Development and validation of lost days of labor productivity scale to evaluate the business cost of intimate partner violence

Abstract

Developing scientific evidence showing the impact of intimate partner violence (IPV) on companies' productivity is an effective way to involve them in IPV prevention. However, there are no suitable and brief self-report instruments available that measure this impact in labor settings.

This study develops and assesses the measurement properties of lost days of labor productivity scale based on tardiness, absenteeism, and presenteeism which may be due to IPV. Fourteen items have been developed and tested for 2,017 employees in 306 companies in Ghana, Pakistan and South Sudan. Descriptive statistics, confirmatory factor analysis, Heterotrait–Monotrait matrix, and reliability coefficients have been conducted to assess the reliability of the scores. Confirmatory factor analysis indicates a two-factor second-order solution, stable by sex and countries. All subscales demonstrate good reliability, construct and discriminant validity, showing that the scale is a valid and reliable self-report questionnaire, which may measure the impact of IPV on businesses.

Keywords

Psychometric; labor productivity scale; intimate partner violence; presenteeism; absenteeism; tardiness; test evaluation

1. Introduction

Intimate partner violence (IPV) is a violation of human rights and a severe public health problem which impacts countries' economies and development. It cuts across gender regimes, cultural contexts, socioeconomic levels, and geographical regions, with women the most affected (Heise & Kotsadam, 2015; Fulu et al., 2013; Catalano, 2012). Globally, one in three ever-partnered women experience physical and/or sexual violence in their lifetime (25.4 % in Western Europe, 36.6 % in Africa, 37.7% in South-East Asia [WHO, 2013]).

IPV prevalence rates are higher in the countries we consider. In Ghana, a recent national study of 2002 women found 45% experienced IPV in the last 12 months (Asante et al., 2019). 37% experienced emotional abuse, 27% economic abuse and 23% physical or sexual violence. Another survey of four districts in Ghana found similar levels of physical or sexual violence in the last 12 months (21.3%) (Ogum Alangea et al., 2018).

South Sudan (SS) has one of the highest rates of violence against women and girls worldwide; a study of three conflict affected sites in SS found lifetime IPV prevalence of 60–75% (Ellsberg & Contreras, 2017). A wider study of ten regions across the country found 51% of women experienced physical and/or sexual IPV in the last 12 months (Elmusharaf et al., 2019), and another study confirmed that IPV rises during conflicts (Murphy et al., 2019). In Pakistan, the lifetime IPV experienced by married women aged 15 to 49, and the 12 months prevalence, is 33% (Karmaliani et al., 2017). In a study of women aged 18-60, 16% of women experienced physical and /or sexual violence in the last 12 months (Ghaus, et. al, 2019).

Much research from the US concludes that IPV impacts women's mental and physical health and affects their work performance (Patel & Taylor, 2011; Potter & Banyard, 2011; Gupta et al., 2018; Wathen et al., 2015; 2018). 81.9% of participants (men and women) with experience of IPV reported it affecting their productivity (Wathen et al., 2015). IPV affects women's emotional health, damaging their ability to maintain (Moe & Bell, 2004; Reeves & O'Leary-Kelly, 2007; Swanberg et al., 2007) and succeed at work (Swanberg & Logan, 2005).

Perpetration of IPV also creates productivity and business losses (Mankowski et al., 2013). In Canada a study of 193 men found perpetrators working full-time lost over 52,700 days (CAD 5 million in wages). 19% of participants were involved in accidents at work, 80% saw reduced productivity, over 30% left work to perpetrate or deal with consequences of IPV (Schmidt & Barnett, 2012). A more recent study found that one third of male participants contacted their partner to exert emotional control over them while they were at work. Almost 40% of these men said that their productivity was significantly impacted because they were distracted and made mistakes. 25% said they lost their job due to presenteeism, absenteeism, and decreased job performance (Scott et al., 2017). In some developing countries, studies have shown significant impacts on productivity due to presenteeism, absenteeism, and tardiness from survivors, perpetrators,

and co-workers who witness IPV (IFC, 2019a; IFC, 2019b; Darko, Smith, & Walker, 2015). For example in Oceania, women survivors lose seven–ten workdays annually due to IPV (IFC 2019a).

Due to the emerging interest in IPV prevention in the private sector, particularly with the recent passage of the ILO Convention 190 on Violence against women and harassment, it is imperative to ensure the reliability of the measurement of lost days of productivity. This research develops and assesses the measurement properties of a labor productivity scale to capture lost days of productivity based on tardiness, absenteeism, and presenteeism which may be due to IPV. There are many scales available to measure lost days of productivity; however, none are specifically designed to measure it associated with IPV. Moreover, most of the existing scales are used in high-income countries only. Hence, to ensure the external validity of the study results, we include estimates based on IPV prevalence in countries with different economies and circumstances in Africa and South Asia.

1.1. How does IPV impact labor productivity?

1.1.1. Absenteeism

The higher the incidence and severity of IPV, the more likely survivors and perpetrators lose days of work (CDC, 2003; Arias & Corso, 2005; Karpeles, 2004). Three situations can occur:

1. IPV results in injury, leading to lost days to address physical or mental health (Woods, et al., 2008; Modi, Palmer, & Armstrong, 2014). The perpetrator could also lose workdays to take his partner for medical treatment.
2. IPV causes missed workdays to address legal, financial, or personal issues for both survivor and perpetrator.
3. IPV causes missed workdays for other reasons. For example, children who witness violence may experience impacts to their health, school performance and general well-being – requiring their parent(s) to take time off.

