100	Women 38 %; men 62 %	Workers of a bank	Minas Gerais (Brazil)	Effort 12.43 (4.28)	0.70	Exploratory factor analyses were consistent with the factors of the theoretical model. Few ítems load in more than one factor. (Worst loading item: "physically demanding")	23 items
						Reward 39.22 (14.86)	0.95		
						Overcom. 13.64 (4.01)	0.86		

Ansoleaga et al. (2013a, b)	Spanish	3010	Women 49 %; men 51 %	Various	National (Chile)	Effort (no inf)	0.63	Confirmatory factor analyses (CFA) showed good structural adjustment (RMSEA = 0.054 and CFI = 0.98), and dose-response association between incremental exposure to the psychosocial dimensions of work and distress	Short version 10 items
						Reward (no inf)	0.74		
						Overcom. (no inf)			
Gómez-Ortiz (2010)	Spanish	1922	Women 53.5 %; men 46.5 %	Various	Bogotá (Colombia)	Effort 15.41	0.73–0.81	Exploratory factor analysis with varimax rotation showed three factors as the best solution. Correlation with JCQ (to test convergent validity) varied between 0.2 and 0.6 for different groups. The correlations with the health indicators (GHQ) of the Colombian samples, that test predictive validity, show that the scales of the ERI are positive correlated with the majority of the health indicators. (worse item loading: "easily relax and 'switch off' work")	23 items
						Reward 40.08	0.80–0.87		
						Overcom. 15.37	0.71–0.80		
Arias-Galicia (2014)	Spanish	346	Women 100 %	House wifes and women with an extra occupation	Cuernavaca (México)	Effort 13.32 (5.4)	0.84	Confirmatory factor analyses (CFA) confirmed the structure of the ERI questionnaire and correlations with mental health indicators, (self-esteem, self-efficacy, mental and physical health) were in the expected direction	23 items
						Reward 46.22 (8.4)	0.79		
						Overcom. 15.02 (3.3)	0.67		

(continued)

Table 11.3 (continued)

References	Language	Sample Size	Sex	Occupations studied	City of origin of the sample	Averages (SD) of ERI factors	Alphas	Other results	ERI Version
Camacho-Ávila et al. (2014)	Spanish	324	Women 48.8 %; men 36.4 %	Blue-collar	Cuernavaca (México)	Effort	0.90	The confirmatory factor analyses (CFA) confirmed the structure of the ERI questionnaire; Reliability levels were satisfactory. Design of response options were complicated for the participants. (Worse item loading: "easily relax and 'switch off' work")	Versión de 23 items
						Reward	0.82		
						Overcom	0.69		
Díaz and Feldman (2010)	Spanish	233	Women 75.3 %; men 23.3 %	Health workers (physiotherapist, psychologist, nurses, therapist, occupational therapist, dentists)	Caracas (Venezuela)	Effort (no inf.)	0.83	Exploratory factorial analyses confirmed three factors (effort, Reward and overcommitment) of the original model (worse item loading: "easily relax and 'switch off' work")	23 items
						Reward (no inf.)	0.87		
						Overcom. (no inf.)	0.57		
Juárez-García et al. (2015)	Spanish	1292	Women 57.4 %; men 42,6 %	Health workers	Various countries (Argentina, Chile, Colombia, México, Peru, Venezuela)	Effort	0.80	Overall confirmatory factor analyses (CFA) confirmed the theoretical structure of the ERIQ. The effort and overcommitment scales were invariant (equivalent) across the six countries, but the reward scale was not totally invariant. Several associations between ERIQ and mental health remain significant after controlling for sociodemographic variables	23 items
						Reward	0.86		
						Overcom.	0.73		

			Means	Effort	Reward	Overcom			
			Global N = 1292	14.00	42.81	13.37			
			Argentina N = 104	11.09	45.67	13.95			
			Chile N = 67	13.19	44.13	14.00			
			Colombia N = 294	15.34	44.47	14.44			
			México N = 322	13.7	44.03	12.96			
			Perú N = 175	12.71	41.09	13.37			
			Venezuela N = 330	14.9	40.45	12.35			

each sample and related it directly to the health outcome studied. However, this lack of testing the moderating effects of over-commitment is not a specific fact of Latin-American studies since it is commonly observed so far in international research on the model.

