Child Well-being and Survival in Urban Development Context, The case of Khartoum State

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By

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1- Introduction:

Poverty, the need for subsistence and survival, the civil wars and conflicts, the crowded cities of inadequate housing, and the urban development which doesn't take children into its development plans, are the features characterize urban settlements in the Middle East and North Africa (MENA) Countries. These features are not only shape the future of the countries' children, they also push with them to the streets and enforce them to leave their schools and work at early age and in inhuman and dramatic circumstances. These factors interact with other developmental and socio-economic factors to influence and determine the well-being of children.

Children needs and rights in the MENA countries are usually ignored and thus, their concerns are not thought of or considered in the strategies of planning. Furthermore, children are more likely to be affected by their surrounding environment, as they are largely influence by the family concerns and susceptible to all variables of the household characteristics; quality of residence, parents' education, parents' occupation, mother age, family income and other exogenous and endogenous factors.

Research on the status of Sudanese children, particularly, those who are vulnerable and disadvantage with regard to their urban development context, is limited due to many barriers. Disaggregated data used in most of the previous studies were not typically comparable overtime; sources of data are weak and defective. The situation was getting more complicated as conflicts and civil wars spread in the country. Thus, reliable and transparent assessment of the living conditions of children, their households and community, was an impossible task to perform, specially, if it is to focus on specific categories of children. Though, the efforts of the governmental and non-governmental organizations in Sudan to protect and care of children and to improve children situations through focused programs that have important bearings on formulating country's strategies towards child well-being in Khartoum State.

The study will investigate and assess the status of vulnerable and disadvantaged (V&D) children in Khartoum State. It will investigate the issues confronting V&D children (children with disabilities, orphans, street children, refugee/displaced children, child abuse, poor children, working children, illiterate & drop-out of school children, and children affected by violence). The study will try to answer questions

like: How the surrounding environment (socio-economic, demographic and environmental variables) contribute to the deterioration of children well-being and force them to become V&D? What is the effect of parents' characteristics; education and occupation on the improvement of their children status? Which factors are the most discriminate among the individual, household, and community determinants, Weather V&D children at different levels of living exposed to similar risk factors? Which factors affect V&D children at each level and which are the most discriminate?

2. Overview on Khartoum:

The Republic of Sudan is constituted of 26 states, 134 provinces, and 600 localities. With an area of 2.5 million square kilometers and population of 33.6 million in mid 2003 (Central Bureau of statistics 5th population census listing 2002), Sudan population characterized by young age structure, with a medium age of 18.2 years, while 53 percent are 18 or less, and 43 percent are under 15 years of age of whom 39 percent are urban.

Khartoum State lies in the north eastern part of central Sudan, in the conjunction of the Blue and White Niles. The Area of Khartoum State is estimated as 20,736 km², most of this area lies in a semi desert climatic region, whereas, the rest is in the desert region.

Due to several pulling factors, among them its status as the main capital of Sudan, where services are concentrated and employment opportunities are relatively abundant, Khartoum is the most attractive state in Sudan for the population. The population of Khartoum estimated as 5.4 million in mid 2003. While the latest report of the characteristics of Khartoum State Localities, 2004, has shown that the total population size in Khartoum localities is summing-up to 6.93 million, representing about 21 percent of Sudan Population., and considered as the most active population in Sudan, as there are 81 percent of the total population of the state, engaged with the labour force.

According to the Central Bureau of Statistics (CBS), Children under 15 years are estimated as 36 percent of total Khartoum population. While children less than 18 years are 42 percent and children 0-18 are 44 percent as shown in table (1) below.

Further the CBS projection shows that children 4-5 years are growing by 2.4 annually and will increase from 288 thousands in 2003 to 416 thousands in 2018. Primary school age population 6-13 will be growing by 3.4 annually which will have its implication of the pressure on preschool and primary education facilities.

