Under-five Child Mortality and Child-Abuse-Related-Deaths in the former USSR: Is there an under reporting of abuse related deaths?

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Abstract

The study explores the former USSR countries `Under-fives' *Child Mortality Rates* (*CMR*) and Child-Abuse-Related-Deaths (CARD), since the end of the Soviet Union and asks whether there has been an `under-reporting' of CARD?

W.H.O. under-five mortality rates per million (pm) were extracted for 1988-90 compared with 2008-10 for *CMR* and confirmed and possible *CARD.*

Possible CARD are Undetermined Deaths(UnD) and *Ill-Defined Signs & Symptoms (IDSS)* and as these categories have been linked to under-reporting of CARD.

CMR and CARD odds ratio calculated and correlated to determine possible under-reporting of CARD.

Seven countries met the UNICEF objective of reducing CMR; five halving their previous USSR rate.

Russian CARD at 29pm is highest but six countries rates were less than 10pm.

Undetermined Deaths (UnD) increased in Kazakhstan 13-fold, Belarus 8 times, Ukraine seven and in Russia more than four.

Ill-defined deaths trebled in Belarus, and rose more than 25% in Kazakhstan, Georgia and Ukraine.

CARD significantly correlated with *UnD* but not with CMR.

Odds ratios of CMR to *CARD* categories were substantial, more than 4.1:1 in Belarus, Kazakhstan, Russia and Ukraine, indicating possible under-reporting of *CARD.*

Despite CMR improvements, this first-ever study of former USSR countries should alert the authorities of Belarus, Kazakhstan, the Russian Federation and the Ukraine to the extent of possible child abuse.

Key Words: child mortality, under-reporting homicide, USSR.

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Background.

Following the end of the Soviet Union there were major rises in violent adult deaths in many of the former USSR countries (Maksimova et al, 2006; Varnik et al, 2010; Lysova et al, 2012; Stametel, 2012). This led to the question of what happened to child mortality since the end of the Soviet Union, especially the most vulnerable, the under-five year olds. This reflects the UNICEF statement that, "*in the last analysis child mortality rates (CMR) are an indicator of how well a nation meets the needs of its children"* (UNICEF, 2001) and is a Millennium goal for the developing countries to reduce CMR by 2% per annum by 2015 (UNMDG, 2009).

Another measure of "*how well a nation meets the needs of its children*" is associated with child neglect and at its extremes, Child-Abuse-Related-Deaths (CARD) which, despite recent improvements in many Western countries (Pritchard, Williams, 2010; Finkelhor, 2012) is a continuing concern (NSPCC, 2002; Brandon et al, 2098).

A literature search on child neglect in the former USSR counties found 52 studies but only five were relevant (Andreev et al, 1995; Berrien et al, 1995; Dalenberg et al, 2004; Kerfoot et al, 2007; Zabina et al, 2009), as the majority concerned older adolescents and HIV infections (Vermeiren et AL, 2003; Kissin et al 2007). There were only two studies that explored the prevalence of child abuse (Andreev et al, 1995; Berrien et al, 1995) and this poses the question of whether CARD, of the under-fives in particular, is either not a problem amongst the former USSR countries or, if the problem exists, is there possible under-reporting of abuse related deaths?

To determine how well the former USSR countries are "*meeting the needs of their children*" total Child Mortality Rates (CMR) for the under-fives and confirmed and possible CARD in the ten former USSR countries are analysed from the break-up of the Soviet Union to the present, 2010.

Confirmed CARD are categorised as homicides and the fatal sequel of an assault, coded X85 to Y09 and Y871 (WHO, 2012).

Possible CARD are drawn from the categories `*Undetermined Deaths'* (UnD) and `*Ill-Defined Signs & Symptoms*' (IDSS) deaths as it has long been argued that these

categories contain `hidden' CARD because the mode of lethality are similar to abuse related deaths and of course the perpetrators will seek to obscure their behaviour (Creighton, 1993, Emery, 1993; Schmidt & Madea, 1995; NSPCC, 2002; Newton & Vandeven, 2006).

In regard to USSR adult violent deaths it was found that there was an under-reporting because it embarrassed the former regime, seen in the in disproportionately high levels undetermined adult deaths (UnD) (Wasserman & Varnik, 2006; Lysova et al, 2012), hence the rationale to explore under-five UnD and IDSS deaths as a possible source of under-reporting of CARD.