Out of the publications mentioned, 26 studies analyze the relationship between ERI and health or describe the prevalence of ERI. These investigations demonstrate a great deal of variability in the size of the samples studied, as can be seen in Table 11.4. One study assessed only 15 workers that were compared to a control group of similar demographic characteristics; 5 studies included samples of less than 100 workers (57–99 range); 15 studies involved between 100 and 1000 participants, and only 5 studies had samples between 1000 and 3010 participants.

Several samples had similar occupations, mostly nurses and health workers, (which was the case in 13 of the 26 studies), military personnel, teachers, and professional drivers. Other samples included people with different occupations, usually from the same company (bank, mining company, electrical company) but also from multiple companies. Only one Chilean study reported having used a national sample of salaried workers (3010 participants).

Another important characteristic of the samples is that they include a majority of women. Eighteen of 26 studies included only women, or women represented at least 75 % of the samples. Three studies included only men and in one study men were the majority (95 %). Five studies included more or less equal numbers of both sexes, and in one there is no clear information of the distribution.

Importantly, all the studies involved a cross-sectional design with the exception of two that were carried out in Brazil. The first of the two exceptions was a case-control study that included 385 participants, 160 cases (that required sick leave benefits for over 15 days after having been diagnosed with a "mental and behavioral disorder") and 225 controls (who took sick leave for other diseases). Women constituted 43.3 % of this group (Martinez et al. 2015). The second was a cohort study which related work stress with work ability carried out 3 years later that included 1022 participants in the first wave and in which 41.4 % of these participants responded to the second wave of questionnaires. The participants were all workers in a private hospital, of which 72.1 % were female (Silva-Junior and Fischer 2014).

The samples of the studies whose purpose was to determine the prevalence of ERI and/or it relationship to health outcomes (analytic studies) were selected fundamentally from Rio de Janeiro, Sao Paulo and Minas Gerais (Brazil); Santiago and a national sample (Chile), Cuernavaca, Xochimilco, León, Torreon and Mérida (Mexico), Bogota (Colombia), Caracas (Venezuela) and Habana (Cuba). Brazil has carried out the most studies (and has the most publications) using ERI. Twenty-nine of the publications (63 %) have been carried out in English, 14 (30.5 %) in Spanish and 3 (6.5 %) in Portuguese.

Most of the study designs are cross-sectional (44 of 46), and although this does not characterize only Latin American studies, the fact of this design does limit their contribution to clarifying the causal relationships between work conditions and health.

Table 11.4 Description of studies with interest on prevalence or relationships ERI-health indicators

References	Sample size	Occupation	Sex	Participation rate	Country	City	Health outcome	Alphas	Scales averages (standard deviation) and prevalences ERI: effort-reward imbalance
Fogaça et al. (2009)	57	Physician and nurses in two pediatric intensiv care units	Women 82.5 % men 17.5 %	50 %	Brasil	Sao Paulo	Quality of life	No information	Mean effort: 8.07 (2,70); mean rewards:13.4 (2.89)
Fogaça et al. (2010)							Prevalence among different health profesionals	No information	Mean effort: 8.16 (1.91) physicians at pediatric ICU; 8.25 (2.45) physicians at the newborn ICU. Mean reward: 13.08 (3.15) physicians at pediatric ICU; 13(2.45) physicians at the newborne ICU
Fischer and Martinez (2013a)	514	Nurses	Women 100 %	83.8 %	Brasil	Sao Paulo	Work ability	Effort: 0.74; reward: 0.83; overcom.: 0.73	Mean effort: 11.6 (3.7); mean rewards: 50.7 (4.9); mean overcom.: 12.3 (3.1); ERI: 0.8 %
Fischer and Martinez (2013b))	79	Food service professionals	Women 82.9 %; men 17.1 %	96.2	Brasil	Sao Paulo	Work ability	Effort: 0.73; reward: 0.81; overcom.: 0.78	Mean effort:11.8 (3.7); mean rewards: 50.3 (5.1); mean overcomm: 12.9 (3.6)

