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Understanding Effort-Reward Imbalance among Kinshasa's Physiotherapists

—A Mixed-Methods Cross-Sectional Study

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Abstract

Background: The issue of psychosocial risks at work has gained significant attention due to an improved recognition of the professional environmental cause of physical and psychological symptoms. **Objective:** To establish the typical profile of the Kinshasa physiotherapist most exposed to the Effort-Reward imbalance (ERI) using the Siegrist model, which evaluates both efforts, rewards and overinvestment. **Method:** A total of 174 physiotherapists practicing in Kinshasa were included in the study. The Siegrist model was administered to all participants, and 40 physiotherapists were selected to respond to an open questionnaire in the form of interviews, but after 17 interviews, semantic and theoretical saturation had been reached. Quantitative data were analyzed using ANOVA and principal component analysis (PCA), while qualitative insights enriched the interpretation of these findings by providing contextual depth. **Results:** The average ERI score was 0.43 ± 0.19 with 3% of physiotherapists having a score > 1. The ANOVA shows that working at patients' homes and aiming for a high salary were significantly related with the ERI score and the sub-score "Efforts" ($p < 0.01$). Also, male physiotherapists overcommit more than female physiotherapists. The PCA has identified 9 major determinants of the ERI: diplomas, experience, specialty, workplace, self-esteem, status control, rewards, time and volume of work. **Conclusion:** Despite precarious working conditions and a difficult socio-economic context, only 3% of Kinshasa physiotherapists are subject to ERI. This surprising contrast may reflect high resilience, adaptive coping strategies, or a normalization of adversity that lowers reward expectations. The typical profile of the most ex-

posed physiotherapist to the ERI in Kinshasa is a male physiotherapist who invest high effort, seeks high remuneration and provide home-based care. Both individual factors (such as education, experience, and self-esteem) and contextual elements (including workplace, workload, and perceived rewards) play a key role in shaping ERI in this population. **Clinical Implications:** Working at the patient's home allows physiotherapists to have work, and therefore a salary or a supplement to their salary; but this way could also expose them to imbalance and stress.

Keywords

Psychosocial Risk, Occupational Health, Stress, Musculoskeletal Disorders, Physical Therapy, Physiotherapy, Health at Work, Psychological Disorders

1. Introduction

Work is constantly undergoing change as society evolves, and the suffering it causes changes in nature, characteristics and terminology. Suffering is transformed and metamorphosed into stress, which in turn becomes burnout, accompanied by physical and psychological symptoms [1]. Changes in the working environment have led to the intensification of the pace of work, downsizing of the workforce, and flexibility and job insecurity. All of these factors have brought occupational risks to the forefront. These risks are, however, still poorly studied, particularly in Africa. These psychosocial risks can take a variety of forms, such as stress, burnout, moral harassment, verbal abuse, etc. [2]. The changing world of work, with its emphasis on profitability at the expense of the well-being of workers, calls for greater attention to be paid to the physical and psychological suffering in the workplace and its environment [3].

The impact of workplace evolution on workers' health has become so evident that establishing a clear and insightful theoretical model is now essential. This model is intended not only to provide explanations on the links between work and health, but also to shed scientific light on the facts in order to take action and prevent the growing ill-being of workers [4].

Among the scientific models that have been developed, Siegrist's "effort-reward imbalance" (ERI) model [5] is considered to be of major importance in understanding the stress mechanisms that can lead to psychological or somatic disorders in the workplace [6] [7]. The ERI model is based on the observation that a work situation can be based on a combination of high levels of effort on the part of the worker and insufficient recognition of their efforts. This can lead to a cascade of symptomatic or pathological reactions at both emotional and physiological levels [8].

In an occupational health survey, Cohidon *et al.* demonstrated the association between ERI and work-related ill-being [9]. Likewise, Niedhammer *et al.* [10] and Eddy *et al.* [11] have highlighted the contribution of the ERI model to the onset

of cardiovascular disease. In an original study, Calnan *et al.* showed that the components of the ERI model are significant indicators of job satisfaction among medical professionals [12]. Overall, ERI can have major consequences on physical and mental health (musculoskeletal pain, burnout, anxiety, etc.) and is associated with an increased intention to leave the profession even among physiotherapist [13]-[15].

The Effort-Reward Imbalance (ERI) model has been widely applied to study physiotherapists condition, including in Sweden to explore burnout prevention through job satisfaction [16], in Switzerland to assess moral distress [17], and in Brussels and Saudi Arabia to evaluate job satisfaction [3] [18]. Findings specific to physiotherapists remain mixed. Among Swedish physiotherapists, Enberg *et al.* emphasized the need to improve working conditions, particularly regarding psychosocial risks and recognition, to prevent burnout among physiotherapists and others healthcare professions [16]. In Switzerland, Saghascini *et al.* reported that 29% of physiotherapists experienced ERI, indicating moral distress and a tendency to consider leaving the profession [17]. In contrast, only 3% of physiotherapists in Brussels Lubanzadio-Mengi *et al.* [3] and 9% in Saudi Arabia, Devreux, 2012 [18] suffered from ERI (score > 1), suggesting a generally high level of job satisfaction in those contexts.

Physiotherapist attrition has been linked to various factors. A significant migration trend has been observed in Hungary driven by the search for better salaries, professional opportunities, and working conditions [19]. In the U.S., Handlery *et al.* identified five key contributors to attrition: limited career development, increased productivity demands, financial strain, physical workload, and emotional burden [20].

Like most healthcare professionals, physiotherapists face double exposure to occupational hazards in the course of their work. In addition to the occupational risks inherent in daily work activities, such as working hours and workload, physiotherapists accumulate a psycho-emotional burden linked to their role as caregivers [2]. This includes the emotional burden of dealing with people in pain, the pressure to achieve results, and the demands of patients [2] [21].

