Ethology as a Collaborative Factor for the Reduction of Complaints of Family Violence due to Physical Aggression in Peru

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Abstract*— The new concept of Evolution Coefficient (E) in Peru examines the levels of Complaints of Family Violence due to Physical Aggression (DVFAF), both dimensions of Ethological Factors'. The levels of the variables of the Collaboration Factors grouped into three dimensions are also examined: Social, Economic; and Human Resources in Education and Health in the 24 Departments of Peru. The dataset © of the National Institute of Statistics (INEI) between 2010 and 2020 is used. Economic inactivity (men and women) and GDP as economic concepts added to the participation of professors and collegiate doctors as human resources available in each territory, destined to calculate patterns of family violence in the national geographic diversity. The E Coefficient maintains a strong correlation with the dimensions of the Collaboration Factors' (R^2=0.99; F (11,247) = 2,479.73; p < 001), which makes it possible to visualize the levels of family violence. A strong correlation is identified between the E Coefficient and DVFAF (R^2=0.91; F (1,262) = 2,478.19; p < 001), which corroborates the link between DVFAF dimension and Collaboration Factors in Peru. In the case of economically active men, 31.88 cases of DVFAF are reduced (R^2=0.91; F (1,286) = 2,951.79; p < 001). In 2020, 75% of Peru is at least 4 times more violent than in 2010. The value of Eta square indicated a large effect of the Departments on the E coefficient (F (23,240) = 3.20; p < 001, η2 = 0.23). It is recommended to account for the job opportunities of citizens, as well as to train Health and Education professionals around social problems, taking into account the need for a multidisciplinary perspective to reduce family violence in Peru.

Keywords*—Ethology, family violence, collaboration factors, economically active citizens, education and health.

I. Introduction

In order to explore the collaboration between Peruvians and its relationship with violence, this research has developed the correlation between the Collaboration Factors, which group variables of the following dimensions: Social, Economic and Human Resources of Education and Health; and the Ethological Factors, which are made up of the Evolutionary Coefficient, and Complaints of Family Violence due to Physical Aggression. The novelty of the study is that it has allowed the generation of a reliable measurement tool, which enables a new look at the community problem of violence. It arises as a need in the face of the scarce tools, since in Peru, self-reports are usually used to measure violence, which maintain high margins of error due to the high exposure of the victims [1].

On the one hand, violence is found in various fields, which is why it is studied by multiple areas of knowledge. The approaches to the problem must be based on an interdisciplinary perspective and it is necessary to generate new methodologies to deal with it from a psychosocial understanding [2-6]. As for aggressiveness, it is an innate evolutionary response to environmental threats, but it is maladaptive when it occurs as a mechanism outside of environmental dangers. In the case of human beings, social norms are agreed to prevent maladaptive behaviours' such as violence [7-9]. Likewise, the formation of groups of human beings is based on trust and emotionality, and these are in the ability to self-regulate, with the lack of cooperation being a limiting factor for the development of social skills and the creation of highly effective groups [10,11]. Regarding group leadership, it is regulated by socio-ecological characteristics and the social and institutional norms of culture, making it possible for both sexes to be competent to lead according to the groups' motivations [12,13].

On the other hand, it is important to make visible the causes and needs generated by violence to generate public policies that promote prevention in the face of community problems [5, 14-16]. In the United States, the weakness of non-criminal social control leads to an excess of criminal controls, repercussions in the community and an increase in violence in neighbourhood settings [17], which highlights the importance of a psychosocial perspective to confrontation with the problem. Mentioned this, when the pandemic began in 2020, the resources that could have developed in infants outside family contexts decreased, since the countries did not contemplate said scarcity of resources, facing a greater risk of family violence [18]. It should be noted that child violence occurs mostly in a physical and sexual way [16], and that adolescent pregnancy comes from usually by relatives of the victim [19].