(continued)

Table 11.4 (continued)

References	Sample size	Occupation	Sex	Participation rate	Country	City	Health outcome	Alphas	Scales averages (standard deviation) and prevalences ERI: effort-reward imbalance
Griep et al. (2010, 2011)	1307	Nurses	Women 100 %	93.9	Brasil		Self-rated health	Effort: 0.73; reward: 0.76; overcom.: 0.75	Using tertiles: high effort: 25.9 %, low reward: 25.6 %, high overcommitment: 28 %
							Sickness absenteeism	Effort: 0.73; reward: 0.76; overcom.: 0.75	Using tertiles: hight effort: 32.3 %; low reward 34.5 %; ERI and overcom. Present: 17.3 %
Haikal et al. (2013)	752	Health workers (technitians, assistants, physician, nurses)	Women 80 % men 20 %	95	Brasil	Montes Claros	Prevalence among different health proffesionals	No information	ERI: 66.9 %; overcom.: 2.5 %
Martinez et al. (2015)	1022 (first wave); 423 (second wave)	Workers of an hospital	Women 72.1 % of the second wave;		Brasil		Work ability	No information	No specific information about prevalences or means
Martins and Lopes (2012; 2013)	506	Militars	Men 100 %	92	Brasil		Physical activity	No information	ERI: 12.6 %
							Common mental disorders	No information	Using tertiles: cases with CMD have low effort-high reward: 22 %; loow effort-low rewards: 35 %; high effort-high reward: 48 %; high effort-low rewards: 55 %

Rotenberg et al. (2014)	1122	Nurses, technicians and nurses assistants	Women 100 %	89.4	Brasil	Rio de Janeiro	Minor psychiatric disorders and recovery from work	No information	No specific information about prevalences or means
Silva-Junior et al. (2011, 2014)	1436	Nurses	Women 87.3 %; men 12.7 %	No information	Brasil	Rio de Janeiro	Work ability	No information	No information
	385 (160 cases and 225 controls)	No information	Women 43.3 %; men 56.7 %	No information	Brasil	Sao Paulo	Sickness absenteeism	Effort: 0.79; reward: 0.86; overcom.: 0.85	Cases ERI: 65.8 %; controls ERI: 34.2 %; ERI + overcommitment cases 58.1 %; controls 41.9 %
Silva et al. (2008, 2010, 2011)	696	Nurses	Women 87.8 % men 12.2 %	69.9	Brasil	Sao Paulo	Perceived health	No information	Mean overcom.: 14.03 (3.1); ERI: 7.8 %
							Work hours	No information	ERI: 7.8 %;
							Health related quality of life (perceived health)	No information	ERI: 7.8 %;

(continued)

Table 11.4 (continued)

References	Sample size	Occupation	Sex	Participation rate	Country	City	Health outcome	Alphas	Scales averages (standard deviation) and prevalences ERI: effort-reward imbalance
Silva and Barreto (2010a, 2010b, 2012)	2054	Employees of a bank. White collar or managerial positions	Mujeres 50 % Hombres 50 %	82.16	Brasil	National	Health related quality of life (perceived health)	Effort: 0.82; reward: 0.80; overcom.: 0.85	No specific information about prevalences or means
							Self-rated health	Effort: 0.82; reward: 0.80; Overcom.: 0.85	Using tertiles high ERI: 16.12 %; high overcommitment: 6.20 %
							Minor psychiatric disorders	Effort: 0.82; reward: 0.80; Overcom.: 0.85	No specific information about prevalences or means
Souza et al. (2012, 2011)	158	Various of the same electric company	Men 100 %	98.2 %	Brasil	Northeast of Brasil	Depression	No information	Using tertiles: high effort: 48.7 %; low reward: 60.1 %; high overcom.: 53.2 %; ERI:32.1 %: effort mean: 13.73 (5.07); reward mean: 46.54 (7.48); overcom. mean: 14.93 (2.15); ERI in depress workers 39.2 %; in non depress 8.4 %; 50 % of workers with ERI had mental disorders
							Common mental disorders	No information	