A Swiss study entitled "Focus RDC", carried out on the healthcare system in Kinshasa in the Democratic Republic of the Congo (DRC), revealed that Kinshasa's physiotherapists are subject to relatively modest salaries [22]. This is in keeping with the socio-economic context of Kinshasa, where poverty, job insecurity and unemployment coexist on a daily basis [23].

Many health professionals are paid by the state. With only 3% of its budget allocated to the health sector, the government struggles to honor its commitments to health workers who complain of inadequate salaries [24] [25]. It therefore seemed appropriate to investigate Siegrist's model among Kinshasa's physiotherapists.

This study aimed to evaluate effort-reward imbalance among physiotherapists in Kinshasa by calculating the ERI score and identifying associated socio-profes-

sional factors. It also sought to establish the typical profile of the physiotherapist in Kinshasa who is most exposed to effort-reward imbalance through an analysis of variance comparing the ERI score and its sub-scores with socio-demographic variables. Understanding this profile and its underlying determinants, could guide physiotherapists towards a preventive approach aimed at improving occupational health.

2. Methods

The study included physiotherapy graduates employed in hospitals and rehabilitation centers in Kinshasa who consented to participate. This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. The study was approved by the local ethical committee and participants gave oral and written informed consent to the study. The anonymity and confidentiality of the participants were strictly maintained throughout the study. Data collected were used solely for research purposes.

Methodology

Following the example of Kahumbera and Duranton [26], this study employed a mixed-methods approach that combined quantitative data collection, which provide statistical evidence of associations between socio-demographic variables and ERI scores, AND qualitative data collection which offers in-depth insights into the underlying reasons, perceptions, and lived experiences that help explain those associations. Data collection was based on the sequential explanatory mixed-methods design outlined by Creswell and Clark, starting with quantitative data collection, followed by qualitative data to contextualize, refine and nuance the interpretation of the quantitative results [27]. Consistent with the approach recommended by El Achhab *et al.*, priority was given to the quantitative data [28]. This integration allowed for a deeper understanding of the statistical trends observed in the ERI scores by linking them to the real-world experiences of physiotherapists, thereby providing a more comprehensive and nuanced interpretation of the results that strengthens the validity of the findings and enhances their relevance to practical and policy contexts.

A. Quantitative approach

Population

An accidental sampling strategy was employed, whereby all physiotherapists encountered in the selected facilities were invited to participate, with no restrictions on the number of participants per site [29]. Accidental sampling is a non-probabilistic method often used in research studies or developmental science studies. This technique involves directly targeting a given population relevant to the research in order to obtain information where homogeneous accidental sampling has clearer generalisability than heterogeneous accidental sampling [29] [30]. In this study, we opted for a reasoned choice of homogeneous sampling of physiotherapists among other healthcare professionals. Accidental sampling captures physiotherapists in their natural work settings, enhancing ecological validity

by reflecting real-life experiences. It often includes highly engaged clinicians, those most impacted by or resilient to stress, offering valuable insights into extreme cases. Unlike structured recruitment, it reduces non-response bias by including individuals who might otherwise opt out, such as those constrained by time or stress. Given physiotherapists' variable schedules, it also ensures broader representation across shifts, sectors, and specialties. In contexts where research is limited, it enables rapid access to data for identifying trends and guiding future, more rigorous study designs [31].

The study population included physiotherapists with formal qualifications working in rehabilitation centers and hospitals throughout Kinshasa who voluntarily agreed to participate. To ensure adequate representation of healthcare structures, the study adhered to the DRC health pyramid, which categorizes facilities into three levels based on their capacity and specialization. At the primary level are the General Reference Hospitals of the Health Zones (HGR1), which serve as the first point of reference for healthcare services. The secondary level includes hospitals with slightly higher technical capabilities (HGR2). At the tertiary level are provincial reference hospitals, university clinics (HU3), and non-university tertiary-level clinics (HNU3), which provide the most specialized care. Rehabilitation centers (CRV) also play a critical role, encompassing the CRHP physical rehabilitation center, facilities within the "Bondeko Villages" network, and private rehabilitation centers.

Depending on participant preference, the questionnaires were completed either through self-administration (60%) or via face-to-face interviews (40%). A total of 193 questionnaires were returned, of which 9 were excluded due to incomplete responses. This resulted in a final sample of 174 valid questionnaires, reflecting a response validity rate of 90%.

Hardware

Each questionnaire comprised two distinct parts. On the one hand, a sociodemographic questionnaire includes profession-specific items such as hours worked, number of patients cared for, recruitment method, and other related variables. On the other hand, the Siegrist questionnaire lead to the calculation of the ERI (effort-reward ratio) score, comprising 3 dimensions: *Effort* (6 items), *Reward* (11 items) and *Over-investment* (6 items) [32]. The ERI Score was calculated using the following formula:

$$\text{Ratio} = \frac{11}{6} \times \frac{\text{Effort Score}}{\text{Reward Score}}$$

A ratio > 1 indicates an effort-reward imbalance at work, exposing the worker to physical or psychological health risks.

Statistical analysis

Descriptive statistics were performed using IBM SPSS Statistics (version 25) to summarize the sociodemographic and ERI data. To explore the relationships between sociodemographic variables and the ERI score, as well as its sub-scores, an analysis of variance (ANOVA) was employed. A one-way ANOVA was conducted

to examine the statistical association between the ERI Score and various sociodemographic variables.

ANOVA is used to identify statistically significant differences in mean ERI scores across different categories of sociodemographic variables. This allows the researchers to assess whether factors such as employment conditions or workplace characteristics are associated with variations in the ERI score and its components. However, it is important to note that ANOVA identifies associations rather than causal relationships.

In addition, a principal component analysis (PCA) was conducted to reduce the dimensionality of the data and identify underlying patterns or components that could explain the variability in the dataset.