1.1.2. Tardiness

Repeated tardiness may lead to the employee being marked as absent. Several authors (Alexander, 2011; Swanberg & Logan, 2007; 2005) have documented tactics that

perpetrators employ to delay/sabotage women from going to work (e.g., taking car keys, purse/wallet, or deliberately destroying her garments). Other reasons for being tardy include needing time to conceal signs of physical injury; regain calm before going to work (Swanberg & Logan, 2005); deal with witnessing relatives (Borchers, Martsolf, & Maler, 2016); or clean up damage in the home.

1.1.3. Presenteeism

Presenteeism is the amount of time survivors and perpetrators attend work but are not productive: having difficulty concentrating on a task, working more slowly than usual, tiredness, stopping work despite being physically present etc. (Hemp, 2004; Lohausa & Habermannb, 2019). Presenteeism involves working days lost through diminished performance and zero-productivity.

There are three underlying situations that drive presenteeism in situation of IPV:

1. Women's cognitive and work skills are damaged (Reeves & O'Leary-Kelly, 2007).
2. Perpetration of violence impacts emotional and mental health of the perpetrator resulting in distraction and accidents (Scott, et al, 2017; Woods et al., 2008). Addtionally some perpetrators divert their focus to use of company resources (e.g. telephone, transport) to control or attack partner (Lim et al., 2004; Giesbrecht & PATHS, 2018).
3. Effects on co-workers who witness IPV (Logan et al., 2007; Swanberg, Logan, & Macke, 2005; McFerran, 2011; Giesbrecht & PATHS, 2018). They may devote work time to supporting the IPV victim. Also if IPV occurs on the company's premises a feeling of being unsafe is created (Mankowski et al., 2013).

1.2. How is productivity loss measured?

Several systematic reviews identified 24 instruments to measure productivity loss (Jones et al., 2016; Gardner et al., 2016; Mattke et al., 2007; Braakman-Jansen et al., 2011; Ospina et al., 2015), the most popular being the Work Limitation Questionnaire (WLQ), the Health and Work Performance Questionnaire (HPQ), the Work Productivity and Activity Impairment (WPAI) Questionnaire, the Health and Labor Questionnaire (HLQ), and the Health and Work Questionnaire (HWQ).

Measuring productivity loss due to presenteeism is more complex than counting the number of days off (Lohausa & Habermannb, 2019). Ospina et al. (2015) reviewed 40 studies of measurement properties of presenteeism instruments, concluding that the instruments with the strongest level of evidence were the Stanford Presenteeism Scale (6-item version), the Endicott Work Productivity Scale, and the Health and Work Questionnaire (HWQ). However, these instruments have had serious drawbacks to monetize lost productivity (Lofland, Pizzi, & Frick, 2004; Mattke et al., 2007; Brooks et al., 2010).

According to Lerner and Henke (2008), the WLQ is the most appropriate instrument for accurately measuring work productivity in individuals with depression (Douge, Lehman, & McCall-Hosenfeld, 2014). However, its measurement system based on the five-point response scale ranges from "all of the time (100 percent)" to "none of the time (0 percent)" makes it difficult to obtain accurate measurements of lost time. Other measurement systems based on day ranges seem more convenient (Goetzel et al., 2004; Ozminkowski et al., 2004; Koopman, 2002; Aronsson, Gustafsson, & Dallner, 2000; Munir, 2007; Collins et al., 2005).

2. Materials and methods

2.1. Sampling procedures

The fieldwork was based on a non-random sample of employees working in 306 large, medium and small private companies in different manufacturing and service sectors with head offices in the main regional cities of Ghana, Pakistan, and South Sudan (countries with different contexts and risk violence settings). For the psychometric test, a total of 2,017 female and male employees aged 18–65 years participated: 391 women and 414 men in Ghana, 268 women and 264 men in Pakistan, and 323 women and 357 men in South Sudan.

In all three countries, the data were obtained during the working day by prior arrangement with companies. Averaging 20 minutes to complete, questionnaires had a confidential and voluntary self-report format which encouraged truthful answers. Prior to fieldwork, the study was reviewed and approved by the NUI Galway Ethics Review Committee; the University of Ghana Ethics Committee, National Bio-Ethics Committee (NBC); Government of Pakistan; and National Bureau of Statistics, South Sudan.

2.2. Instruments

The usual procedure to estimate the impacts of IPV on labor productivity has been using an independent variable, usually a recognized scale of intimate partner violence against women, on a dependent variable, which in this case is a scale of lost days of productivity (E.g. Reeves and O´Leary-Kelly, 2007; Darko et al., 2015). We consider that this indirect method of separated variables is more convenient than asking the survivors directly, since not all women are aware of the effects of IPV on their labor productivity, and could generate underreporting. In addition, asking about work productivity first ensures a less biased record due to traumatic memories of IPV, as best practice in violence recommends IPV questions are asked after establishing adequate trust with the survivor (WHO, 2001).

Our contribution focuses on designing a new lost days of labor productivity scale that can be quantified and monetized based on wages or value added. The aim is to capture the marginal difference in absences, delays and presenteeism that may be due to IPV, isolating them from other possible causes. The emphasis in the development of this scale of losts days of productivity is to establish that the loss may be due to IPV in particular. With the currently existing scales this cannot be done, as they are too long, their response alternatives cannot be quantified in days and they do not integrate the three dimensions (absenteeism, presenteeism and tardiness) which are key to productivity loss.

The number of lost days of productivity by IPV could be calculated by comparing the averages of absenteeism, presenteeism, and tardiness between those who have and have not experienced or perpetrated IPV. Using econometric techniques (as Propensity Score Matching) we might calculate the impact of IPV on the amount of lost time in the workplace for survivors and perpetrators, using the new scales and standard indicators of IPV (Duvvury et al., 2019). However, for this calculation to be valid we first need to demonstrate that the new scale is valid and reliable.