To determine how well the ex-USSR countries have "met the needs of their children" changes in Child Mortality Rates (CMR) and actual and possible CARD, are analysed from 1988 up to the latest data available, 2010.

This hypothesis-stimulating study has three research questions:- since the end of the Soviet Union have the former USSR countries:-

1] met the UN objectives of reducing CMR of under-fives;

2] reduced actual and possible CARD,

and,

3] are there any statistical indications of possible under-reporting of child (0-4years) homicides?

Methodology

Child Mortality Categories: WHO data for under-fives (0-4years) are extrapolated to calculate a 3-year-average baseline1988-90 for each country to be compared with that country's latest 3-year-average index up to 2008-10 (WHO, 2012). There are a few countries with earlier index years that are indicated in the tables. However, data for Turkmenistan was only available up to1998 so they are excluded from any inter-country comparison.

Child-Mortality-Rates (CMR): The total combined boy and girl child mortality rates per million (pm) are extrapolated for Infant (<1 yr) and Young Child (1-4 years) from which an Under-five (0-4years) CMR is calculated, that is *Total Deaths All Causes-coded 0050-008*0 (WHO, 2012).

Child-Abuse-Related-Deaths (CARD): Confirmed CARD are based upon 0-4 year old Homicide statistics (Coded *7210*) (WHO, 2012).

Possible-CARD categories are:-:

(i) *Undetermined Deaths* (UnD), defined as " *deaths of undetermined intent* are *All Other External Causes (coded 7240), and* when it is *"not possible for the medical or legal authorities to determine whether it was accident, self-harm or assault"*. It includes "*poisoning…(ranging from drugs to vapours and gases)…hanging…..suffocation…. drowning and submersion "*; but in each case "*intent could not be determined", coded Y10-89*. All these methods of lethality contain a degree of violence and are thought likely to be the source of any under-reported CARD (Creighton, 1993; Emery, 1993; Schmidt & Medea, 1995; Newton & Vandeven, 2006).

However, whilst an UnD will always remain `undetermined', considering the methods of lethality, an UnD in an under-five year old might be thought suspicious (NSPCC, 2002; Pritchard & Williams, 2010). Indeed, Australia and the USA recently created `infant mortality review panels' to address this problem, which led to lower reporting of UnD but rises in confirmed CARD (Bennett et al, 2006;Jenny & Isaacs, 2006; Pritchard & Williams, 2010).

(ii) III-Defined Signs and Symptoms (IDSS) This category, coded R00-99, is where there are "*other sudden deaths of unknown causes, excluding sudden cardiac death*" *(R96),* and *"unattended deaths"*, where "*the body was found but no cause could be discovered"(R96-7)*, and *"other ill-defined and unspecified causes of mortality (R99).* The IDSS category also includes *Sudden-Infant-Death-Syndrome' (SIDS)" (R95) (*WHO, 2012*)* and earlier child protection researchers thought that SIDS probably contained `hidden' or under-reported CARD (Emery, 1993; Schmidt & Madea, 1995; Newton & Vandeven, 2006). However caution is required as more recent research indicates that SIDS have a complex multi-causal inter-active etiology (Bennett et al, 2006; Matturi et al 2008; Woodruff et al, 2008).

It is stressed that the *greatest caution* is required in considering UnD and IDSS as abuse-linked, lest we inadvertently add further distress to bereaved parents.

Statistics: The Spearman rank order (Rho) correlation is used to test any statistical association between the categories CMR, Homicides, Undetermined and Ill-Defined-Sign-&-Symptom deaths. The ratio of change is the difference between a country's baseline and the index year mortality rates for each of the categories. Ratios of greater than 1.10 or lesser than 0.90, would be considered to be clinically and statistically significant (Guildford, 1978). However in previous international comparative studies only ratios of greater than 1.20 or, lesser than 0.80 were considered as indicating substantial change (Pritchard & Williams, 2010; Pritchard & Hickish, 2011; Pritchard & Wallace, 2011).

To examine whether there is any indication of possible under-reporting over the period, CMR to CARD and Possible CARD Odds ratios are calculated. An example best illustrates the point. If country X CMR ratio of change was 0.75, in effect a 25% fall over the period, whilst the UnD ratio was 1.2; in effect a 20% rise. To calculate the Odds ratio we divide the UnD ratio of 1.20 by the CMR: ratio 0.75 yielding CMR: UnD Odds ratio of 1.6 highlighting the disproportionate rise in UnD over the same period that CMR fell.