The PCA followed three main steps: 1) **Compliance with postulates:** Verification of prerequisites to ensure the dataset was suitable for PCA. This included examining the correlation matrix for significant relationships between variables (values between 0 and 1), ensuring a Kaiser-Meyer-Olkin (KMO) index greater than 0.5, and confirming statistical significance with Bartlett's test of sphericity ($p < 0.005$). 2) **Extraction of principal components:** Selecting the most relevant components to explain the maximum variance in the data while reducing redundancy. 3) **Interpretation of components:** Assigning meaning and labels to the extracted components based on the variables contributing most strongly to each.

These statistical methods provided a robust framework for analysing both the quantitative variability and latent structures within the dataset.

B. Qualitative approach

Qualitative data collection

Thematic analysis was conducted using the framework analysis approach outlined by Gale *et al.* [33]. This approach was chosen to facilitate the development of themes and models that effectively capture physiotherapists' satisfaction [33].

The qualitative sample was drawn from the 174 physiotherapists interviewed during the quantitative phase of the study. A subgroup of experienced physiotherapists was selected for semi-structured interviews based on their demonstrated interest in the satisfaction survey and their sensitivity to issues related to working conditions, as well as the promotion and recognition of the physiotherapy profession.

The primary inclusion criterion was a minimum of 10 years of professional experience in a hospital or rehabilitation center. This criterion ensured the credibility of the participants' contributions and the collection of high-quality information. A decade of practice fosters deeply rooted perceptions shaped by long-term exposure to professional realities, enabling participants to provide rich, retrospective and comparative insights into the factors that have influence their satisfaction over time [34]. To ensure a robust qualitative study, participants were purposefully selected based on their expertise or demonstrated interest in the topic, following methodologies used in previous studies [26] [28] [35].

Forty physiotherapists were selected and agreed to take part in the interviews. After conducting 17 semi-structured interviews (6 women/11 men), each lasting at least 30 minutes, both semantic and theoretical saturation were achieved marking the point at which additional interviews no longer yielded new insights relevant to the research question. Semantic saturation was identified when no novel themes or ideas emerged across interviews, ensuring content depth [36] [37]. Theoretical saturation indicated that further data collection would not enhance the conceptual understanding of the factors influencing job satisfaction and effort-reward dynamics among physiotherapists [37] [38].

All interviews were recorded using a Dictaphone to ensure accuracy and reliability in data collection. The interview guide explored various themes related to job satisfaction, including participants' motivations for choosing physiotherapy studies, their interest in the field, and their perception of the profession. It also explored the potential gap between disconnect between academic training and workplace realities, as well as factors influencing both satisfaction and dissatisfaction in their professional experience. Additional topics covered financial and salary-related concerns, opinions on working conditions, proposed improvements, and experiences of physical or psychological strain in the workplace.

Data analysis

Data analysis and collection were carried out manually, following the framework analysis method defined by Ritchie and Spencer [39]. Manual transcription, enhanced data familiarization, preserved contextual and non-verbal cues, improved coding accuracy, allowed direct quality control, and supported reflexive interpretation—thereby strengthening the depth and trustworthiness of the analysis.

Each recorded interview was transcribed verbatim. This was followed by a familiarization phase, during which transcripts were read and re-read to immerse the researchers in the data and begin identifying emerging themes.

Each interview was transcribed verbatim. This followed a familiarization phase, during which the transcripts were read and re-read to immerse the researchers in the data and begin identifying emerging themes.

During the coding phase, short phrases and excerpts were systematically coded or labelled according to thematic relevance, in line with the physiotherapists' job satisfaction. Subsequently, an analytical framework was then constructed by organizing or categorizing these themes and sub-themes into a matrix. Finally, the mapping and interpretation phase involved examining the full set of themes to identify overarching patterns and relationships. This step aimed to link the findings to the study's research objectives and provide a comprehensive understanding to the qualitative data.

Figure 1 illustrates the global analytical framework developed to present the study results, focusing on four key themes derived from participant responses; 1) **Uncertain career pathways**, capturing the lack of expectations and motivations guiding physiotherapists into their profession; 2) **Mismatch between**

work expectations and reality, highlighting the challenges related to working life, including low wages and poor working conditions; 3) **Sources of satisfaction and dissatisfaction**, identifying elements that contribute to both fulfilment and frustration in the profession; and 4) **Physical and psychological strain**, addressing the impact of work-related stressors on physiotherapists' physical and mental health.

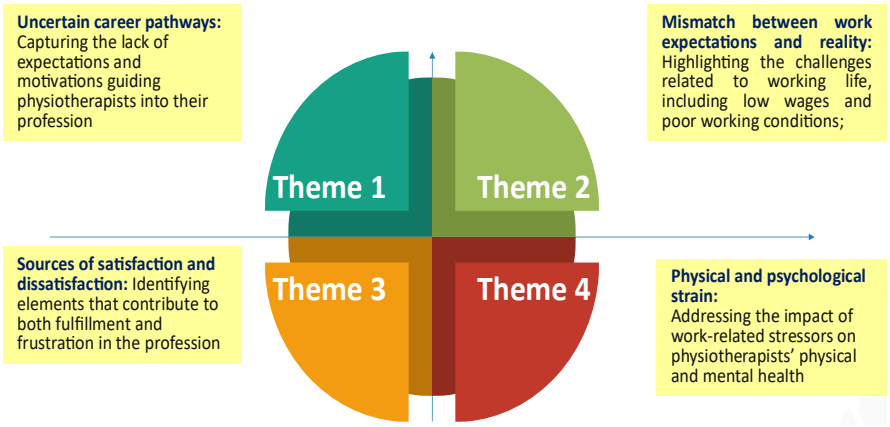

Figure 1. Framework used for analyzing job satisfaction among Kinshasa's physiotherapists.

C. Qualitative and quantitative data integration and triangulation

The integration of both datasets occurred during the interpretation phase, where qualitative insights were systematically compared with and mapped onto the quantitative findings [27] [28]. A thematic analysis of the semi-structured interviews was conducted to interpret, clarify, and contextualize the associations observed in the quantitative data. For example, categories such as salary level, home treatment, and workload, which showed significant relationships with ERI scores, were explored in depth through the narratives of participants. This analytical process helped identify underlying patterns, perceptions, and lived experiences that enriched the understanding of the statistical outcomes, thereby contributing to a more holistic and comprehensive understanding of the effort-reward imbalance experienced by physiotherapists in Kinshasa.