Teles et al. (2014)	762	Primary health workers	Mujeres 79.9 % Hombres 10.1 %	95.6	Brasil	Minas Gerais	Quality of life	Effort:0.76; reward: 0.73; Overcom.: 0.78	ERI: 24.6 %; overcommitment: 40.50 %
Ansoleaga and Castillo-Carniglia (2011))	77	Non clinical workers in a public hospital	Mujeres 46 % Hombres 54 %	Latitud decisional 0,90	Chile	Santiago de Chile	Depression, anxiety and psychotropic drugs	Brief scale; no information	ERI: 75 %
Ansoleaga (2015)	782	Health workers in a pediatric hospital	Mujeres 76.9 % Hombres 13.1 %	No information	Chile	Santiago de Chile	Depression, psychological distress and psychotropic drugs	Brief scale; no information	Effort: 51 %; low reward: 51 %; overcommitment: 41 %; ERI: 67 %
Ansoleaga and Toro (2010)	303	Random sample in a mine enterprise	Mujeres 5 % Hombres 95 %	No information	Chile	No information	Depression	No information	ERI: 33 %
Ansoleaga et al. (2013a, b, 2014)	3010	National sample	Women 49 % men 51 %	57	Chile		Depression	Brief scale effort: 0.63; reward: 0.74;	High effort: 28 %; low rewards: 45 %;(not explain how define low and high effort and rewards); ERI: 50 %
							Alcohol consumption	Brief scale effort: 0.63; reward: 0.74;	Effort: 28 %; low rewards: 45 %, ERI: 50 %

(continued)

Table 11.4 (continued)

References	Sample size	Occupation	Sex	Participation rate	Country	City	Health outcome	Alphas	Scales averages (standard deviation) and prevalences ERI: effort-reward imbalance
Canepa et al. (2008)	68	Health workers	Women 91.2 % men 18.8 %	No information	Chile	Santiago de Chile	Mental health	No information	Mean effort: 11.19 (3.76); mean rewards: 44.11 (7.38); ERI: 0.60 (0.31)
Cendales et al. (2014)	142	Professional drivers	Men 100 %	35.5	Colombia	Bogotá	Blood pressure and mental health	Effort: 0.74; rewards: 0.85; Overcom.: 0.71	Mean ERI: 0.484 (0.26); mean overcom.: 12 (3.2)
Gómez-Ortiz and Moreno (2009)	251	School teachers	Women 76.9 % men 23.1 %	95	Colombia	Bogotá	Blood pressure and mental health	Effort: 0.80; rewards: 0.80; Overcom.: 0.80	Mean effort: 17.6 (5.5); mean reward: 43.7 (8.7); mean overcom.: 18 (4.1); ERI: 22.3 %
Aguilar-Zavala et al. (2012)	290	No información	Mujeres 100 %	No information	México	León, Torreón, Mérida	Postmenopause symptoms	No information	No specific information about prevalences or means
Sánchez-Barajas et al. (2015)	100	Women at peri- and early postmenopause	Mujeres 100 %	No information	México	León	Indicators of artherosclerosis	No information	ERI mean: 0.33
Martínez-Alcantara (2013)	199	Faculty of an University	Mujeres 58 % Hombres 42 %	68	México	Xochimilco	Various psychosomatic disorders and fatigue	No information	Using median: high effort: 37 %, low reward: 33 %, overcommitment: 42 %