A positive substantial Odds ratio of 1.20 is thought to be *indicative* of possible under-reporting, though only country-specific research could confirm this.

Contexts - There are two important global contexts in which to considered child mortality namely the economic and the religio-cultural, which might well influence differences between the countries.

The Economic: It is recognised that poverty is a major factor related to child mortality (UNICEF, 2001; UNMDG, 2009; Pritchard & Williams, 2011) and there are wide economic variations between the different republics, with the Russian Federation continuing to be the richest country amongst the former USSR (Brown, 2010; US Bureau of Statistics, 2012). Unfortunately standardised economic data was only available for five of the ten countries (US Bureau of Statistics, 2012) so it is not

possible to make any meaningful economic contextual analysis but the issue needs to be borne in mind when considering the results.

The Relgio-Cultural: Four of the former USSR countries, despite 90 years of secular government, still reflect the `Orthodox' national religious tradition, whilst six can be ascribed as `Islamic', which continued strongly under the Soviet period (Roi, 2000; Brown, 2010). However, as with all former USSR countries they contain a mixture of different nationalities and faiths, and variation of within faiths, especially in the `Islamic ' countries, and not just between the major Sunni and Shia divide, which are important cultural influences (Roi 2000; Brown, 2010; Lings, 2006; Fadiman & Frager, 1997).

Results

Child-Mortality-Rates (CMR) 1988-90 v 2008-10

In all countries, male mortalities were higher than female and the CMR are the combined male and female rates for the under-fives.

Table [1] shows the highest current CMR (0-4years) per million (pm), excluding Turkmenistan whose latest index year was as early as 1998 (21,432pm), the highest ranged from 14,904pm in Kyrgyzstan, 9,734pm in Kazakhstan down to 2,561pm in Belarus 2,561pm and 4,399pm in Russia.

The improvements in the former USSR countries are seen in the averages of the two periods: initially 14,741pm but by 2008-10 down to 7213pm an equivalent fall of 56% since the end of the Soviet Union.

All former USSR countries had substantial CMR falls, with ratios of more than <0.80 over the period; notably in Tajikistan 0.25, Russia 0.35, Azerbaijan 0.37, Belarus and Uzbekistan 0.4, these are equivalent to falls of more than 50%, meeting the UN Millennium Goal targets of 2% p.a.

Insert Table [1]

Confirmed Child-Abuse-Related-Deaths (CARD): Table [2].

The highest current (2008-10) confirmed CARD were in Russia at 29pm, followed by the Ukraine 19pm, and, Belarus and Kazakhstan at 17pm, no other country's CARD rate exceeded 7pm.

Russian rates were equivalent to a 40% rise but with the exception of Kazakhstan, all the other countries had *ostensibly* had more than halved their confirmed CARD.

Under-five CMR: CARD Odds ratios*:* Relative to the changes in CMR, there were disproportionate and substantial changes in the Odds ratios of CMR to CARD. Russia had the greatest proportionate rise at 1: 4.1 followed by Kazakhstan 1:1.52, and Azerbaijan falling just short at 1: 1.19. Conversely, there were Odds ratios of less than 1: 0.80 in Georgia, Kyrgyzstan, Tajikistan and Ukraine, indicating that CARD fell proportionately more than total CMR.

Insert Table [2]

Possible-CARD:

Undetermined Deaths (UnD): Table [3]. The highest UnD were in Kazakhstan at 338pm then Belarus 297pm, Ukraine 270pm and Russia 254pm. Except for Azerbaijan at 59pm the four other countries had UnD rates of less than 20pm. There were however major differences between the countries, with remarkable increases in Kazakhstan, up13-fold, Belarus up more than 8-fold, the Ukraine rose seven times, and, Russia UnD rate quadrupled, with a doubling in Azerbaijan since the break- up of the USSR.

Conversely, there were notable falls in the five remaining countries.

CMR: UnD Odds ratios: There were substantial CMR: UnD Odds ratios indicative of possible under-reporting of CARD.

The largest were in Belarus 1: 21.5, followed by Kazakhstan 1: 20.5, Russia 1:13.1, the Ukraine 1:11 and in Azerbaijan 1: 5.9.

Conversely there were Odds ratios of under 1: 08 in Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, indicating that UnD fell more substantially than did CMR in these countries.