We designed an anonymous self-report questionnaire, including the independent variable (IPV), and the new scale of lost work days. As an independent variable, we used an Intimate Partner Violence Against Women scale, defined as survivors experiencing at least one episode of any form of violence: Psychological (insulted her, or made her feel bad; belittled or humiliated her in front of other people; did things to scare or frighten her; made her feel worthless); Economical (prevented her from getting a job, going to work, trading or earning money; taken her income or salary against her will; visited her

place or work to harass or threaten her; thrown her out of the house; spent money on alcohol, tobacco or other things for myself when I knew she did not have enough for essential household expenses; threatened to assault her or someone she cared about); Physical (slapped her or threw things at her which could hurt her; pushed or shoved her; hit her with a fist or something else that could hurt her; hit, kicked, dragged, beat, choked or burnt her; attacked her with a weapon or instrument such as a gun, knife, or other weapon); Sexual (physically forced her to have sex when she did not want to; made her have sex when she did not want to by threatening or intimidating her; forced her to do something else sexual that she did not want to). The focus on specific behaviors ensured sensitivity to the cultural and ethnic contexts of women in each country without imposing a universal definition of what is or is not violence.

The questions used in the scale have been adapted from the Conflict Tactic Scale 2 (Straus, 2007), the National Intimate Violence Against Sexual Violence Survey by the Center for Disease Control and Prevention (Black et al., 2011), and the 2005 WHO questionnaire used in the first cross-country study of IPV. Answers are recorded on the following scale: never; has happened before but not now; once; twice; 3 to 5 times; 6 to 10 times; 11 to 20 times; and more than 20 times. The same questions are asked from the perpetrators about them perpetrating any of these behaviors towards their intimate partner in the last 12 months.

As a dependent variable, we build short scale to measure lost days of productivity. The goal was to design the scale as brief as possible but with the greatest reliability possible; brief instruments are more time and cost effective (Brendel, Gutzeit, & Ponce, 2017) in business context. The short scale was initially designed in Peru and validated by expert judgment (Vara-Horna, 2013). The scale was then subjected to an internal consistency analysis through Cronbach's Alpha value and construct validity through linear relationships using Principal Component Analysis (Vara-Horna, 2013). The scale was validated again by the technical advisory group from the What Works to Prevent Violence program. Below is the description of each scale:

Lost days due to absenteeism. This is defined as the cost of missed work per day of absence. The items were based on the ones developed by Reeves & O'Learly-Kelly (2007, 2009). Questions were made to workers about the number of days they were absent from work in the last four weeks. Replies were recorded using a five-point Likert scale

with six response alternatives: zero; one; two; three–five; six–ten; ten or more days. We used the lowest point in the scale of each response to calculate the annual number of days lost (Strömberg et al., 2017). The scale comprised two dimensions: absenteeism for health reasons and for other reasons, each were given a weighting of one since an absence is equivalent to 100% of a workday. All items were added and multiplied by their relevant weightings. To ensure a consistent estimation, an average was calculated with the items A1 and A2 (see Table 1), due to the high correlation of the items and their highest frequency (see Table 2).

[Table 1 here]

[Table 2 here]

Lost days due to tardiness. This is defined as the cost of the missed work per day of tardiness based on work productivity. The items were based on the ones developed by Reeves & O'Leary-Kelly (2007, 2009). Questions were made to workers about the number of days they were at least one hour late to work in the last four weeks. Replies were recorded using a four-point Likert scale with six response alternatives: zero; one; two; three–five; six–ten; ten or more days. The annual number of days lost was calculated using the lowest point in the scale of each answer (Strömberg et al., 2017). The scale comprised two dimensions: tardiness for health reasons and for other reasons, each were given a weighting of 0.125, given that an absence is equivalent to 12.5% of a workday. All items were added and multiplied by their relevant weightings. However, to ensure a consistent estimation, an average was calculated with the items T1 and T2, due to the high correlation of the items and their highest frequency.

Lost days due to presenteeism. This is defined as the cost of the time that workers went to work, but were not productive, for the last four weeks. To measure presenteeism, we used five items that are part of two dimensions or subscales. The low performance by distraction and exhaustion dimension was based on the items of the Work and Health Interview by Stewart et al. (2004) and the Work Limitations Questionnaire by Lerner et al. (2001). The zero-productivity dimension has been used in the organizational environment in Peru (Vara-Horna, 2013). Six alternative responses were provided: zero; one; two; three–five; six–ten; ten or more days. We used the lowest point in Likert scale of each response to calculate the annual days lost (Strömberg et al., 2017). Due to the high correlation and highest frequency of the items P1, P2, P3, and to ensure a consistent estimation, an average was calculated with these items, which represented distraction and

exhaustion indicators, considering a work productivity loss of 25% a day. Additionally, zero-productivity item (P4) was a productivity loss of 100% per day, which was equivalent to one day of absenteeism. In the case of the accident rate item (P5), a 200% of productivity loss per day was considered as it involves both past and future losses for the repair of harm and expenses related with support. The sum of these days was multiplied by the relevant weightings.

2.3. Analysis

The data obtained through surveys in the three countries, were tabulated and analyzed using the statistical software SPSS, MPlus V.8 and Smart-PLS V.3. The objective is to analyze the psychometric properties of the new scale that measure the lost days of productivity, through the different types of validity (criterion, construct, discriminant) and reliability, in different countries.

Concurrent validity. Concurrent validity refer to validation strategies in which the predictive value of the test score is evaluated by validating it against certain criterion (Cronbach & Meehl, 1955). Hence, a self-report of lost day productivity shows validity if it is related to intimate partner violence against women. We used Spearman correlation to estimate the relationship between IPV scale and lost days productivity due by absenteeism, tardiness and presenteeism. As with many aspects of social science, the magnitude of the correlations obtained from concurrent validity studies is usually not high. A typical predictive validity obtains a correlation near of r = 0.3; with quite substantial utility in workplace (Wigdor & Green, 1991). Therefore, a direct and significance correlation coefficient beetwen the scales are necessary to demonstrate the validity of the inference; because it would be shown that when there is IPV, the number of days lost would be greater. Therefore, it could be assumed that the marginal difference between groups with IPV and without IPV (controlling for other variables) is due to violence.