Tamez-González et al. (2012)	15	Computer workers	Women 86.6 %, men 13.4 %	No information	México	Xochimilco	Prevalence or levels of ERI in the sample	No information	On line department: mean effort : 12; mean reward: 18.2; mean overcom.: 9.57. Control department: mean effort:7.42; mean rewards: 30.66; mean overcom.: 7.16
Blanco-Gómez (2010)	339	Physiotherapist and occupational therapist	Women 77.58 % , men 22.41 %	No information	Venezuela	Caracas	Emotional work	Effort: 0.7; reward: 0.84; Overcom.: 0.62	Effort mean: 14.84 (4.35); reward mean: 40.41 (8.81); overcom. mean: 12.94 (3.24)
Lourdes-Marrero et al. (2008)	78	Health workers	Women 100 %	No information	Cuba	La Habana	Pregnancy complications	No information	Using tertiles: high effort: 29 %; low reward: 31 %; high overcom.: 42 %; High ERI: 36 %
Loli et al. (2014)	292	House wifes and women combinign home and other job	Women 100 %	No information	Perú	Lima	Various: perceived health, self-esteem, self-efficacy, disstres and family integration	Effort: 0.84; reward: 0.88; Overcom.; 0.61	Mean effort: 13.37 (5.49); mean rewards: 47.54 (8.46); mean overcom. 11.9(3.0); ERI: 0.17(0.142)

With only a few exceptions, the studies used the 23-item version of the ERI questionnaire and the two-step answer format. The exceptions are two Brazilian studies that reported having used the 46-item version (Fogaça et al. 2009, 2010), and the studies led by Ansoleaga (Ansoleaga and Toro 2010; Ansoleaga and Castillo-Carniglia 2011; Ansoleaga et al. 2013a, b; 2014, Ansoleaga and Castillo-Carniglia 2011) in Chile, using the short 10-item version.

The averages of some or all of the ERI scales are reported in only 11 of the 37 studies (see Table 11.5). We consider that not reporting the means of the scales is an important deficiency, given that it is the means that can most easily be compared between samples from different countries and groups (assuming that there is no differential item functioning-DIF.). To make possible any kind of comparison between studies, we summarize the ERI-data reported by them in Table 11.5.

As can be appreciated, the averages of the effort scale, that can range between 6 and 24, were between 8.07 (physicians and nurses in Brazil) and 17.6 (school teachers in Colombia). In general, the values for effort and reward are within the range of data reported by Siegrist et al. (2004) in various European countries, and the same holds true for over-commitment.

Eleven of the 37 studies reported prevalence rates indicating the percentage of people in the sample whose value of the effort and reward ratio is greater than 1. The values reported range from a low of 0.8 % to a high of 75 %. Prevalences of less than 20 % were mentioned in three studies (0.8; 7.8; 12.6); values between 25 % and 50 % were reported for three studies (22.3 24.6 and 33); and values between 50 % and 75 % were reported in five studies (50; 65.8; 66.9; 67; 75). It is worth pointing out that the lowest value reported corresponds to the study that used the 46-item version, and the highest corresponds to one of the studies that used the short version.

The prevalences obtained using tertiles were reported in only six studies. A couple of studies report data for high effort, low rewards or high over-commitment but they do not indicate the criteria used to decide what constitutes high and low levels, so their data are therefore not included here. The authors of these studies used the calculation of the tertiles to explore a dose-response relationships between the model components, the ratio between effort and reward and health indicators. The huge variability in the reported data leads us to think that not all the studies follow the same procedure to calculate their cut-off points, making the values difficult to compare.

The data above makes it appropriate to point out the need to encourage researchers in Latin America to always report the averages of each scale, prevalences and as much information as possible about all the procedures followed as well as about the reasons for not following the suggestions made by the original authors of the ERI scale, for example to use the ER-ratio either as continuous variable or as categorical variable based on the quartiles of the distribution. This would make it more feasible to carry out more informative comparative analyses.

ERI-related health outcomes in the analytical studies are described in Fig. 11.3.