Insert Table [3]

***Ill-Defined Signs & Symptoms (IDSS)*:** The current highest IDSS rates were in Belarus at 423pm, followed by Kazakhstan 391pmand Russia at 263pm, with lows of under 150pm in Kyrgyzstan, Tajikistan, Georgia and Uzbekistan.

Belarus trebled its IDSS rate and Kazakhstan increased by the equivalent of 72%, Georgia 54% and the Ukraine 27%.

CMR: IDDS Odds ratios: There were notable rises in CMR to IDSS ratios in Belarus 1: 8.9, Russia 1: 2.9, Kazakhstan 1: 2.15 and the Ukraine 1:1.47 and Azerbaijan 1:1:59, with below 1: 0.80 Odds ratios in Tajikistan, Kyrgyzstan and Uzbekistan.

Insert Table [4]

Correlating the CMR and CARD Mortalities*:* Table 5 shows the inter-correlations of all four separate mortality categories with each other for the pre and post break-up of the Soviet Union.

For the 1988-90 baseline year, the only significant and positive correlation was between CMR and Ill-Defined deaths (Rho=+0.7333 p<0.01).

By 2008-10 there were however major changes as CMR correlated *negatively but not significantly* with all the other categories (Homicides (Rho = -0.5208 p<1.0 a trend), IDDS (Rho= -0.400 n.sig) and UnD (Rho= -0.3701 n.sig).

Conversely, there were *significant positive* correlations between Homicides, Undetermined deaths (Rho = +0.9042 p<0.001), positive but not significantly with Ill-Defined Signs and Symptoms (Rho= +0.4625). CHECK rhO

There was a significant trend, probability falling just short of statistical significance between UnD and IDDS (Rho= +0.5167 $p<0.1$).

Discussion.

Limitations: The key limitation to this study depends upon how *accurate and reliable* was the reported statistics for the baseline years of 1988-90 in relation CARD, in view of the problems found earlier about adult violent death that were said to have a `political dimension' and had been treated as `top secret' (Wasserman & Varnik, 1998). Therefore, if the current levels of CARD had occurred prior to the end of the USSR, they might have been `politically' unacceptable and therefore not reported. However, this does *not* seem to be the case as *Undetermined and Ill-Defined reported* deaths rose markedly from the earlier period, indicating that CARD and UnD and IDSS rates are reasonably reliable and that there are real increases, which in terms of UnD and IDSS are likely to contain under-reported abuse deaths.

A minor limitation was that there was no exact temporal matching of the latest data, especially Turkmenistan whose index years were 1996-98 but the Odds ratio was essentially testing a country against itself, to indicate changes in that nation's ability "*to meet the needs of its children*" over the period.

Despite the above limitations, this first comparative analysis of child mortality and abuse related deaths in the former Soviet Union countries shows that there have been major changes to which the relevant authorities should respond.

Salient Findings: The first research question of this hypothesis stimulating study is answered in the affirmative, as seven of the ten former USSR countries substantially reduced their total CMR, meeting or coming close to achieving the UN Millennium goals to reduce under-five CMR by 2% p.a.

In regard to reducing actual and possible Child-Abuse-Related-Deaths the picture is more mixed.

Reported confirmed CARD increased only in Russia but the major rises in Undetermined deaths, in Belarus, Kazakhstan, Russia and the Ukraine, at a time

when these four countries CMR fell so substantially, is *indicative* of possible under-reporting of CARD.

Such an interpretation is further strengthened by the rises in Ill-Defined deaths in Belarus, Georgia, Kazakhstan and the Ukraine, and with the significantly high positive correlation between confirmed CARD and undetermined deaths. This would fit the assertion that it is amongst the *undetermined deaths* that are most likely to contain possible `hidden' abuse related deaths (Creighton, 1993; Emery, 1993; Schimdt & Medea, 1995; Bennett et al, 2006; Newton & Vandeven, 2006).

Further more these same four countries' Odds ratios showed a marked disproportionate rise compared to their total Child Mortality Rates, again suggesting a degree of under-reporting of neglect and/or abuse related deaths.

This suggests that the need for child protection is either not understood or perhaps some authorities prefer not to highlight the problem, mirroring what occurred with adults (Wasserman & Varnik, 1998; Maksimova et al, 2006; Lysova et al, 2012; Stametel, 2012).

This interpretation is further supported by the fact that the only significantly positive correlations between the mortality categories were CARD and undetermined and a trend in relation to CARD and Ill-Defined deaths.