Regarding educational institutions, violent behaviors in the home, neighbourhood and peer group are evident, with parents playing a transcendental role in the integral formation and development of the personality of their children, promoting or punishing violent behaviours'. [19-22]. In French-speaking West Africa, there are limited culturally consistent interventions for reducing abusive events within family systems, indicating that child protection interventions that include all household members and understanding of culture [23]. In addition, when economic violence arises due to unemployment, economic deficits, dysfunctional couples and communication failures, violence is manifested in school settings. For this reason, the scarcity of economic resources affects educational achievements and the well-being of the home [20, 21, 24]. From another point of view, the recidivism of violence increases the cases of homicide [25], for which factors such as migration must be taken into account, since this exposes people to sexual and domestic violence [15], as well as taking into account the high rates of sexual or physical violence against women [26]. In this way, it is important to train, educate and guide human resources from various sectors, whether business or public, to generate commitments

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based on social responsibility, in order to address domestic, sexual and physical violence in an appropriate way [26-28].

Regarding the economic aspect, the analysis of the framework of the formation of violence regarding the accumulation of capital must be developed in a multidisciplinary way, explaining violence, coercion, and consent, as well as their relationship with the particular geography [29]. The social isolation given from the pandemic brought negative impacts on employability, and as a consequence increased economic stress [18, 30], physical and psychosocial, as in rural families in Bangladesh [30], generating a greater risk of family violence [18, 30]. Economic violence also arises in couples, and economic discomfort is related to domestic violence [31, 32]. The increase in the negative effects of unemployment is more associated with countries where there is greater difficulty in achieving the marital separation of couples [33]. Thus, there is an increase in domestic violence when unemployment increases due to psychological and economic stress in couples [32, 33]. Forced coexistence, fears of COVID-19 and economic stress have generated an increase in violence [34]. This is how the importance of economic strengthening is highlighted as a preventive measure against family violence [23], since exploitation and economic control are frequent in the latter, as well as also labor obstruction [31]. In the case of Indonesia, monocultures are carried out on large scales by corporations, which leads to an increase in child labor [35]. It is recommended to give the necessary importance to reducing poverty and increasing the economic well-being of the country [28]. That is why it is crucial that governments take charge of compliance with child protection laws in terms of economic exploitation on the street [28], as well as taking into account that economic policy must be consistent with employment opportunities to deal with domestic violence [36] and that violence goes against the economic well-being of the country [37]. However, the economic growth of a country, the psychological distance and the status of the nation limit national identification [38], given that in countries with an authoritarian regime, people belonging to Political parties use various tools to control the social and economic sphere, obtaining greater job and economic opportunities, resulting in a form of economic violence [39, 54].

From another point of view, it is essential to understand that the care network of the health area in charge of cases of violence helps to make visible the needs in the follow-up of cases, since these have a greater presence in homes [16, 25]. Health professionals must take into account the symptoms and signs that occur from the different types of violence, in order to carry out the corresponding and effective intervention [16] In addition, it is highlighted that economic well-being influences the quality of life of people and the reduction of suicides [40]. In educational settings, Education professionals understand domestic violence as a cause of physical and mental harm, and of dropping out of school [41]. To combat evil, violence is not necessary and, therefore, teachers and students can use critical reflection tools such as and thus address problems related to violence [42]. According to the population of Mexico, sexual education is important for the prevention of intimate partner violence, but there are not enough tools to evaluate sexual education [43], and by using narrative therapy tools, schoolchildren are able to recognize their sense of belonging, as well as act according to standards of behaviours' peaceful [44]. Students understand that sexual violence influences the naturalization of interpersonal ties that are based on lack of respect within the family and that these types of ties are manifested in the school context [41]. Regarding the educational environments of Peru, the relationship between family violence is linked to low levels of self-esteem and, with this, the social areas, school performance and self-perception are influenced [45]. Thus, it is essential that Health and Education professionals reflect on violence, both in the people they serve and in their professional practice [6, 41, 46-50] and that work in an interdisciplinary way, in order to reduce the levels of violence [41].

The paper presents a method to integrate grouped variables in the dimensions of Society, Economy and Human Resources in Education and Health, and explores the *Ethological* factors and their impact on Complaints of Family Violence due to Physical Aggression (DVFAF). The research questions are: Is there a relationship between *Collaboration* Factors and *Ethological* Factors in Peru? What are the characteristics of the DVFA pattern as a variable of *Ethological* Factors in Peru? and, Do the economically inactive people (women and men) influence the change in the patterns of DVFAF in Peru?