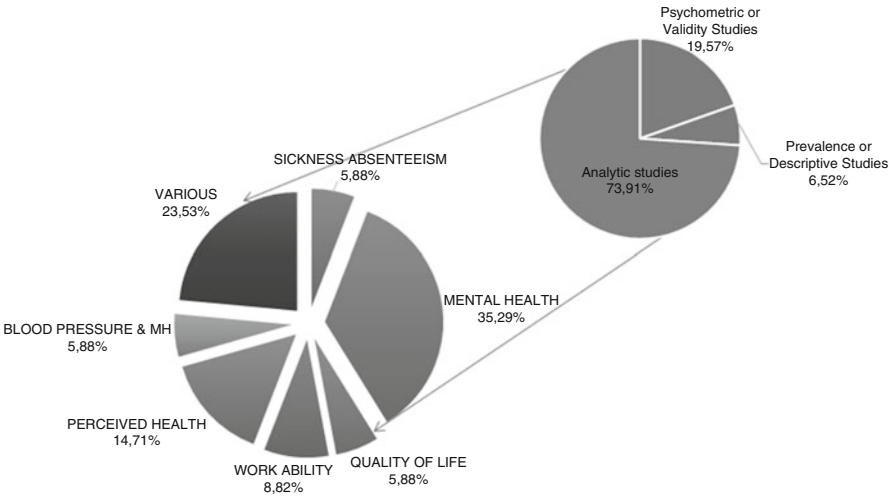
Table 11.5 Analytic studies compared by the type of data reported (means, ERI prevalence or extreme tertiles)

Description of ERI variables	References	Effort	Rewards	Over-commitment	ERI	Country	Occupation
Mean and standard deviation	Fogaça et al. (2009)	8.0 (2.70)	13.4 (2.89)	–	–	Brazil/mostly women	Physicians
	Fischer and Martinez (2013a)	11.6 (3.70)	50.7 (4.90)	12.3 (3.1)	–	Brazil/women	Nurses
	Fischer and Martinez (2013b)	11.8 (3.70)	50.3 (5.10)	12.9 (3.6)	–	Brazil/mostly women	Food service
	Silva et al. (2008)	–	–	14.0 (3.1)	–	Brazil/mostly women	Nurses
	Souza et al. (2011)	13.7 (5.07)	46.54 (7.48)	14.9 (2.15)	–	Brazil/men	Various
	Canepa et al. (2008)	11.9 (3.76)	44.1 (7.38)	–	0.60 (0.31)	Chile/mostly women	Health workers
	Cendales et al. (2014)	–	–	12.0 (3.2)	0.48 (0.26)	Colomb./men	Drivers
	Gómez-Ortiz and Moreno (2009)	17.6 (5.50)	43.7 (8.70)	18.0 (4.1)	–	Colomb./mostly wom.	Teachers
	Sánchez-Barajas et al. (2015)	–	–	–	0.33	Mexico/women	No informat.
	Blanco-Gómez (2010)	14.8 (4.35)	40.4 (8.81)	12.9 (3.2)	–	Venez./mostly wom.	Therapists
	Loli et al. (2014)	13.3 (5.49)	47.5 (8.46)	11.9 (3.0)	0.17 (0.14)	Peru/women	Mixed

(continued)

Table 11.5 (continued)

Description of ERI variables	References	Effort	Rewards	Over-commitment	ERI	Country	Occupation
ERI prevalence using ratio >1	Fischer and Martinez (2013a)				0.8 %	Brazil	Nurses
	Haikal et al. (2013)				66.9 %	Brazil	Health workers
	Martins and Lopes (2013)				12.6 %	Brazil	Military
	Silva-Junior and Fischer (2014)				65.8 %	Brazil	No information
	Silva et al. (2011)				7.8 %	Brazil	Nurses
	Teles et al. (2014)				24.6 %	Brazil	Health workers
	Ansoleaga and Castillo-Carniglia (2011)				75.0 %	Chile	Non clinical workers
	Ansoleaga (2015)				67.0 %	Chile	Health workers
	Ansoleaga and Toro (2010)				33.0 %	Chile	Mine workers
	Ansoleaga et al. (2013a, b)				50.0 %	Chile	National sample
	Gómez-Ortiz (2010)				22.3 %	Colombia	School teachers
Extreme tertiles		High effort	Low reward	High overcomm	High ERI		
	Griep et al. (2011)	32.3	25.6	28.0	–	Brazil	Nurses
	Griep et al. (2010)	–	34.5	17.3 (+ERI)	–	Brazil	Nurses
	Martins and Lopes (2012)	–	–	–	55.0	Brazil	Military personnel
	Silva and Barreto (2012)	48.7	–	6.2	16.1	Brazil	White collar
	Souza et al. (2012)	29.0	60.1	53.2	32.1	Brazil	Various
	Lourdes-Marrero et al. (2008)		31.0	42.0	36.0	Cuba	Health workers



VARIOUS= WORK HOURS, ALCOHOL CONSUMPTION, PREGNANCY PROBLEMS, MENOPAUSE SYMPTOMS, ARTHEROESCLEROSIS, PHYSICAL ACTIVITY, MUSCULO-ESKELETICAL PROBLEMS, SELF EFFICACY, SELF ESTEEM, ETC.