Construct validity. Construct validity is the extent to which the measurements used actually test the hypothesis or theory they are measuring. Construct validity should demonstrate that scores on a particular test do predict the theoretical trait it says it does (Ginty, 2013). We used confirmatory factor analysis to compare different factor structures to find the best fit and make sense with the theory previously mentioned in section 1.1. We compared six models in the overall sample. For the best fitting model, we attempted

to cross-validate this model in each country and gender sample. The first is a one-factor model, where all items belong to one factor without distinguishing between scales. The second is a correlated two-factor model, with one factor consisting of absenteeism and tardiness together, and another factor of presenteeism. The third is a correlated three-factor model, looking at absenteeism, tardiness, and presenteeism. The fourth model is a second-order factor assuming that the three factors of model three are highly correlated, and a latent second-order factor explains the high correlation. The fifth model is a second-order factor model assuming that the two factors of model two are highly correlated, and a latent second-order factor explains the high correlation. The sixth model is a second-order factor assuming that the two factors are highly correlated, and inside each factor are two subscales: absenteeism and tardiness for health reasons and other reasons, presenteeism by low performance and zero-productivity.

For the Confirmatory Factor Analysis, we used a categorical analysis approach because it has less bias compared with standard Maximum Likelihood (ML). Indeed, Weighted Least Square Mean and Variance Adjusted Estimator (WLSMV) is convenient because our variables are measured on an ordinal scale, and the values between categories are not equidistant, and some items are highly skewed and kurtotic.

Several fit indices were examined to evaluate the overall fit of the model. The chi-square goodness-of-fit statistic, the comparative fit index (CFI), and the Tucker-Lewis index (TLI) were used. CFI and TLI are incremental indices reflecting the improvement in fit gained by a given factor model relative to the most restrictive (null or independence) model. Values close to 0.95 are indicative of a good fit. Furthermore, we utilized the Root Mean Square Error of Approximation (RMSEA), where a value of 0.05 or less indicates a close fit of the model in relation to the degrees of freedom. The p of Close Fit (P-close) is a one-sided test of the null hypothesis that the RMSEA equals 0.05. If p is greater than 0.05, then it is concluded that the fit of the model is “close”. Finally, we report the Weighted Root Mean Square Residual (WRMR), a measure recommended for a fit of models with categorical observed variables, where a WRMR near or less than 1.0 indicate a good fit (Yu & Muthén, 2002).

With the best model identified, we analyzed its reliability, convergent and discriminant validity. **Discriminant validity** measures the extent to which the construct differs empirically, preventing overlapping construct (Hair et al., 2014). We analyze the

discriminant validity using Smart-PLS V. 3 (Ringle, Wende, & Becker, 2015). Henseler et al. (2015) propose to use the multitrait-multimethod matrix (HTMT), to assess discriminant validity, finding that HTMT can achieve higher specificity and sensitivity rates (97–99%) compared to the cross-loadings criterion (0%) and Fornell-Lacker criterion (20.82%). HTMT values close to one indicates a lack of discriminant validity in first-order factors. Some authors suggest a threshold of 0.85 (Kline, 2011). Gold et al. (2001) proposed a value of 0.90. In the case of second-order factors, the opposite is expected, that is, HTMT values are above one since they are part of the same construct.

For the **reliability**, the most common measurement used for internal consistency is Cronbach Alpha and composite reliability, in which it measures the reliability based on the interrelationship of the observed items' variables. The values range from zero to one, where a higher value indicates a higher reliability level. Values of reliability higher than 0.70 are good. However, the value that is more than 0.95 is not desirable (Hulin, Netemeyer, & Cudeck, 2001).

3. Results

3.1. Descriptive statistics

As shown in Table 3, labor and demographic characteristics per country and per gender were collected. The average age for men and women from the three countries was 28–33 years old. Around 26.6% and 81.8% of women and men have a higher education level, and between 1.4% to 11.2% did not complete primary school. Most of them had a full-time permanent contract, working on average slightly more than eight hours for 5.3 to 6.2 days a week. In Ghana, women (USD 193.7) earn a lower wage than men (USD 220.5), while in Pakistan and South Sudan, women seem to earn more money than men.

[Table 3 here]

3.2. Concurrent validity

One way to calculate the validity of lost days productivity scale in relation to IPV is by the correlation between both measures (Cronbach & Meehl, 1955). Table 4 shows that there are significant direct correlations between IPV and absenteeism, tardiness and presenteeism, both by sex and country.

[Table 4 here]

In all three countries, there are different levels of IPV in the last 12 months. In Ghana, 26.6% of all female workers reported being assaulted by partners. Likewise, 23.2% of all male workers reported attacking their partners. In South Sudan, 34.6% of all female workers say they were attacked, while 37.6% of all male workers say they attacked their partners. Finally, in Pakistan, 14.8% of all female workers reported being assaulted by their partners, while 4.5% of all male workers report attacking their partners. In these three contexts, though very different from each other, the concurrent validity has remained stable. The correlation was insiginifanct for women survivors in Pakistan for abseneteeism and tardiness. This is understandable that in a society where's mobilility is highly controlled, women are less likely absent or be late to work.

3.3. Construct validity

We used confirmatory factor analysis to compare the precision between theory and the data. The scale will be valid to the extent that the items of absenteeism, tardiness and presenteeism are grouped according to their theoretical constructs. First, there should be a substantial difference between presenteeism and absenteeism, and there should be a distinction between subdimensions between them. A strong relationship between absenteeism and tardiness can also be expected, since both scales have similar situations related to health and other activities.