3. Results

3.1. Descriptive Statistics

3.1.1. Socio-Demographic Data

The study included 174 physiotherapists, all of Congolese nationality, with a gender distribution of 59% women and 41% men. The average age was 39 years, with a range spanning from 22 to 72 years. On average, participants had 11 years of professional experience.

Regarding monthly net income, 55% reported earning more than 100,000 Congolese francs (CF), 29% earned between 50,000 and 100,000 CF, and 16% earned less than 50,000 CF. Table 1 presents the frequencies and percentages of the various qualitative socio-demographic variables.

Table 1. Percentage of qualitative variables in the study population.

Qualitative variable		Number of employees (out of 174)	Percentage (%)
Gender	Men	71	41
	Woman	103	54
Congolese nationality		174	100
Status	Married	107	61.5
	Divorced	1	1
	Single	63	36
	Widower	3	2
Profession	Physiotherapy	161	93
	Physical Physician	13	8
Institute	ISTM	161	92.5
	Faculty of Medicine	13	7.5
Diploma	Graduation	129	74
	License	44	25
	Ph.D.	1	1
Net salary	<50,000 FC	28	16
	50,000 - 100,000 FC	5 1	29
	>100,000 FC	95	55
Years of experience	<10 years	93	53
	10 - 20 years	52	30
	>20 years	29	17
Hospital	Yes	164	94
	No	10	6
Cabinet	Yes	88	51
	No	86	49
Domicile	Yes	154	88.5
	No	20	11.5
Combination	Hospital + Practice	12	7
	Hospital + Home	92	53
	Office + Home	45	26
	Hospital + Office + Home	25	14

Abbreviations: ISTM (Institut supérieur des techniques médicales), FC (Congolese francs). According to the exchange rate at the time of the survey, 50,000 FC was worth $50.

3.1.2. Siegrist Questionnaire

Table 2 shows the main quantitative variables, with headcount size, mean score and sub-scores (s/s) ERI from Siegrist's model, standard deviation (S.D) and extremums.

Table 2. Number, mean, standard deviation and extremes of each quantitative variable.

Quantitative variable	Workforce	Mean ± S.D	Minimum	Maximum
ERI score	174	0.43 ± 0.19	0.20	1.18
s/s Efforts (6 - 30)	174	11 ± 4	6	26
s/s Reward (11 - 55)	174	20 ± 4	11	39
s/s Compensation (1 - 5)	174	2 ± 1	1	5
s/s Estimate (5 - 25)	174	9 ± 2	5	16
s/s Status control (5 - 25)	174	9 ± 3	5	21
s/s Overinvestment (6 - 24)	174	14 ± 3	6	23

Only 3% of the physiotherapists in this sample were exposed to effort-reward imbalance, having obtained an ERI score > 1 (**Figure 2**) while 97% obtained an ERI score < 1.

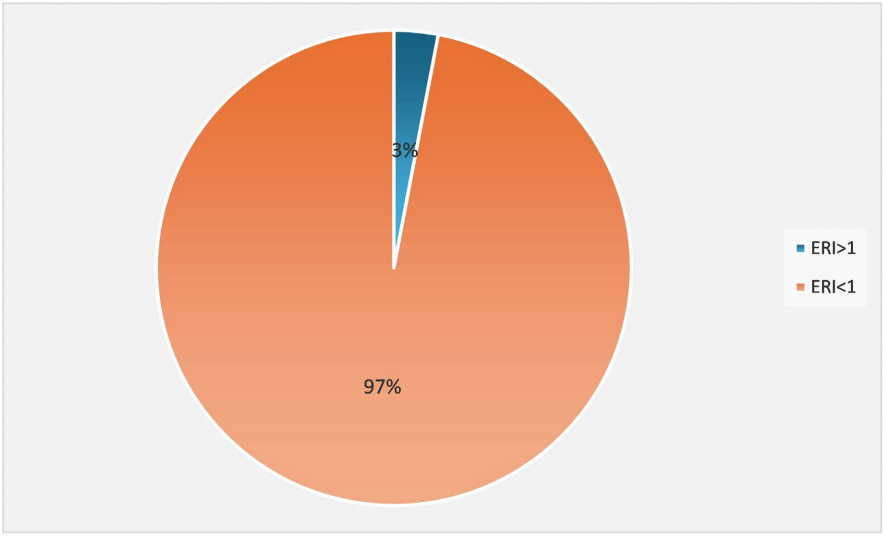

Figure 2. Percentage of physiotherapists with an effort-reward imbalance. Only 3% of the physiotherapists who participated in the study had a positive ERI score, suggesting that they are exposed to effort-reward imbalance.

3.2. Inferential Analysis

3.2.1 ANOVA and ERI Score

The socio-demographic variables showing a statistically significant association with the ERI score are presented in **Table 3**.

The ANOVA showed that the variables *Salary* and *Home treatment* were significantly related with the ERI score. Physiotherapists with a salary > 100,000 FC had the highest mean ERI score and were therefore likely to be exposed to effort-reward imbalance ($p = 0.048$).

Similarly, physiotherapists who visit the patient's home have the highest average ERI score and are therefore at risk of being affected by effort-reward imbalance ($p = 0.023$).

Table 3. Socio-demographic variables statistically related to ERI score.

Qualitative variables		Workforce	Mean Score ERI ± S.D	p-value
Salary	<50,000 FC	23	0.36 ± 0.11	0.048*
	50,000 - 100,000 FC	51	0.41 ± 0.16	
	>100,000 FC	95	0.46 ± 0.21	
Home treatment	Yes	154	0.44 ± 0.20	0.023*
	No	20	0.34 ± 0.10	

*: significant difference (p-value < 0.05).