II. Methods and Materials

A. Statistical analysis

To find significance between the variables of the *Collaboration* Factors with the *Ethological* Factors, SPSS v.25 was used. The population that was used corresponds to the 24 Departments of Peru. The dimensions of the *Ethological* Factors are Evolution Coefficient – *E* and DVFAF. The dimensions of the *Collaboration* Factors are Society, Economy, and Human Resources in Education and Health. The conceptual framework of the research is explained in Figure 1.

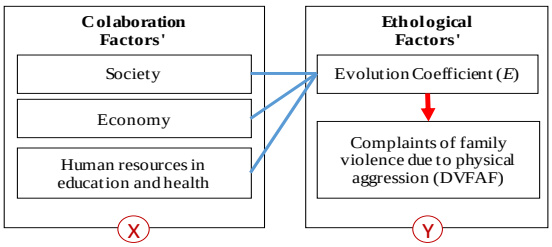

Fig. 1. Data analysis between variables. Source: Authors

Table I shows the variables involved the dimensions analyzed.

TABLE I
Definition of Variables, Acronym , Source and Unit Mesure

Dimension/Variable	**Acronym**	**Source**	**Unit Measure**
Society			
Victims of femicide	VF	INEI,2022	N° of cases
Unborn births per year	NIxA	INEI,2022	N° of cases
Marriages registered per year	MIxA	INEI,2022	N° of cases
Registered deaths	DI	INEI,2022	N° of people
Censused population	PC	INEI,2022	N° of people
Economy			
Economically inactive people	PENA	INEI,2022	k of people
Economically inactive men	HENA	INEI,2022	k of people
Economically inactive women	MENA	INEI,2022	k of people
Economically active population	PEA	INEI,2022	k of people
Economically Active Women	MEA	INEI,2022	k of people
Economically Active Men	HEA	INEI,2022	k of people
People of working age	PET	INEI,2022	k of people
Women of working age	MET	INEI,2022	k of people
Working-age men	HET	INEI,2022	k of people
Employed female economically active population	PEAOF	INEI,2022	k of people

Employed male economically active population	PEAOM	INEI,2022	k of people
Employed economically active population	PEAO	INEI,2022	k of people
Domestic Gross Product	PBI	INEI,2022	k of Soles
Economic Coefficient	C_PBI	Authors	k of Soles
Human resources in education and health			
Teachers of the private sector education system	DOCPRIV	INEI,2022	N° of people
Teachers of the public sector education system	DOCPUB	INEI,2022	N° of people
Registered nurses	ENFCOL	INEI,2022	N° of people
Registered doctors	MEDCOL	INEI,2022	N° of people
Dependent variables			
Complaints of family violence due to physical aggression	DVFAF	INEI,2022	N° of cases
Evolutionary Factor	FE_3	Authors	*E*

Source Authors

The Departments in Peru are grouped into three Ecological Regions. The Coastal Region is compound of 10 Departments, while the Highlands by 11 and the Forest Region by 03.

B. Evolution Coefficient (E)

The Evolution Coefficient incorporates the social, economic, and human resources components in education and health. It is designed to identify the territories in which these elements contribute to the factors of collaboration and that allow relating to the evolution of said territories in terms of increasingly complex economic and social exchange. The *E* Coefficient was calculated using (1):

$$E = \left(\frac{\alpha^3 + \beta^2 + 1}{\gamma + \delta + \varepsilon}\right)/(\theta \times 100.000) \qquad (1)$$

α: *Registered nurses (ENFCOL), expressed in number of people;*
β: *Registered doctors (MEDCOL), expressed in number of people;*
γ: *Economic Coefficient (C_PBI), expressed in thousands of soles and its calculated by (2);*
δ: *Women of working age (MET), expressed in number of people;*
ε: *People of working age (PET), expressed in numb er of people;*
θ: *Economically active population, expressed in number of people.*

Economic Coefficient (γ_1) data was normalized calculated with a linear regression respect the number of registered nurses (ENFCOL) and number of teachers of the private sector education system (DOCPRIV) (R^2=0,98; *F* (2,261) = 7.427,96; Sig = ,000). It was calculated using (2):

$$\gamma_1 = -3{,}27E{+}06 + 7{,}35E{+}03x_1 + 3{,}58E{+}02x_2 \qquad (2)$$

x_1: Registered nurses (ENFCOL)
x_2: Teachers of the private sector education system (DOCPRIV)

C. Complaints of family violence due to physical aggression

The National Institute of Statistics and Informatics (INEI) - by acronym in Spanish - records it annually in its reports as the number of cases in Peru. For his investigation, the INEI data was taken from the year 2010 to 2020.