Brief mention must be made of the economic and religio-cultural factors that may have influenced the different categories of deaths. The Russian outcomes are especially surprising because Russia is the strongest economically (US Bureau of Statistics, 2012).

In relation to the notionally `Orthodox' countries, Belarus, Russia and the Ukraine, these had the strongest indication of under-reporting, but only two of the six `Islamic' countries, Kazakhstan and Azerbaijan, whilst the other four had major reductions. Why this might be requires country specific research.

Conclusions: What might these results indicate?

First in terms of reducing overall child mortality, seven former USSR countries can claim to have improved their ability `*to meet the needs of their children*', and two are

close to achieving the UN Millennium Development goal objective of reducing CMR by 2% p.a.; the exception being Kyrgyzstan.

However, the increases in actual and possible CARD categories in Belarus, Kazakhstan, Russia and Ukraine, is *indicative that there is a* serious child protection problem that is not being addressed.

Bearing in mind the political sensitivity of children's deaths in the West the remarkable increase in Undetermined and to a lesser degree the Ill-Defined-Sign-&-Symptoms deaths, does suggest that a significant proportion may well have been abuse related.

This raises the question of whether the problem of child abuse and its extremes is not recognised in the Belarus, Kazakhstan, Russia and the Ukraine, or is there is a deliberate under-reporting? Again only country and case-specific research can answer this question.

It is suggested that *these four countries need to focus their attention on meeting the needs of their children*, as despite the overall laudatory improvements in their total child mortality, all appear to have failed to meet the challenge surrounding child-abuse-related-deaths.

This study provides a baseline for future measurement of CARD in these countries and should alert the four Governments of the need to hear `*the voice of their silenced children'*.

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Table [1] Child Mortality Rate (CMR) rates per million (pm) and & ratios of change 1988-2010. Ranked by highest current CMR

Country, Years & rank	**Under-five CMR Rates pm**
1. Kyrgyzstan 1988-90	18633
2007-09	14904
Ratio of change	0.80
2.Kazakhstan 1988-90	14761
2007-09	9734
Ratio of change	0.66
3 Uzbekistan 1998-90	21447
2003-05	8552
Ratio of change	0.40
4 Georgia 1988-90	10409
2008-10	7850
Ratio of change	0.75
5 Tajikistan 1988-90	26214
2003-05	6571
Ratio of change	0.25
6 Azerbaijan 1988-90	15125
2005-07	5547
Ratio of change	0.37
7. Ukraine 1988-90	7022
2008-10	4800
Ratio of change	0.68
8 Russia 1988-90	12635
2007-09	4399
Ratio of change	0.35
9. Belarus 1988-90	6425
2007-09 0	2561
Ratio of change	0.40
Turkmenistan 88-90 ##	28833
Latest 1996-98	21432
Ratio of change	0.74
Average 9 USSR ##	14,741 ##
2008-10	7,213
Ratio of change	0.44

Not including Turkmenistan.

Table [2] Confirmed CARD rates per million (rpm) and ratios of change 1988-2010. CMR to CARD Odds ratios. Ranked by highest current rate.

Country & Years & rank	CARD 0-4 ys rpm	CMR: CARD Odds ratios
1.Russia 1988-90	20	
2007-09	29	1: 4.11
ratio of change	1.44	
2. Ukraine 1988-90	43	
2007-09	19	1: 0.65
ratio of change	0.44	
3=. Belarus 1988-90	37	
2007-09	17	1: 1.15
ratio of change	0.46	
3=.Kazakhistan 1988-90	17	
2007-09	17	1: 1.52
ratio of change	1.00	
5. Azerbaijan 1988-90	16	
2005-07	7	1; 1.19
ratio of change	0.44	
6 Kyrgyzstan 1988-90	24	
2007-09	5	1: 0.26
ratio of change	0.21	
7 Uzbekistan 1998-90	8	
2003-05	4	1: 1.25
ratio of change	0.50	
8. Tajikistan 1988-90	26	
2003-05	3	1: 0.48
ratio of change	0.12	
9.Georgia 1988-90	5	
2008-10	1	1: 0.27
ratio of change	0.20	
Turkmenistan 1988-90.	10	
1996-98	8	1: 1.08
ratio of change	0.80	

Table [3] Undetermined Deaths (UnD) rates per million (rpm), ratios of change 1988-2006. CMR to UnD odds ratios. Ranked by highest current rate.