Physiotherapists with salaries > 100,000 FC and those who carry out home treatments therefore seem to be more exposed to effort-reward imbalance.

3.2.2. ANOVA and ERI Sub-Score

Table 4 summarizes the socio-demographic variables significantly associated with the *Effort* (s/s) sub-score.

Table 4. Socio-demographic variables statistically related to the Effort sub-score.

Qualitative variables		Mean ± S.D s/s Efforts	p-value
Salary	<50,000 FC	9 ± 3	0.049*
	50,000 - 100,000 FC	10 ± 3	
	>100,000 FC	11 ± 4	
Home treatment	Yes	11 ± 4	0.017*
	No	9 ± 2	

*: significant difference (p-value < 0.05).

As with the overall ERI score, the ANOVA shows that the variables *Salary* and *Home treatment* were significantly related with the Effort sub-score.

Indeed, physiotherapists earning > 100,000 FC put in significantly more effort than other physiotherapists (p = 0.049). Likewise, physiotherapists who make house calls also put in more effort than those who don't (p = 0.017).

Table 5 summarizes the socio-demographic variables significantly associated with the *Overinvestment* (s/s) sub-score.

Table 5. Socio-demographic variables related to the overinvestment sub-score.

Overinvestment		Mean	S.D	p-value
Sex	Men	14	3	0.015*
	Women	13	3	

*: significant difference (p-value < 0.05).

Male physiotherapists overwork or overcommit themselves more than female

physiotherapists. There is a significant difference with an ANOVA p-value of 0.015.

3.3. PCA and ERI

PCA was employed to reduce dimensionality by identifying a minimal number of components that capture the majority of the specific variance among the variables. In total, 27 variables, including the ERI score and its sub-scores, were subjected to PCA.

Analysis of the correlation matrix indicated a determinant of 1.437^{-6} (neither 0.0 nor 1.0), the KMO index was 0.569 (exceeding the 0.5 threshold), and Bartlett's test of sphericity was highly significant ($p < 0.001$). These three criteria confirmed the appropriateness of applying PCA to the dataset.

As shown in Table 6, PCA identified 9 key components that explain 65% of the variance across the 27 original variables. These components reflect underlying factors contributing to ERI; (C1) Effort-Reward Imbalance, (C2) professional experience, (C3) professional title, (C4) treatment location, (C5) service load, (C6) personal investment, (C7) organizational aspects, (C8) working hours, and (C9) patient recruitment methods. The full list of variables and component loadings is provided on Table 7.

Table 6 shows the total explained variance, which is a method of extracting factors or principal components.

Table 6. Total explained variance and cumulative percentage of the 27 basic variables.

Total explained variance		
Initial Eigen values		
Components	Total	Cumulative %
1	3.824	14.136
2	2.582	23.725
3	2.444	32.776
4	1.872	39.711
5	1.734	46.133
6	1.473	51.587
7	1.354	56.602
8	1.142	60.832
9	1.069	64.790
10	0.943	68.081
11	0.924	71.703
20	0.465	94.385
27	0.009	100

Nine components (with eigen value > 1) condense 65% of the information contained in all 27 basic variables.

Table 7 shows the rotation of the component matrix (VARIMAX rotation/SPS software) indicating the strength of association between a variable and a component. This rotation facilitates interpretation by clarifying how grouped variables contribute to underlying dimensions influencing effort-reward imbalance (ERI) among physiotherapists in Kinshasa.

Table 7. Rotated component matrix (VARIMAX rotation) showing the loadings (≥0.50) of individual variables on the 9 principal components extracted through PCA.

Rotation of the Component Matrix									
	Components								
Variables	1	2	3	4	5	6	7	8	9
Reward	0.945								
ERI	0.883								
Status control	0.832								
Esteem	0.769								
Effort	0.738								
Age		0.832							
Xperience year		0.799							
Marital Status		0.635							
Institution			0.893						
Profession			0.839						
Degree			0.663						
Clinic/Cat				0.720					
Cabinet				0.647					
Combination				0.514					
Workplace									
N Patients/day					0.800				
Work time					0.733				
Approche						0.735			
Training less						0.632			
Speciality						0.520			
Home work							0.706		
Other activity							0.511		
Work hours/d								0.667	
Pa recruitment									0.767

This matrix presents the nine principal components selected, with each column showing the weight or coefficient of the basic variables ≥ 0.5. These variables and the components they form constitute the main elements that can explain the imbalance between effort and reward among physiotherapists in Kinshasa.

Here are the nine principal components or factors derived from PCA using SPSS software:

C1 (Effort-Reward Imbalance): ERI score, Status control, Esteem, Reward

C2 (Professional Experience): Age, Years of experience, Marital status

C3 (Professional Title): Institution, Profession, Degree

C4 (Treatment location): Clinical category, Practice, Combination of treatment locations

C5 (Service load): Number of patients per day, Treatment time

C6 (Personal investment): Approach, Seminars/continuing education, Speciality

C7 (Organisation): Home treatment, Other income-generating activities

C8 (Working hours): Working hours/day

C9 (Patient recruitment): Patient recruitment methods

3.4. Qualitative Analysis

The qualitative analysis of job satisfaction led to the development of an analytical framework comprising four main themes, each supported by existing literature. The findings are illustrated using selected, coded verbatim excerpts (K: physiotherapist; M/F: male/female) The qualitative analysis of job satisfaction led to development of an analytical framework consisting of 4 main themes, each supported by existing literature. The results are supported by selected and coded verbatims (K: physiotherapist, M or F: male or female).

Theme 1: Uncertain career pathways

The first trend reflected a lack of expectations due to limited prior knowledge or insufficient information about the physiotherapy profession. As one participant shared, "*When I wanted to enrol in law or journalism, there were no places left because of the regional quota system. In the end, it was an uncle who works at the university clinics who steered me towards physiotherapy*" (*K.H3*). Another participant recounted a similar experience: "*I originally enrolled in nursing and didn't even know what physiotherapy was. To my great surprise, at the start of the academic year, my name came up in the physiotherapy section at ISTM*" (*K.F5*).