D. Statistical design

Ten years states were obtained for each of the 24 Departments in Peru. The data obtained were ordered in an X_{nxl} data matrix, where *n* is the number of rows (samples) and *l* is the number of variables in this investigation (data and coefficients), resulting in a total of 298 states, 32 measured variables and 8 coefficients (both, predictors). With these predictors, years, Departments and Ecological Region, this matrix totaled 11,680 data cells.

The statistical model Y = Xß + ε was used to analyze the linear regression [51, 53]. ANOVA was calculated with 95.0% confidence interval. Two regression models were explored to determine the confirmation of the relationship between variable X: "*Collaboration Factors*"' and variable Y: "*Ethology Factors*"'. With this validation, the *E* coefficient was calculated for each of 24 Departments by years. Finally, Eta-squared (η2) was calculated by determining the effect size measure as a unique and standardized number that expressed how different the means of the samples evaluated were and how far apart, they were calculated [52]. The rules accepted for eta-squared in this investigation were as follows: (i) η2 = 0.01 corresponds to a small effect; (ii) η2 = 0.07 corresponds to a medium effect; and (iii) η2 = 0.15 corresponds to a large effect.

The hypotheses: the Evolution Coefficient (*E*) is a new way of establishing a link between *Collaboration* Factors and *Ethological* Factors in Peru based on the relationship with the dimensions of Society, Economy, and Human Resources in Education and Health. Likewise, the *E* Coefficient is related to the reports of Family Violence due to Physical Aggression and that are influenced by their pattern in each Department and Ecological Region in the analysis of family violence in Peru; and, that varies, worsening, in time.

E. Instruments

For the Variable X, *Collaboration* Factors', the following sources were used:

1. Socioeconomic reports from the National Statistics Institute - INEI, historical dataset © 2010-2020
2. Database X_{nxl} data matrix with data and coefficient values, departments code; and, ecological region code.

For the variable Y, *Ethological* Factors', (1) were used; It is also a dimension of the analyzed problem.

III. RESULTS

The 24 Departments assessed were compiled from the INEI historical dataset © 2010-2020. The analysis process lasted 105 days. For each Department, 10 samples were collected (repetitions, one per year) and 32 variables were considered for each Department. The $Matrix_{nxl}$ was created, and 8 coefficients were calculated, and the treatments were assigned (Ecological Region classification). The collected data was entered into the $Matrix_{nxl}$ and analyzed. Hypothesis tests, linear regression analysis, ANOVA and quadratic Eta were performed to find the statistical significance between variable X "*Collaboration Factors*"' and the variable Y "*Ethological Factors*"'.

Table II calculates the analysis of Model (1) for the dependent variable *E* with data from the 24 Departments of Peru in 10 years of analysis for the *Collaboration* Factors with their variables analyzed in the three dimensions.

TABLE II
SUMMARY OF THE MODEL FOR THE EVOLUTION COEFFICIENT

Model	R	R square	R square adjusted	Standard error of the estimate
1	1,00[a]	0,99	0,99	47,22

a. Predictors: (Constant), ENFCOL, PENA, PEAOF, DOCPUB, MENA, PBI, DOCPRIV, MEA, HENA, PEA, PEAOM.
b. Dependent variable: Evolution Coefficient (*E*).
Source: Authors

The different and independent estimators of the variance in the Evolution Coefficient (*E*) and the ratio of the mean

squares of the indicators referred to the *Collaboration* Factors' were analyzed through the F statistic associated with the Model (1). From the analysis, since the probability is that the value is greater than 0.05, the hypothesis is accepted that the means of the variables of the Collaboration Factors are the same as the *E* Coefficient. The reduction of the ANOVA prediction error is almost 99% (R squared) with respect to the predictors. In Table III, the ANOVA of Model (1) was calculated.