As mentioned in the analysis, results for the six models are reported in Table 5. The fit of the one-factor model and the two and three-factor model are poor, according to key criteria, while the second-order factor models have better fit. However, it is the second-order two factor model for absenteeism and presenteeism with subscales shows the best fit with better values for RMSEA, CFI, and TLI. The best data-theory model then is one where there is a first-order general factor (all items together) that has two second-order subscales (absenteeism/tardiness and presenteeism), each with two subdimensions (absenteeism/tardiness for reasons of health, absenteeism/tardiness for other reasons; low performance and zero-productivity). Therefore, we prefer this model as the best approximation of the data.

[Table 5 here]

The stability of the final model by country and gender is verified in Table 6.

[Table 6 here]

Once the construct validity has been established, it is necessary to determine the internal **convergent validity**, that is, the relationship between each item with its subscales and scales. We observe from Table 7 that the results show **convergent validity** for all scales and subscales. Indeed, the Average Variance Explained (AVE) is the mean of the squared loadings (AVEs are between 52.7% and 95.9%). As for the factorial scales, the loadings for absenteeism and tardiness (between 0.811 and 0.866 for health reasons subscale; between 0.726 and 0.881 for other reasons subscale) are higher than the expected theoretical minimum (0.706). The same applies to presenteeism (between 0.834 and 0.889 for low-performance subscale; between 0.855 and 0.863 for the zero-productivity subscale).

[Table 7 here]

3.4. Discriminant validity

Discriminant validity is particularly important to demonstrate that the new measures are not redundant (Shaffer, DeGeest & Li, 2016). This is particularly on the first order scales; however, in second-order scales the opposite is expected, being part of a more general construct. We assess the discriminant validity between the latent variables using the Heterotrait-Monotrait (HTMT) criterion (Henseler, Ringle, & Sarstedt, 2015). Table 8 shows the HTMT values. The results indicate discriminant validity between the first-order constructs since the HTMT values are below the (conservative) threshold value of 0.85. Furthermore, the corresponding bootstrap confidence interval does not include the value one. At the same time, we can establish discriminant validity between the second-order constructs and its subscales, since the HTMT values are above the (conservative) threshold value of 1.00. As expected, between Presenteeism and Diminish performance and Zero productivity; and Absenteeism and Tardiness with Health reason and Other reasons.

[Table 8 here]

3.5. Internal consistency

Coefficients of internal consistencies of the first-order factors and the second-order factor are displayed in Table 9. The Cronbach's α coefficient for the first-order factors ranged from 0.668 to 0.820, whereas McDonalds' Ω ranged from 0.668 to 0.822. For the second-order factor, α was 0.802, and Ω was 0.806. The composite reliability between 0.814 and

0.884 indicates strong levels of internal consistency, values well above the commonly recommended threshold of 0.7 (Hair et al., 2017). Together these indicate that the both the first order and second order constructs display a high degree of internal consistency.

[Table 9 here]

4. Discussion

The cross-cultural and cross-population validation of the lost days of labor productivity scale, based on tardiness, absenteeism, and presenteeism which may be caused by IPV, is necessary to involve companies in violence prevention. This study's findings provide the basis for applying this scale in workplaces setting.

This research has several strengths: 1. A short scale has been designed that is more appropriate for business contexts. 2. Use through self-reports that facilitates its application with large samples. 3. Indirect method that is ideal for self-reports and for overcoming cognitive limitations due to IPV and biases typical of the employment relationship with the company. 4. Multiple evidence of validation: construct, discriminant, concurrent, reliability, coming from a large sample from three different cultural and social contexts.

The concurrent, construct and discriminant validity results are strong and confirm the preliminary findings obtained in Peru (Vara-Horna, 2013). In this study, based on concurrent validity, a significant direct relationship has been found between the lost days scale and IPV, demonstrating that those who experience IPV may lose more productive days. This result is particularly important because it validates the econometric method of calculating the marginal difference in lost days between survivors and non-survivors, controlling for other explanatory variables. This indirect method is necessary because it cannot always be investigated due to the direct labor consequences of IPV, since survivors have a high probability of experiencing memory and cognition problems in their daily activities due to post-traumatic stress caused by IPV (Stein et al, 2002 ; Twanley et al, 2009; Valera, 2018). This can lead to significant underreporting. On the other hand, when using self-report questionnaires it is very difficult for a woman to remember and become aware of all the times that her productivity decreased due to IPV (Vara-Horna, 2013). Unlike interviews, there is no interviewer to guide and support the inquiry, but the women are alone. In these cases, asking first about all the times your productivity decreased in a

short period of time establishes a neutral and more objective recall. Then, when asked about IPV incidents, the experience will no longer be as invasive.

Our scale follow this logic, inquiring indirectly the number of days which may be lost due to IPV, asking workers about the number of days lost due to different situations and then comparing the workers affected by IPV with those who were not. In the literature it is usual to ask IPV survivors directly the number of days lost, in such a way that the answer is assumed as it is, without making any calculation (Prasad et al., 2004; Ozminkowski et al., 2004; Johansen, Aronsson, & Marklund, 2014; Hansen & Andersen, 2009). Aside from cognitive reasons before mentioned, we believe that the survivors are unlikely to be aware of all the possible effects of IPV (e.g. missed work because of impacts on children). Also, asking workers directly can condition them not to say the actual number of days missed for reasons other than their health (e.g. caring for ill relatives, inability to travel, or other financial or legal reasons), because companies only justify sick absences.

Regarding construct validity, the same factor structure has been verified across the three different countries, showing stability. This is important because it shows the intercultural strength of the scale in countries with very different social and cultural structures. It is also one of the first psychometric evidence in business contexts in middle-income countries.