Fig. 11.3 Percentage of type of studies and health outcomes associated to ERI indicators in analytical studies

As we can see, mental health was the most evaluated outcome, followed by perceived health. In general, there is a lot of variability among the health indicators selected, and in the use of different strategies of coefficients for statistical analysis (Odds Ratios, Betas, Pearson coefficients, etc.). This makes it complicated to compare the relationships between ERI factors and each health outcome. All the outcomes showed a positive and significant relationship with the global indicator (ERI) and with each of its components, with the exception of blood pressure. Greater values on the ERI scales and a greater E/R imbalance are related to greater proportions of mental health problems, more depression, less work ability, lower quality of life, worse self-rated health, more mental disorders, alcohol and drug use, sick leave, menopause symptoms and fatigue, among others. It seems that the perception and reporting of these problems increases as levels of effort, over-commitment and E/R imbalance increase, and as perceived rewards decrease. Blood pressure could only be predicted when both ERI and Job Strain were used in conjunction. Considering the data on morbidity and mortality in Latin American countries, it is surprising that there aren't more studies that use cardiovascular problems, hypertension, diabetes, obesity and burnout (given their association to depression) as health indicators. The data described supports the idea that the ERI scale allows us to identify health risks clearly, but it could also indicate a possible publication bias.

11.6 Conclusions and Recommendations

The first important conclusion of this chapter is that the results of the research on work stress and its impact on health in Latin America reflect an early stage of scientific inquiry with clear methodological limitations. The subcontinent is lagging behind in terms of studying this topic, and this is reflected in a significant scarcity of research and in the fact that the existing publications have multiple limitations. The above is particularly true for studies that use ERI, but is not exclusive to research done with this model.

We believe that the main reasons for this scarcity of studies may include, on the one hand, the difficulty of obtaining funding and of having access to samples (especially large or national ones), which are closely related issues. On the other hand, we also consider the hindrances surrounding publishing in specialized high-impact journals.

Countries' economic problems together with professionals' and stakeholders' insufficient knowledge in terms of the models and the relevance of such studies are at the root of this scarcity. However, it is also fair to point out that many of the individuals that are interested in this problem do not enjoy the necessary conditions to be able to access much of the research published in international journals, many of them written in English. Researchers in different countries should consider to augment publishing and reading in different languages in order to increase the exchange and enrichment of everyone's knowledge and practice.

The difficulties highlighted may explain why most of the studies are concentrated in certain countries, cities, sectors or occupations. To overcome some of the problems, we would have to think about options such as establishing different types of alliances, perhaps with private advisors or state agencies, with researchers from different countries, or additional strategies can be imagined. It is important to increase the number and level of studies carried out in our subcontinent and to publish their results.

A number of other issues add to making publication difficult. One of them is that the editors of a number of recognized journals in this area are not aware of the gaps in regional knowledge, thus disregarding or rejecting respective reports submitted for publication, often labeling them as: "not contributing to existing knowledge". Furthermore, given the difficulties surrounding publication, there may be a substantial publication bias as researchers are likely to submit studies with positive findings.

Overcoming the limitations to the current studies will require research to improve in a number of ways, some of which we suggest here:

1. Most of the health indicators used in these studies were of a psychological nature and self-reported. It is necessary to increase the use of health and performance objective indicators (e.g. blood pressure) and to increase the size and occupational variability of the samples. These considerations refer to aspects that would increase our chances of more appropriately assessing the impact of work stress on health in the Latin American subcontinent. However, it also seems necessary

to use more complex designs including conducting longitudinal studies as well as utilizing advanced strategies for statistical analyses.