TABLE III
ANOVA[a] FOR PREDICTIVE VARIABLES

Model		Sum of squares	df	Quadratic mean	F	Sig.
1	Regression	6,08E+07	11	5,53E+06	2.479,73	,000[b]
	Residue	5,51E+05	247	2,23E+03		
	Total	6,14E+07	258			

[a]Dependent variable: Evolution Coefficient (*E*).
[b]Predictors: (Constant), ENFCOL, PENA, PEAOF, DOCPUB, MENA, PBI, DOCPRIV, MEA, HENA, PEA, PEAOM.
Source: Authors

The value of F, in this case, is strongly significant (R^2=0,99; *F* (11,247) = 2.479,73; $p < 001$), indicating that there is a relationship between the *Collaboration* Factors with the Evolution Coefficient. In Fig. 2 the histogram of the dependent variable: *E* Coefficient was calculated. In Fig. 3, the regression of the values of the variables of the *Collaboration* Factors with the dimension "*Evolution Coefficient* " was calculated.

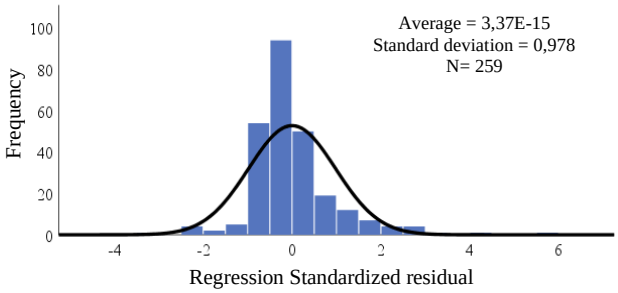

Fig. 2. Histogram of the dependent variable: Evolution Coefficient (E). Source: Authors

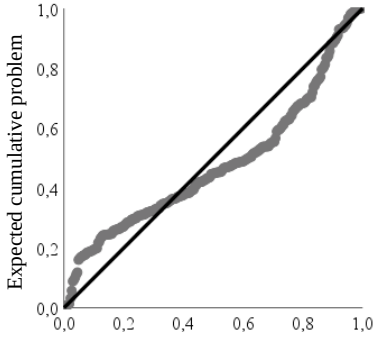

Fig. 3. Regression normal for the Evolution Coefficient (E) with respect to its predictors. Source: Authors

A significant positive relationship was identified between the Evolution Coefficient and the Complaints of Family Violence due to Physical Aggression (R^2=0,91; *F* (1,262) = 2.478,19; $p < 001$). In Table IV, the ANOVA of the Model (2) was calculated, which considered the *E* coefficient as the dependent variable and Complaints of Family Violence due to Physical Aggression as the independent variable.

TABLE IV
ANOVA[a] FOR PREDICTIVE VARIABLES

Model		Sum of squares	df	Quadratic mean	F	Sig.
2	Regression	8,09E+09	1	8,09E+09	2.478,19	,000[b]
	Residue	8,55E+08	262	3,27E+06		
	Total	8,95E+09	263			

[a]Predictors: (Constant), Complaints of Family Violence due to Physical Aggression (DVFAF).
[b]Dependent variable: Evolution Coefficient (*E*).
Source: Authors

The t statistic of the regression coefficient is different from zero, so there is a correlation between the DVFAF and the *E* coefficient and is expressed in (3).

$$DVFAF = 345{,}31 + 11{,}45\,E \qquad (3)$$

With (3), the Complaints of Family Violence due to Physical Aggression was calculated. It is significant positive correlation (R^2=0,91; *F* (1,262) = 2.478,19; $p < 001$), and is equal to 345,31 when *E* Coefficient is equal to zero, it has been possible to explain that the reduction of the values of *E*, increases the probability of reduction of DVFAF cases, reinforcing the need to increase *Collaboration* Factors' in households in Peru. In Fig. 4, the statically positive significance relationship between DVFAF and *E* Coefficient was calculated considering the Ecological Regions in Peru.

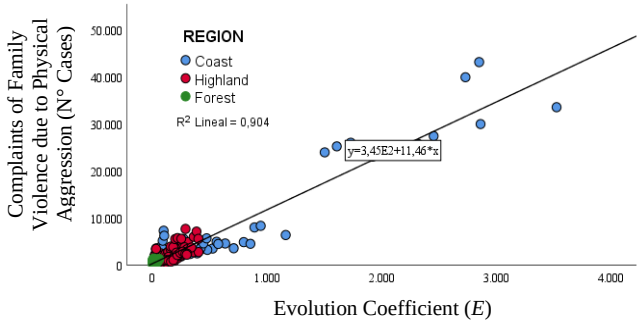

Fig. 4. Positive relationship between Evolution Coefficient and the Complaints of Family Violence due to Physical Aggression Source: Authors

In Table V, the existing bilateral correlations between the variables of the *Collaboration* Factors and the *Evolution* Factors' have been calculated.