The factorial structure has also been stable according to sex. This validation is necessary because this scale has been designed to be used with both men perpetrators and women survivors. Focusing only on survivors (and not men perpetrators) may underestimate the costs of IPV for businesses, as well as increasing the prejudice that women are costly for companies, affecting their employability.

The second-order factorial model, where absenteeism and tardiness are part of the same construct, is an expected result due to the labor dynamics of tardiness and absenteeism (Strömberg et al., 2017). Many times, the difference between the two is a matter of time (where companies treat tardiness as absenteeism once a certain limit is exceeded).

Our scale of absenteeism is based on indicators linked to IPV, which results in injury, poor health and mental distress. Absenteeism due to sickness, injury, or special circumstances is primarily unplanned, while planned absences include predictable

scheduled time off or vacations. According to managerial theory (Somers, 1995; Cooper & Dewe, 2008), these predictable absences cause little disruption to workspaces. It is the unplanned absences that cause disruption for business; as such businesses are reluctant to to provide leave for reasons other than health.

Theoretically, IPV-related trauma requiring medical attention is the main reason for absenteeism. However, other reasons include time off to attend to impacted children and for involvement in legal/judicial procedures related to IPV (Peterson et al., 2018). Moreover, not all types of violence directly impact on health. Economic violence, for example, means restricting the ability to attend work or destruction of labor property or work uniform (Postmus et al., 2018), which can increase tardiness, absenteeism, and presenteeism. So our absenteeism-tardiness scale investigates both health and other reasons, showing that they are related. The inclusion of other reasons are crucial to captutre the diversity of experience by class, ethnicity and gender.

In the case of presenteeism, the difference between the subscales of low performance and zero-productivity is important, though difficult for companies - especially from the service sector - to register and control, so the measurement of time lost through exhaustion and distraction is necessary. In our results, we have found that the subscale of zero-productivity has an acceptable level of reliability, so it is necessary to improve it. Increasing items of zero-productivity from two to three would ensure the consistency of the subscale.

Increased academic and business interest in presenteeism in the past decade has resulted in a variety of definitions and approaches (Terry & Xi, 2010; Hirsch, Lechmann, & Schnabel, 2017). Two approximations to the study of presenteeism can be found in the literature (Johns, 2010; Pedersen & Skagen, 2014). The first concentrates on the loss of productivity (dominant approach in the US), in which presenteeism is a function of one of its consequences (reduced performance). The second (more popular in Europe) concentrates on the reasons for going to work despite being ill. Johns (2010) noted that this second approach has received more evidence of construct validity. Our investigation uses the first approach as it seeks to estimate the economic consequences of presenteeism for businesses, before looking at its causes. We think that the European definition of presenteeism is very restrictive because willingness to go to work is not affected only by

health (Stewart et al., 2004; Johns, 2010; Aronsson, Gustafsson, & Dallner, 2000; Johansen, Aronsson, & Marklund, 2014).

There is abundant literature that has demonstrated the strong relationship between IPV and psychological trauma, especially depression and stress (Campbell, 2011; Trisi, 2018). On the other hand, there is emerging literature that relates various health conditions, such as stress, allergies, depression, anxiety, among others, with presenteeism (Schultz & Edington, 2007). But there is still a lack of research that links these variables.

Some researchers believe that factors that reduce absenteeism will increase presenteeism (Koopmanschap et al., 2005). However, certain researchers have also found high rates of presenteeism in industries where absenteeism was also high. We find a direct correlation between absenteeism, presenteeism, and tardiness, which indicates that they influence each other (Aronsson et al. 2000).

Some authors criticize conventional scales of presenteeism as overestimating the calculation of lost days (Ospina et al., 2015; Lofland, Pizzi, & Frick, 2004; Brooks et al., 2010; Beaton et al., 2009). In response, we use conservative algorithms in our calculations. For performance reduction due to exhaustion and distraction, for example, we have used a weight of 25% of the value reported in each item, based on our empirical data and field experience. Besides, we have averaged the three items of the scale because they are highly correlated, assuring us a consistent estimate. Complementary to this, we have used the lowest points of all the response categories in all the scales (Strömberg et al., 2017) and not the midpoints that are usually used in the conventional scales.

The findings provide preliminary evidence that the 14-item lost days of labor productivity scale is a valid and reliable construct, which may be used to acquire knowledge of IPV impact on businesses, through self-report surveys in workplace settings. The evidence comes from workers in three countries in Asia and Africa, but it is important that the survey be validated in other contexts and languages. Indeed, although the number of participants in our survey exceed the recommended criteria for applying the principal component analysis to evaluate a scale's psychometric properties (Rattray & Jones, 2007), larger samples could ensure the stability of the factor structure, when compared also by business sector (eg services, manufacturing).

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Table 1: Items, Weightings, and Algorithms of the Scales and Dimensions

Dimensions		Items	Weightings	Algorithms
Absenteeism: Health reasons	**A1**	I was unwell at home	1	Absenteeism (days)=
	A2	I had to go to a hospital or a health clinic because I was unwell	1	∑ [(Mean (A1, A2)), A3, A4, A5]
Absenteeism: Other reasons	**A3**	I had to look after a child or other family member because they were unwell	1	
	A4	I had to attend to legal, financial or personal matters	1	
	A5	I did not have enough money for transport to and from work	1	
Tardiness: Health reasons	**T1**	I was unwell at home	0.125	Tardiness (days)=
	T2	I had to go to a hospital or a health clinic because I was unwell	0.125	∑ [(Mean (T1, T2)) * 0.125, T3*0.125, T4*0.125]
Tardiness: Other reasons	**T3**	I had to look after a child or other family member because they were unwell	0.125	
	T4	I had to attend to legal, financial or personal matters	0.125	
Presenteeism: Low performance by distraction/exhaustion	**P1**	Difficulties concentrating on my work	0.25	Presenteeism (days)=
	P2	Working more slowly than I would normally	0.25	∑ [(Mean (P1, P2, P3)) * 0.25, P4, P5*2]
	P3	Feeling exhausted at work	0.25	
Presenteeism: Zero productivity	**P4**	Had to stop working because something was bothering him/her	1	
	P5	Made mistakes or had work-related accidents	2	