The second trend highlighted strong interest and specific motivation in patient rehabilitation among participants with prior exposure to the physiotherapy profession. One participant expressed this sentiment: "*I was very impressed by the physiotherapeutic management of both my parents' ailments. My mother had fully recovered from her hip operation. My father, although he had recovered the ability to walk independently, had retained some after-effects of his hemiplegia. This motivated me to study physiotherapy*" (*K.H1*).

Theme 2: Mismatch between work expectations and reality

The main theme that emerged was the significant disconnect between professional expectations and the realities encountered in clinical practice, both for physiotherapists of the public (shortage of equipment) and private sector (large numbers of patients, shortage of staff). One participant summarized this senti-

ment: "*The reality we live in is very different from the dreams we had as students. Working conditions are difficult, patients are financially limited, and our salary doesn't allow us to make ends meet. A real disillusionment*" (*K.H2*).

Financially, physiotherapists across both public and private sectors emphasized the pervasive economic challenges they face. Many expressed that their wages did not reflect the hard work and dedication required by their profession. One participant elaborated on these struggles: "*The reality is that the life of a physiotherapist is difficult and full of frustrations. We do a lot of hard work, but in return we earn a pittance. We have to fend for ourselves to support our families: send our children to school, pay the rent...*" (*K.F3*). Physiotherapists from both the public and private healthcare sectors in Kinshasa shared perception of disillusionment and financial insecurity.

Theme 3: Sources of satisfaction and dissatisfaction

Several elements of satisfaction were consistently reported by all participating physiotherapists. Having a job in the Congo is seen as a privilege, providing a sense of satisfaction despite salaries, working conditions, and organizational challenges that leave much to be desired. As one physiotherapist expressed, "*When you find work in the Congo it's already a miracle because most unemployed people have a higher education or university degree*" (*K.F5*). Satisfaction also stems from the accomplishment of earning a degree, which brings personal pride and social recognition, and from practicing a respected profession that serves others. Physiotherapists find fulfilment in their successes, gaining recognition from patients and trust from prescribing physicians. Additionally, opportunities for personal growth, such as gaining professional experience, exercising therapeutic freedom, and working independently, contribute to their job satisfaction. One participant highlighted this sentiment: "*First of all, I'm satisfied because I'm doing what I love. When I treat patients and they recover, that gives me satisfaction*" (*K.F2*).

Sources of dissatisfaction were poor pay, poor working conditions, lack of support from the political authorities, high cost of treatment, chronic pathologies, failure to rehabilitate, … This is illustrated by the following testimony: "*The difficulty is that the State does not intervene in the care of patients, who are sometimes obliged to interrupt their treatment due to lack of resources*" (*K.H1*). Financial issues and insecurity were importantly described by the participants: "*Despite the hard work I put in, the salary I receive in this private clinic remains derisory and doesn't allow me to meet my family responsibilities*" (*K.H11*), and this was amplified when they performed treatments at the patient's home: "*Sometimes we agree to go to the patient's home, although we are aware of the patient's limited financial resources. Furthermore, public transport in Kinshasa is a real obstacle course. To reach a patient at home, you waste time, energy and money*" (*K.H6*).

Theme 4: Physical and psychological strain

Physiotherapists reported significant physical and mental health challenges associated with their profession. On the physical front, many expressed complaints of muscle and joint pain resulting from the physical strain and repetitive gestures

required in their work.

Psychological repercussions were equally prevalent, with many physiotherapists highlighting the heavy mental and emotional toll of their work. Commonly reported issues included stress, insomnia, mental fatigue, and the burden of a demanding workload. Low pay, despite significant effort, was identified as a key source of mental strain, particularly among those in the private sector. As one participant succinctly described, "*Physiotherapy is a physically demanding profession. Fatigue and exhaustion after work are our daily lot. Added to this physical exhaustion is the mental exhaustion caused by poor pay*" (*K.H5*).

3.5. Contextualizing ERI

Globally, the qualitative findings provide essential context for interpreting the quantitative results and help explain the unexpectedly low prevalence of ERI reported in the study. The four main themes—uncertain career pathways, mismatch between expectations and reality, sources of satisfaction and dissatisfaction, and physical and psychological strain—echo several dimensions identified through PCA, such as personal investment, service load, and organizational constraints. ANOVA highlighted the overinvestment and considerable efforts made by Kinshasa physiotherapists to cope (See Table 4 and Table 5). However, the interviews revealed a complex and ambivalent relationship to job satisfaction, shaped by a combination of economic hardship, vocational resilience, and cultural framing of employment. Despite expressing dissatisfaction with low salaries, limited resources, and systemic neglect (see verbatim K.F3), many physiotherapists still derived a sense of pride and fulfillment from having stable employment in a challenging context, from helping others, and from the social recognition associated with their role (see verbatim K.F5). These positive dimensions may buffer perceptions of imbalance between effort and reward, resulting in lower ERI scores than anticipated. In particular, the sense that simply having a job is a "privilege" in Kinshasa's economic climate appears to shift the frame of reference, making even modest professional gains feel rewarding (see verbatim K.F5). This suggests that standard ERI tools may underestimate stress in contexts where structural insecurity is normalized, and highlights the value of qualitative analysis in revealing the adaptive mechanisms and contextual interpretations that shape how effort and reward are perceived and reported.

4. Discussion

The aim of this study was twofold: firstly, to assess the effort-reward imbalance among physiotherapists in Kinshasa, and secondly, to draw up a typical profile of the physiotherapist most exposed to this imbalance. To address these objectives, a mixed-methods approach was adopted, in which the quantitative results were interpreted in light of the qualitative findings.