TABLE V
PEARSON BILATERAL CORRELATION BETWEEN PREDICTORS AGAINST EVOLUTION COEFFICIENT AND COMPLAINTS OF FAMILY VIOLENCE DUE TO PHYSICAL AGGRESSION

Variable	DVFAF			FE_3		
	Corr.	Sig. (bilateral)	N	Corr.	Sig. (bilateral)	N
HEA	,955**	0,00	288	,915**	0,00	264
HENA	,955**	0,00	288	,950**	0,00	264
HET	,960**	0,00	288	,927**	0,00	264
MEA	,952**	0,00	288	,914**	0,00	264
MENA	,956**	0,00	288	,940**	0,00	264
MET	,961**	0,00	288	,931**	0,00	264
PENA	,840**	0,00	288	,834**	0,00	264
PEA	,955**	0,00	288	,913**	0,00	264
PBI	,969**	0,00	288	,956**	0,00	264
DOCPRIV	,957**	0,00	288	,937**	0,00	264
DOCPUB	,897**	0,00	288	,854**	0,00	264
ENFCOL	,974**	0,00	264	,975**	0,00	259
MEDCOL	,968**	0,00	264	,957**	0,00	259
VF	,914**	0,00	141	,865**	0,00	136
DVFAF	1		288	,951**	0,00	264
FE_3	,951**	0,00	264	1		264

** The correlation is significant at the 0.01 level (bilateral).

Source: Authors

The data supports our hypothesis, it was calculated that *Collaboration* Factors' decrease the levels of family violence in the Departments of Peru. In the Economic dimension, for each economically active man, the cases of DVFAF are reduced by 31.88 (R^2=0,91; *F* (1,286) = 2.951,79; *p* < 001); and, for each economically active women, the DVFAF are reduced by 16.35 (R^2=0,92; *F* (1,286) = 3.043,93; *p* < 001). In respect of the dimension of Human Resources in Education and Health, for each teacher of the public sector education system, the DVFAF are reduced by 2.12 (R^2=0,81; *F* (1,267) = 1.182,60; *p* < 001); and, for each registered doctor, the DVFAF are reduced by 1.4 (R^2=0,94; *F* (1,262) = 3.938,92; *p* < 001). For each GDP unit, DVFAF cases increase by 8,806 (R^2=0,94; *F* (1,286) = 4.443,07; *p* < 001).

In Table VI, the ANOVA analysis was calculated and identifies the null hypothesis that all population means are equal, demonstrating the influence of the Departments on the characteristics of family violence in Peru.

TABLE VI
ANOVA AND ETA SQUARE TEST

Origin	Sum Square	df	Mean Square	F	Sig.	Eta square
Corr. Model	84,40	23	3,67	3.20	0,00	0,23
Intersection	1.285,69	1	1.285,69	1.121,73	0,00	0,82
Department	84,40	23	3,67	3,20	0,00	0,23
Error	275,08	240	1,15			
Total	1.645,17	264				
Total corr.	359.48	263				

Source: Authors.

It was calculated that the means of the Departments differ significantly, (*F* (23,240) = 3,20 *p* < 001, η^2 = 0,23) for the Evolution Coefficient (*E*) dependent variable. The Eta square value indicated a large effect of Departments on *E* Coefficient; also, Eta square indicated a medium effect of the Ecological Regions in Perú.

The variation of the value of the *E* coefficient throughout the 10 years of study in the 24 Departments was also calculated. Based on the values of 2010, they were compared with the values of 2015 and 2020. Fig. 5, establishes the variation of the values of *E* coefficient grouped by Ecological Region in Peru.