Table 2. Descriptive and Spearman rank correlation matrix of the item

Item	M	SD	Kurt	Skew	A1	A2	A3	A4	A5	T1	T2	T3	T4	P1	P2	P3	P4
A1	**1.37**	0.79	2.38	5.72	1.00												
A2	**1.32**	0.74	2.54	6.33	**0.59**	1.00											
A3	1.21	0.66	3.69	14.56	0.24	0.25	1.00										
A4	1.14	0.55	4.71	24.55	0.24	0.26	0.30	1.00									
A5	1.12	0.52	5.28	32.11	0.21	0.28	0.22	0.34	1.00								
T1	1.31	0.71	2.62	7.48	**0.52**	0.44	0.22	0.24	0.19	1.00							
T2	1.30	0.68	2.59	7.32	0.40	**0.53**	0.27	0.23	0.26	**0.52**	1.00						
T3	1.25	0.69	3.10	10.05	0.20	0.19	0.46	0.24	0.19	0.22	0.27	1.00					
T4	1.15	0.56	4.62	24.59	0.22	0.22	0.29	0.53	0.30	0.27	0.27	0.33	1.00				
P1	**1.58**	1.05	1.89	3.17	0.31	0.33	0.24	0.22	0.22	0.32	0.40	0.25	0.27	1.00			
P2	**1.58**	1.00	1.86	3.22	0.32	0.31	0.26	0.21	0.17	0.34	0.36	0.25	0.23	**0.58**	1.00		
P3	**1.77**	1.19	1.48	1.44	0.31	0.31	0.24	0.20	0.15	0.33	0.34	0.22	0.19	**0.53**	**0.65**	1.00	
P4	1.28	0.77	3.58	14.56	0.26	0.27	0.24	0.24	0.24	0.30	0.31	0.26	0.29	0.41	0.43	0.46	1.00
P5	1.10	0.48	6.15	44.27	0.22	0.27	0.23	0.27	0.28	0.27	0.28	0.26	0.36	0.27	0.30	0.25	0.42

Note: All correlation coefficients are statistically significant at 1% level of significance. Values in bold signify important values, implying relatively high mean and correlation.

Table 3. Labor and demographic characteristics of male and female employees

Variables	Ghana		Pakistan		South Sudan	
	Women (n=391)	Men (n=414)	Women (n=268)	Men (n=264)	Women (n=323)	Men (n=357)
Age						
Mean (S.D.)	31.6 (8.8)	33.1 (9.1)	28.7 (7.4)	31.0 (9.4)	28.3 (7.0)	29.6 (8.2)
Education level (%)						
No formal qualifications	0.3	0.8	6.0	2.7	3.7	4.2
Primary school	1.4	-	11.2	8.4	4.4	6.4
Secondary school	22.2	12.4	26.1	36.1	30.8	36.1
Undergraduate diploma	10.3	5.0	20.9	26.2	18.0	14.6
Bachelor's degree or higher	65.8	81.8	35.8	26.6	43.2	38.7
Labor seniority (%)						
Less than 12 months	11.7	13.1	13.8	4.9	23.1	26.6

Between 1 and 2 years	25.3	24.6	31.0	26.1	29.6	31.7
More than years 2	62.9	62.3	55.2	68.9	47.4	41.7
Type of contract (%)						
Permanent contract – full-time	60.2	65.2	50.9	53.9	47.8	40.6
Permanent contract – part-time	9.9	5.1	7.5	6.2	11.3	10.5
Temporary contract – full-time	22.9	20.5	25.5	26.5	24.7	20.7
Temporary contract – part-time	2.3	4.5	1.5	5.0	10.9	13.4
No contract	4.7	4.8	14.6	8.5	5.3	14.8
Hours of work per day						
Mean (S.D.)	8.3 (1.5)	8.3 (1.4)	8.5 (1.4)	8.8 (1.5)	8.6 (1.3)	8.9 (1.5)
Days of work per week						
Mean (S.D.)	5.3 (0.5)	5.3 (0.6)	6.2 (0.7)	6.2 (0.5)	5.7 (0.7)	5.8 (0.7)
Monthly income						
US$ (S.D.)	193.7 (99.7)	220.5 (103.2)	158.5 (73.5)	155.8 (55.1)	99.4 (96.3)	91.7 (85.3)

Table 4. Relationship between intimate partner violence against women and productivity lost day scales

Sex	Country	IPV Prevalence (last 12 months)	Rho Spearman between IPV and Scales		
			Absenteism	Tardiness	Presenteeism
Male (perpetrator)	Ghana	23.2%	.203 *	.348 *	.306 *
	South Sudan	37.6%	.238 *	.374 *	.394 *
	Pakistan	4.5%	.302 *	.349 *	.316 *
	All		.178 *	.288 *	.366 *
Female (survivor)	Ghana	26.6%	.258 *	.297 *	.358 *
	South Sudan	34.6%	.283 *	.264 *	.323 *
	Pakistan	14.8%	.071	.103	.294 *
	All		.245 *	.275 *	.304 *

Note: * $p < 0.001$

Table 5. Fit indices for different models based on WLSMV estimation

Model	X^2	d.f.	p. value	RMSEA	95% C.I. RMSEA	p-close	WRMR	CFI	TLI
Single factor model	1676.08	77	0.001	0.103	0.098; 0.017	0.001	2.906	0.881	0.860
2-Factor model	923.32	76	0.001	0.075	0.071; 0.079	0.001	2.082	0.937	0.925
3-Factor model	918.22	74	0.001	0.076	0.072; 0.080	0.001	2.060	0.937	0.923
2nd order 3 factor model	650.80	72	0.001	0.064	0.059; 0.068	0.002	1.672	0.957	0.946
2nd order 2 factor model (abs)	544.36	74	0.001	0.057	0.052; 0.061	0.006	1.516	0.965	0.957

2nd order 2 factor model (abs & pres)	352.61	70	0.001	0.045	0.041; 0.050	0.952	1.156	0.979	0.973

Note: WLSMV = Weighted Least Square Mean and Variance Adjusted Estimator.