The quantitative data and ERI score calculation indicate that 97% of the study participants do not suffer from effort-reward imbalance (ERI score < 1), as they

have an average score of 0.43 ± 0.19. Only 3% of physiotherapists are exposed to effort-reward imbalance (ERI score > 1). By way of comparison, this percentage is close to the results obtained in a previous study of effort-reward imbalance among Bruxelles physiotherapists, which was 3.8% [3]. Similarly, Derycke *et al.* [40] applied Siegrist's model to Belgian nurses, showing that 4.4% were exposed to effort-reward imbalance. These consistent findings suggest that, in certain contexts, ERI may affect a relatively small proportion of healthcare professionals. Surprisingly, a markedly higher prevalence of 29% was reported by Scascighini *et al.* among physiotherapists in Southern Switzerland [17]. The authors attributed this result to a shortage of physiotherapists in Switzerland who work so hard that they exhibit moral distress, despite decent salaries. Altogether, those discrepancy results indicate that exposure to ERI may vary substantially depending on cultural, regional or systemic factors. This highlights the importance of contextualizing ERI findings within specific healthcare environments.

The finding that 97% of physiotherapists in Kinshasa are not exposed to effort-reward imbalance is surprising, as it contrasts with the socio-economic realities described by the physiotherapists in Kinshasa during the interview (qualitative part). Indeed, the precarious working conditions and difficult socio-economic situation do not provide grounds for an optimal socio-professional situation [25]. This apparent contrast may in fact highlight the resilience that characterizes Kinshasa's physiotherapists, capable of giving their best despite the challenges inherent in their profession. The qualitative analysis brought to light strong elements of job satisfaction (or reward) such as pride in practicing a valued profession that serves the community. This may help explain the high proportion of physiotherapists not classified as being exposed to ERI (see verbatims KF2 and KF5).

The qualitative analysis provided a deeper understanding of the ERI findings by uncovering the underlying psychosocial and contextual factors related to uncertain career pathways, a mismatch between work expectations and reality, sources of satisfaction and dissatisfaction, and physical and psychological strain.

Aspiring physiotherapists often enter the profession with motivation and ambition, envisioning their future roles with optimism. During their training, they begin constructing a professional identity and internalizing the values, behaviors, and norms of the field [41]. However, the present findings reveal a striking gap between these initial aspirations and the realities of professional life. Physiotherapists reported frustration due to organizational challenges and persistent financial difficulties (see verbatims KH1, KH11, KH6).

In the present study conducted in the DRC a large number of physiotherapists employed in the public sector are facing a striking lack of workload. In contrast, those working in the private sector reported being overworked. This situation differs markedly from that in South Africa, where 82% of physiotherapists are employed in the private sector, compared to only 18% in the public sector [42]. In South African private clinics, physiotherapists often contend with understaffing, excessive workloads, and high patient demands [43]. These contrasting realities

across different African regions highlight systemic imbalances and context-specific pressures that shape professional experiences. Although these pressures vary in nature, they consistently place physiotherapists under considerable strain. In the present study, participants described poor working environments, limited support from political authorities, and inadequate remuneration as major sources of dissatisfaction.

The high physical demands of the profession contribute to both musculoskeletal and psychological disorders among physiotherapists in Kinshasa. These findings are consistent with previous research in different parts of the world. For instance, Abaraogu *et al.* demonstrated that Nigerian physiotherapists frequently suffer from musculoskeletal disorders as a result of excessive workload [44]. In the same vein, Cantu *et al.* identified a strong association between burnout and both the ethical organization of work and the broader work environment among American physiotherapists [45]. In this study, a moderate association between these two organizational factors and the intention to leave the profession was observed. These results echo the experiences expressed by physiotherapists in this study (see verbatim KH5), highlighting the dual burden of physical and psychological strain linked to work-related conditions.

Finally, these contrasting results across geographical regions may also reveal the non-adaptation of validated, standardized psychometric tools to the socio-economic reality of underprivileged areas. Standardised tools developed in high-income Western contexts, such as the ERI questionnaire, may have limited suitability when applied in low-resource settings due to differences in socio-economic, cultural, and health system realities. For example, in Kinshasa, physiotherapists often work in informal or mixed public-private settings, face irregular or insufficient pay, and lack social security protections, conditions rarely captured in Western models of occupational stress. Furthermore, job roles, recognition, and reward systems differ substantially from the assumptions embedded in standardised tools, potentially leading to under- or misrepresentation of psychosocial stressors. Language nuances, literacy levels, and different cultural perceptions of "effort" or "esteem" may also affect how respondents interpret and answer items. In the absence of psychometric tools specifically adapted to under-resourced countries, some authors have recommended complementing existing instruments with self-assessed indicators of well-being, ill-being or self-evaluation of health [2] [21]. In line with these recommendations, we suggest combining standardized instruments with context-specific questionnaires that reflect the local work environment, thus improving both the validity and interpretability of results in future studies.

4.1. Typical Profile of the Physiotherapist, Most Exposed to Effort-Reward Imbalance

The profile of the physiotherapist most exposed to effort-reward imbalance was studied by combining the results of the ANOVA with those of the PCA.

The ANOVA showed that *Salary* and *Treatments in the patient's home* were

directly related to the ERI score and *Effort* sub-score. Indeed, the Efforts made by physiotherapists in carrying out treatments at the patient's home in order to maintain a high salary are likely to cause an effort-reward imbalance.

In the qualitative analysis, *Salary* emerged as one of the central themes in the framework for understanding job satisfaction. Participants consistently highlighted the disparity between the effort they put into their work and the inadequacy of their remuneration. Choksi *et al.* showed a major dissatisfaction in salary among Indian physiotherapists [46]. In the present study, the financial strain was particularly evident among those employed in private clinics, where salaries were described as insufficient to meet even basic family needs (See verbatim KH11). Low pay serves as a significant source of dissatisfaction, compounding the challenges faced by physiotherapists in their professional and personal lives. Faced with a modest salary, physiotherapists are obliged to work more in order to maintain a decent standard of living, and provide for their families (rent, children's schooling, food...). Indeed, remuneration is a determining factor in job satisfaction and could become a source of stress or lack of recognition when it is deemed unsatisfactory [47] [48]. Forest and Mageau's theory of self-determination at work identifies remuneration as one of the three main sources of job satisfaction [49].