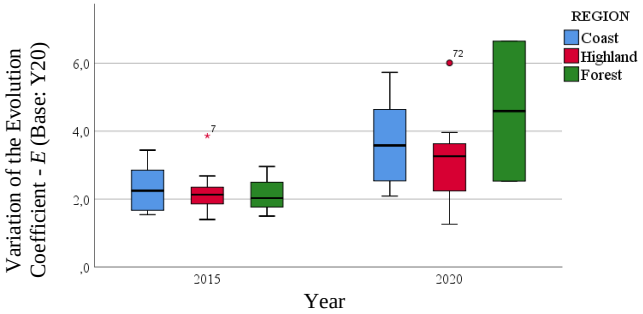

Fig. 5. Grouped Box Diagram of the Variation of the Evolution Coefficient by Year and by Ecological Region (Base year 2010). Source: Authors

From the analysis by Ecological Region and using the year 2010 as a base, the *E* coefficient increased 2.25 times in 2015 and rose to 3.53 in 2020. The "*Forest*" Ecological Region increased 4.59 times with respect to the base year. These data show that family violence has increased notably in the last 10 years in Peru. After analyzing the variations by Ecological Region, the variation of the *E* Coefficient for each Department based on 2010 was analyzed. Fig. 6 shows the value of each Department in 2010 and 2020.

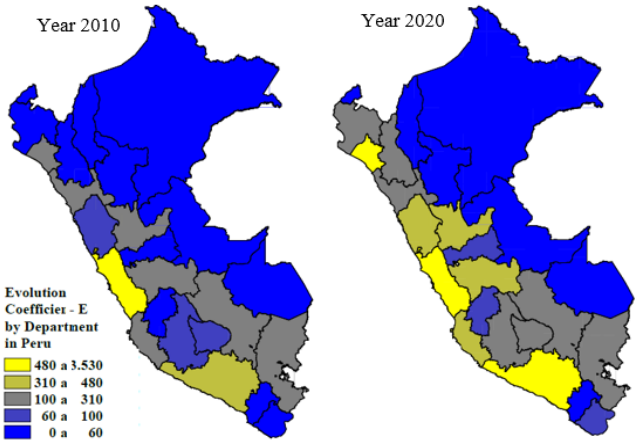

Fig. 6. Evolution Coefficient by Year and by Department. Source: Authors

In 2010, there were fourteen (14) Departments in the lowest range of the *E* Coefficient and only one (01) Department in the highest range. That same criterion in the year 2020, the Departments with the lowest rank only reached 7 while in the highest rank, it rose to three. This means that at the departmental level, in Peru, the Departments are increasingly violent as time goes by.

The variation of the *E* coefficient was analyzed and thus determine the Departments with the highest variation value in 2020 compared to 2010. As a finding, in two (02) Departments family violence increased more than 6 times in 10 years of analysis: in Madre de Dios it increased 6.65 times while in Cajamarca the variation was 6.01. It is followed by the Department of Ancash with a variation of 5.73 times. It can be affirmed that in 2020, 75% of Peru (18 Departments) is at least 4 times more violent than in 2010, registering an annual increase of 16%, and 38% of Peru (9 Departments) is at least 5 times more family violent, registering an annual increase of 20%. It can be affirmed that in 2020 Peru is 3.5 times more family violent than in 2010. We found only two Departments in which family violence did not double: the Department of Amazonas decreasing only 1.26 times in ten years with an annual increase of 3% and in the Department of Pasco with an annual increase of 7%. In Fig. 7, the variations for each Department in the 10 years of analysis was calculated.

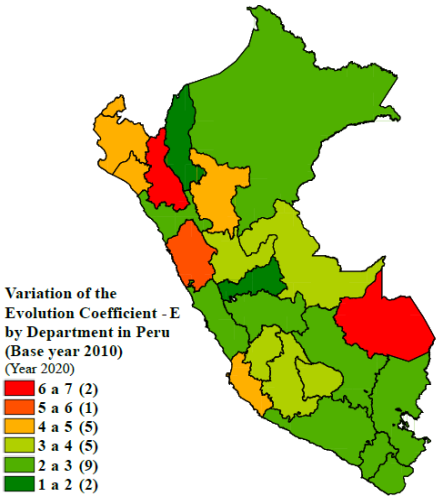

Fig. 7. Variation of the Evolution Coefficient by Year and by Ecological Region (Base year 2010). Source: Authors

IV. Discussion

It was possible to find a Coefficient for the measurement of DVFAF, which allows to account for the need for a multidisciplinary perspective to address problematic family violence [1-6], as well as to understand how collaboration dynamics occur among Peruvians. This is how a measurement tool is generated that contributes both to the understanding of the reality of Peru, as well as to make visible possible solutions at a pragmatic and public policy level.