Table 6. Fit indices for the best model based on WLSMV estimation by gender and country

Model: 2nd order 2 factor	**X^2**	**d.f.**	**p. value**	**RMSEA**	**95% C.I. RMSEA**	**p-close**	**WRMR**	**CFI**	**TLI**
Overall	352.61	70	0.001	0.045	0.041; 0.050	0.952	1.156	0.979	0.973
Men	208.31	70	0.001	0.044	0.037; 0.051	0.914	0.873	0.981	0.975
Women	210.01	70	0.001	0.046	0.039; 0.053	0.841	0.982	0.983	0.978
Ghana	158.45	70	0.001	0.041	0.032; 0.049	0.966	0.844	0.990	0.986
Pakistan	165.65	70	0.001	0.051	0.041; 0.061	0.439	0.812	0.991	0.988
South Sudan	199.62	70	0.001	0.052	0.044; 0.061	0.323	0.993	0.954	0.941

Note: WLSMV = Weighted Least Square Mean and Variance Adjusted Estimator.

Table 7. Factorial structure for the second-order two-factor model

Scales / subscales / items	**Loadings**	**S.E. Loadings**	**R^2**	**S.E. R^2**	**Residual variance**
Absenteeism and Tardiness					
Absenteeism and Tardiness (health reasons)	.844	.021	.713	.035	.287
I was unwell at home (a1)	.824	.016	.679	.026	.321
I had to go to a hospital or a health clinic because I was unwell (a2)	.847	.015	.717	.025	.283
I was unwell at home (t1)	.811	.017	.657	.027	.343
I had to go to a hospital or a health clinic because I was unwell (t2)	.866	.013	.750	.023	.250
Absenteeism and Tardiness (other reasons)	.827	.023	.734	.040	.266
I had to look after a child or other family member because they were unwell (a3)	.808	.023	.653	.038	.347
I had to attend to legal, financial, or personal matters (a4)	.811	.025	.658	.041	.342
I did not have enough money for transport to and from work (a5)	.726	.032	.527	.046	.473
I had to look after a child or other family member because they were unwell (t3)	.764	.023	.583	.035	.417
I had to attend to legal, financial, or personal matters (t4)	.881	.021	.777	.037	.223
Presenteeism					
Presenteeism (low performance)	.860	.020	.740	.034	.260
Difficulties concentrating on my work (p1)	.834	.015	.695	.025	.305
Working more slowly than I would normally (p2)	.889	.012	.790	.021	.210
Feeling exhausted at work (p3)	.854	.013	.729	.022	.271
Presenteeism (zero-productivity)	.979	.025	.959	.049	.041
I had to stop work because I was worried about something (p4)	.855	.022	.731	.038	.269
I had to stop work because of an accident I had at work (p5)	.863	.027	.746	.047	.254

Table 8. Heterotrait-Monotrait Ratio (HTMT) for the second-order two-factor model

Variables	P: (Diminish performance)	Absenteeism and Tardiness (A&T)	A&T: (Health reasons)	A&T: (Other reasons)	Presenteeism (P)
Absenteeism and Tardiness (A&T)	0.593 * [0.531; 0.654]				
A&T: (health reasons)	0.573 * [0.508; 0.634]	1.068 ** [1.040; 1.099]			
A&T: (other reasons)	0.485 * [0.415; 0.556]	1.154 ** [1.112; 1.207]	0.630 * [0.554; 0.701]		
Presenteeism (P)	1.147 ** [1.123; 1.176]	0.726 * [0.661; 0.784]	0.626 * [0.557; 0.689]	0.664 * [0.584; 0.733]	
P: (zero-productivity)	0.663 * [0.585; 0.741]	0.744 * [0.641; 0.839]	0.541 * [0.448; 0.630]	0.776 * [0.659; 0.880]	1.118 ** [1.059; 1.208]

Note: The values in brackets represent the 95% bias-corrected and accelerated confidence interval of the HTMT values obtained by running the bootstrapping routine with 5,000 samples.

* Discriminat validity between the first-order constructs.

** Discriminat validity between the second-order constructs and the subscales.

Table 9. Reliability measures for the subscales and second-order two factor model

Scales	Average r item-scale	Ω McDonald	λ6 Gutman	Composite	σ Cronbach	95% C.I. σ Cronbach
Absenteeism and Tardiness	0.314	0.806	0.819	0.849	0.805	0.790; 0.815
Absenteeism and Tardiness (health reasons)	0.496	0.798	0.765	0.856	0.798	0.782; 0.811
Absenteeism and Tardiness (other reasons)	0.345	0.734	0.711	0.814	0.732	0.710; 0.747
Presenteeism	0.448	0.807	0.789	0.856	0.802	0.780; 0.808
Presenteeism (low performance)	0.603	0.822	0.775	0.884	0.820	0.801; 0.829
Presenteeism (zero-productivity)	0.501	0.668	0.501	0.846	0.668	0.559; 0.669
Overall	0.309	0.863	0.880	0.882	0.862	0.841; 0.869