Throughout this study, *home treatment* emerged as a pivotal element in the professional lives of physiotherapists in Kinshasa. Many rely on providing home-based care to secure work opportunities and increase their income, often at the cost of significant physical and mental effort. This reliance, however, frequently exposes them to effort-reward imbalance. Traveling to patients' homes often becomes a source of frustration due to numerous challenges, such as time lost in transport, non-ergonomic working conditions, and the lack of guaranteed payment. Participants expressed the precarious conditions under which they operate and the considerable effort required to maintain their professional practice (see verbatim KH6).

Carneiro *et al.* found a high rate of dissatisfaction and prevalence of musculoskeletal symptoms among homecare providers as a result of heavy physical work, often in non-ergonomic positions [50]. With their repeated movements, prolonged standing and awkward postures, physiotherapists are involved in the management of musculoskeletal disorders, but can also be victims [51]. This is exacerbated when treatment is realized at the patient's home as previous studies found a strong negative correlation between home treatment and job satisfaction among American physiotherapists [52].

The ANOVA also showed a direct link between gender and overinvestment or overcommitment sub-score. According to the results of our study, male physiotherapists overinvest more than female physiotherapists ($p = 0.015$). These results could be interpreted in light of the study by [53] which argues that women's heavier family logistical responsibilities lead them to seek fewer demanding jobs that are compatible with managing their family responsibilities. African men are

forced to overwork because they bear the cultural burden of providing for their families. The obligation to provide financially for the family is a central marker of masculinity [54]. Participants in a South African study reported that not being able to provide financially for their households placed them in a position of identity distress [55].

African women encounter various obstacles in their professional careers, mainly due to ancestral sociological traditions deeply rooted in the collective unconscious. These traditions associate femininity with motherhood, whether real, imagined or assumed. This perception creates social pressure that encourages women to prioritise their family responsibilities at the expense of their professional careers [56]-[58].

In summary, the typical profile of the physiotherapist most exposed to ERI is characterized by a highly active (overcommitted) and well-paid male professional who expends significant effort traveling to patients' homes. This profile is further informed by explanatory factors for ERI identified through PCA, including self-esteem, status control, rewards, age and experience, degree level, workplace, working hours, and the number of patients cared for.

4.2. Study Limitations

The study employed a cross-sectional design, which reflects associations at a specific point in time. Longitudinal studies would be needed to confirm causal relationships and trends between the identified determinants and ERI.

Reliance on self-reported measures may introduce response or social desirability bias potentially affecting the accuracy of the data. The use of an accidental sampling method may have influenced participation, as physiotherapists facing specific professional challenges might have been either more or less likely to take part. It should also be acknowledged that many physiotherapy graduates in Kinshasa are not actively employed in the profession due to limited job opportunities, often turning to alternative livelihoods in the informal sector. As such, the sample may not fully represent the broader physiotherapy workforce. A larger and more representative sample would have strengthened the statistical power of the study and minimized potential selection bias. Moreover, no context-specific quantitative questionnaires tailored to the local work environment were included, which could have helped to better capture the influence of socio-economic constraints and low-income country dynamics on physiotherapists' perceptions. However, these limitations were partially mitigated by the integration of qualitative interviews with open-ended questions, which provided rich contextual insights and reached data saturation. This mixed-methods approach allowed for a more nuanced interpretation of the quantitative findings and enhanced the cultural and occupational relevance of the ERI assessment in the specific context of Kinshasa. Despite its exploratory nature, this study offers a valuable foundation for future research and can help inform the design of more controlled and context-sensitive investigations. Therefore, this study may serve as a valuable basis for reflection on

physiotherapists' working conditions in Africa, but caution is needed when extending these findings to other regions of the DRC or similar low-resource settings, where socio-economic and healthcare conditions may differ.

5. Conclusions

The present study underscores the value of a mixed-methods approach, comprising both quantitative (combining ANOVA and PCA) and a qualitative analysis. The quantitative approach enables a detailed characterization of the typical profile of the physiotherapist most at risk of effort-reward imbalance. In parallel, the qualitative analysis provided critical contextual insight by incorporating the lived experiences of physiotherapists, thereby enriching the interpretation of the quantitative findings.

The results of this study showed that only 3% of physiotherapists of Kinshasa suffer from an effort-reward imbalance (ERI > 1). The typical profile of the most exposed physiotherapist to effort-reward imbalance in Kinshasa is that of a male overcommitted physiotherapist who seeks higher remuneration, and exert significant effort, particularly through home visits. This profile is further influenced by several interrelated factors, including self-esteem, status control, rewards, age and experience, degree level, workplace, working hours and number of patients.

While the quantitative analysis provided measurable associations, the qualitative findings offered a deeper contextual understanding, tracing the journey of the Kinshasa physiotherapist from the initial professional aspirations and idealism to a reality marked by organizational constraints, financial hardship, musculoskeletal disorders, and symptoms of burnout. This dissonance between expectations and lived experience reveals the psychosocial toll of the profession in this context.

Resilience appears to be a protective factor, helping some physiotherapists avoid ERI despite adverse conditions. However, the pursuit of higher income through home treatment, though often necessary, may paradoxically increase exposure to effort-reward imbalance. These findings highlight the need for context-sensitive strategies to improve working conditions and support the well-being of physiotherapists in low-resource settings.

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Author Contributions

PLM, JJM and VF conceived and designed the research. PLM, SM conducted experiments. PLM, SM, JM, JF and VF interpreted data. PLM, VF wrote the manuscript and SM, JM, JJM, JF contributed to text improvements. All authors read

and approved the manuscript.

Data Availability Statement

All the data are available from the corresponding author upon reasonable request.

Disclaimer

This study was conducted independently, and no organization or funding body influenced its design, analysis, or interpretation of data.

Conflicts of Interest

The authors declare that they have no conflict of interest in carrying out this study.

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