2. It is important to unify criteria in order to determine what should be considered a risk value in the work stress questionnaires (JCQ and ERI). For now, categorizations within each sample based on predefined scores (such as upper quartile of the score distribution) are used, but it is a well-known fact that these cut-off points are sample—related and are not defined on the basis of clinical evidence. Therefore, we don't yet know enough about how they are related to specific risks for concrete diseases. There is also a need to further explore the best form of analyzing the exposure variable, including the possibility that there exist nonlinear relationships between exposure and various outcomes, e.g. as has been found for job strain and blood pressure (Landsbergis et al. 1994).
3. It is important to complement the studies with the use of qualitative strategies. The theoretical models could be used as guides to carry out interviews and explore additional aspects of work or ones that are not totally described with respect to the work stress of different cultural and occupational groups. Additionally, when studying the stressful conditions of informal workers—that constitute practically half of the working population in various Latin America countries—they probably can't be studied using the questionnaire in its current form because questions typically refer to working conditions of formally employed workers. However, the theoretical model proposed by ERI and supplementing qualitative strategies could be used to explore psychosocial working situations not clearly described so far.
4. Insofar as the validity of the ERI questionnaire, the overall conclusion based on a review of all the studies is that its psychometric characteristics are satisfactory and that it is valid for use in the assessment of work stress here in Latin America as in other regions of the world. Nevertheless we highlight the need for more studies to further validate the ERI questionnaire using advanced psychometric measuring techniques such as confirmatory factor analyses (CFA), differential item functioning (DIF) or the demonstration of time-invariant stability of the ERI questionnaire, using pre- and post-test methodologies (Choi et al. 2014). A further challenge concerns the improved test of criterion validity in studies analyzing associations of ERI with health outcomes (especially those which are among the most important public health problems). In addition to controlling for socio-demographic variables further potential confounding variables need to be taken into account, specifically personality traits such as negative affectivity that affect the way people answer self-reported questionnaires.
5. The validity of the short ten-item ERI scale with the new one-step answer format and four response options (from totally disagree to totally agree) so far has only been analyzed in Chile. This new version has been improved psychometrically and it strengthens the response rate (Tsusumi et al. 2009; Siegrist et al. 2014). The previous two-step procedure of item response resulted in a reduced response rate in some studies, as also mentioned in some studies reviewed here.
6. Of the nine Latin American validity studies, three revealed an overlap of some items as evident from factor analyses. In fact, we also identified some items that presented low factorial loads and were problematic. In this context, at least four

of the nine validity studies identified the same problematic item of the scale 'over-commitment': "I can easily relax and 'switch off' from work." Future studies should clarify whether this problem reflects a methodological effect (as this is the only item that needs to be reversely coded), or whether the item fails to indicate the underlying theoretical construct. Moreover, it is worth highlighting that the only study that explored the factorial invariance of the ERI scales between six Latin American countries, found that the reward scale does not seem to be totally equivalent in all samples under study. This could imply that the cultural meaning of the different reward dimensions included in the model may not be identical in the region's different countries, even given that people speak the same language and have some further cultural communalities. Again, future studies should address this question (See Juárez-García et al. 2015).

Although the ERI model and its components are constructs based on the principles of social equity and are therefore assumed to have rather universal validity, the role of culture in the notions of the ERI model should be studied more thoroughly in the future. In particular, the meaning of obtaining rewards may vary among cultures (Kim and et al. 1990). Other studies have looked into the moderating role of cultural features such as collectivism/individualism on the effect of the rewards (Hui et al. 1991), an effect that was also verified in a Colombian study on the relationship between job strain and health (Cendales and Gomez 2013). Such cultural features related to the difference in the concept of reward have been studied in North American and other cultures such as the Latin-American, whereby for the former, success, personal achievements and hard work are important motivators in themselves, whereas for Latinos, the social benefit granted by work and its equilibrium with the family dimension seem to be the main sources of reward in the job (Díaz and Szalay 1993).

In conclusion, in view of the cultural differences mentioned specifically in the context of this research review in Latin America, and in view of the methodological limitations mentioned, more evidence on the relationship of effort-reward imbalance at work with major public health problems will be required.

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