On the one hand, it is shown that there is a strong correlation between Collaboration Factors and Ethological Factors [16, 18, 29, 30, 41], which indicates that collaboration among Peruvians can be understood from a multidisciplinary perspective. Likewise, this indicates that the approach of public policies must consider aspects of professional training, psychosocial, economic, intra-family, educational, and health, to assist the Peruvian community problem of violence.

On the other hand, the pattern of complaints of family violence due to physical aggression manifests temporary variations considering the geography of the country [29] at the departmental level and according to the ecological regions in Peru. This is how the Selva became the region with the highest increase and the departments of Madre de Dios, Cajamarca, and Ancash the most affected. This refers to the year 2010 and culminates in the year 2020, the initial year of the COVID-19 pandemic [18, 30, 34]. With this, it is pointed out that the detailed observation of the variations of the problem in a specific temporal and geographical framework is of the utmost importance, as in the present work: a decade and at the departmental level. This is how multidisciplinary interventions can be generated more efficiently.

In addition, the Coefficient E makes it possible to find the relationship between both Factors and each of the dimensions of the Collaboration Factors [2-6, 41]. It is a multidisciplinary and highly accurate measurement tool. In particular, the economic inactivity of the population, both men and women, has an impact on social well-being in Peru, generating an increase in reports of intrafamily violence due to physical assaults [5, 14-16, 23, 28, 36, 37, 39]. For this reason, the need to link the Peruvian community problem of violence with economic strengthening, employability, family economic stress is highlighted. Likewise, it is urgent to emphasize the self-regulation of trust and emotionality within the smallest groups of the economy: families.

V. Conclusion

The new concept of Evolution Coefficient (E) arises from the results, being a method that incorporates variables grouped into dimensions of Society, Economy, and Human Resources of Health and Education. Mentioned dimensions are gathered to generate a new tool that addresses family violence from an interdisciplinary perspective, since it is a community problem in Peruvian society.

First, the Coefficient E maintains a strong correlation with the dimensions of the Collaboration Factors, which makes it possible to visualize the edges that influence family violence. Said Coefficient is made up of the variables Registered Nurses, Registered Physicians, Teachers of the Private Educational System, Women of Working Age, Persons of Working Age, Economically Active Population, and Gross Domestic Product. By considering the 3 dimensions, we can understand the importance of addressing each of them for the intervention of family violence, again emphasizing the multidisciplinary perspective. In addition, there is a strong association between the E Coefficient and the DVFAF variable, which corroborates the link between the DVFAF variable and the variables of the Society, Economy, and Human Resources for Health and Education dimensions. With this, the variables Men Not Economically Active, Women Not Economically Active, Women of Working Age, GDP, Teachers of the Private Educational System and Registered Nurses stand out.

Second, by including information from 10 years, it has been possible to know the behavioral evolution of family violence in the country by Department and Ecological Region. The DVFAF pattern reflects the rise in violence over a decade. The social problems in the Departments of Madre de Dios, Cajamarca, and Ancash stand out, as well as in the Selva Region. This is how the importance of considering the temporal and spatial aspect when trying to understand and intervene in a conflict in society is manifested.

Third, the economically inactive population influences the pattern of complaints of family violence due to physical aggression in Peru. In the case of economically active men, 31.88 cases of DVFAF are reduced for each one of them. Regarding economically active women, for each one of them, 16.35 cases of DVFAF are reduced. This result provided powerful information for intervention and preventive measures at the level of economic policies by governments. It is recommended to account for the job opportunities of citizens, as well as train Health and Education professionals around social problems.

Finally, it is from this information that we could investigate more about the reasons for the increase in the recently mentioned areas. Also, variables that comprise the institutional characteristics of the Peruvian nation could be interrogated. In turn, it would be of great interest to link the Coefficient E with (i) preventive tools against violence that already exist in the country, and (ii) variables that influence collaboration in groups of human beings. Finally, it could be interesting to carry out a study that only evaluates how the economic aspects of a family affect the Coefficient E.

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