Country & Years & rank	**UnD 0-4ys pm**	**CMR: UnD Odd ratios**
1.Kazakhistan 1988-90	25	
2007-09	338	1: 2 0.5
Ratio of change	13.5	
2. Ukraine 1988-90	36	
2007-09	270	1: 11.0
Ratio of change	7.5	
3. Russia 1988-90	39	
2007-09	179	1: 13.1
Ratio of change	4.6	
4. Belarus 1988-90	20	
2007-09	172	1: 21.5
Ratio of change	8.6	
5. Azerbaijan 1988-90	26	
2005-07	57	1: 5.9
Ratio of change	2.20	
6. Kyrgyzstan 1988-90	72	
2007-09	39	1: 0.66
Ratio of change	0.53	
7. Uzbekistan 1998-90	40	
2003-05	16	1: 1.00
Ratio of change	0.40	
8. Tajikistan 1988-90	21	
2003-05	4	1: 0.76
Ratio of change	0.19	
9.Georgia 1988-90	20	
2008-10	12	1: 0.87
Ratio of change	0.61	
Turkmenistan 1988-90.	21	
1996-98	6	1: 0.39
Ratio of change	0.29	

Table [4] Ill-defined Signs and Symptoms (IDSS) rates per million (rpm), ratios of change 1988-2006. CMR to IDSS Odd ratios for Under-fives. Ranked by highest current rate.

Country & Years & rank	**IDSS 0-4yrs**	**CMR: IDSS Odds ratio**
1. Belarus 1988-90	118	
2007-09	423	1: 8.95
Ratio of change	3.58	
2.Kazakhistan 1988-90	227	
2007-09	391	1: 2.15
Ratio of change	1.72	
3. Azerbaijan 1988-90	454	
2005-07	269	1: 1.59
Ratio of change	0.59	
4. Russia 1988-90 2007-09	257	
	263	1: 2.91
Ratio of change	1.02	
5.Georgia 1988-90	140	
2008-10	216	1: 2.05
Ratio of change	1.54	
6. Ukraine 1988-90	135	
2008-10	172	1: 1.47
Ratio of change	1.27	
7. Tajikistan 1988-90	1672	
2003-05	95	1: 0.24
Ratio of change	0.06	
8. Uzbekistan 1998-90	181	
2003-05	60	1: 0.83
Ratio of change	0.33	
9.Kyrgyzstan 1988-90	146	
2007-09	10	1: 0.08
Ratio of change	0.07	
Turkmenistan 1988-90.	807	
1996-98	209	1: 0.35
Ratio of change	0.26	

Table [5] Spearman rank order correlation of Death categories- CMR, Homicides, Undetermined & Ill-Defined Deaths 1988-90 v 2008-10

Mortality & Years	**CMR**	**Homicide**	**Undetermined**	**Ill Defined**
CMR 1988-90	- / -	- 0.2833	+ 0.4208	**+0.7333**
p value		<0.6 n.sig	<0.4 n.sig	**<0.025**
CMR 2008-10	- / -	-0.5208	-0.2667	-0.400
p value		**<0.1 trend**	<0.6 n.sig	<0.3 n.sig
Homicide 1988-90	-0.2833	-/ -	-0.0042	-0.3500
p value	<0.6 n.sig		<0.9 n.sig	<0.5 n.sig
Homicide 2008-10	**-0.5167**	- /-	**+ 0.9042**	+ 0.4625
p value	**<0.1 trend**		**<0.001**	<0.2 n.sig
UnD 1988-90	+0.4208	-0.042	-; / -	+0.1542
p value	<0.4 n.sig	< 0.9 n.sig		<0.8 n.sig
UnD 2008-10	-32667	**+0.9042**	- / -	**+0.5167**
p vale	<0.3 n.sig	**<0.001**		**<0.01**
IDSS 1988-99	**+0.7333**	- 0.3500	+0.1542	- / -
p value	**<0.025**	< 0. 5 n.sig	<0.8 n.sig	
IDSS 2008-10	-0.400	+0.4625	**+0.5167**	- / -
p value	<0.4 n.sig	<0. 2 n.sig	**<0.1 trend**	

Significant correlations in **Bold.**

Levels of significance p<0.05= #; <0.025= ## <0.001 = ###, trend, falling just short of significance. N.sig = not significant.

Turkmenistan excluded from analysis. .