Table (1): Age structure of children 0-18 Khartoum 2003

Age group	Age percent of total population	As a percentage less than 18	As percent of children 0-18
0-4	14.5	34.5	32.9
5-9	12.0	28.7	27.4
10-14	9.6	23.0	21.9
Total less than 15	36.1	86.2	82.2
15-17	5.8	13.8	13.2
Total 0-17	41.9	100	95.4
18	2.0	-	4.6
Total 0-18	43.9	-	100

Source: computed from: Central Bureau of statistics, population projection 1993-2018

3. Screening and selection of the eligible households:

The screening procedure for the selection of the eligible households for the survey, utilized the administrative classification of Khartoum state (the sampling frame), based on a list provided by the Administration of Local Governance in Khartoum. According to this administrative classification, the three constituent towns of Khartoum State were classified into localities, as table: (1) shows.

Table: (1): Administrative classification of Khartoum Localities and population size.

Locality	Population Size
Locality of Khartoum	
Khartoum	745,938
Jabal Awliya	1,703,950
Total	**2,449,888**
Locality of Omdurman:	
Omdurman	508,401
Karari	750,000
Ombaddah	1,500,000

Total	**2,758,401**
Locality of Khartoum North	
Khartoum North	533,700
Sharg Alneil	1,184,000
Total	**1,717,700**

Source: important characteristics of Khartoum State Localities Report, 2004.

These localities were classified officially into administrative units. The study stratified the quarters in these units into three strata; higher, middle, and lower class, according to the official classification identified by the Khartoum State, Local Administration Secretariat, which identifies three levels of classification for the quarters on administrative bases in addition to the coverage of services, however, for the purpose of this study, if the administrative classification locates a quarter in a specific class, while its quality of services does not qualify it for this class, then the study locates this quarter in the suitable class.

Following these criteria, quarters from these units were randomly selected for the screening process, proportional to the population size of the localities, considering the size of the class in the selected units, to facilitate selection of the eligible households for the interviews. Using this classification 7 quarters were selected from Khartoum, 9 From Omdurman, and 5 from Khartoum North proportional to the population size in each of the towns. Households at the selected quarters were fully screened.

4. Analytical Framework:

This stage includes data collection and analysis at ***three levels*** for a randomly selected stratified sample of households in Khartoum**:**

- The household level (socio-economic profile of the parents).
- The individual level (the child himself/herself).
- The community level (the environment).

The first group of explanatory factors includes socio-economic indicators. Most measures were based on separate but linked dimensions of socio-economic characteristics: family income, father and mother occupation, and their education... etc. ***The second group*** of explanatory factors includes variables relative to demographic characteristics of children or their mothers: birth order of the child, age of mother ...etc. Some of these factors are related to vulnerability. ***The third group*** of

explanatory variables includes environmental factors, those relating to housing conditions, include type of the latrine, animals in the house, water quality, food, house density, electricity in the house, type of the house, type of floor, building materials etc. The data generated at these three levels was utilized to build regression models using Discriminant Analysis procedure in which V&D children in their different categories will be predicted, this technique is useful to find out the most discriminate variables on each of the categories of children, moreover, it counts for the compound effect of the interaction between the predictors on the dependent variable.

The analysis determines the main factors that have significant influence on children well-being. The Statistical Package for Social Science "SPSS", was used to perform the analysis.

4.1 Data collection instruments and Pretest:

Instruments used for data collection are:

- Household questionnaire: used to collect data on household characteristics, children socio-economics and parental characteristics, and their surrounding environment.
- Guide for interviews with officials to have background about the state of children.
- Focus group discussion and in-depth interview guides to collect detailed data and provide suitable ground for discussion.

A pre-test was conducted to the compatibility of the questionnaires design, types of questions, question order and question wording.

4.2 Data Collection:

Data collection process started from the preparation of questionnaires and continued to include: selection and training of interviewers, pilot survey, and correction of questionnaires, data collection and infield data checking. Twelve interviewers were selected for data collection; they were divided into three groups under the direct supervision of the researcher.

4.3 Inferential Analysis:

This section is devoted for the inferential analysis at the three levels of variables classification, the discriminating variables were categorized into three levels or groups: the first group includes socio-economic characteristics of the child's household, such as family income, father and mother occupation, their education, and other relevant explanatory variables were investigated as discriminant factors affecting child well-being and survival, the second group of explanatory factors includes variables relative to demographic characteristics of children or their parents, such as age of the child when became at the risk of vulnerability or disadvantage, age of mother, age of father, birth order of the child...etc.., and the third group includes factors relating to housing conditions; type of the light, type of the latrine, animals in the house, water quality, food, electricity in the house, type of the house, type of floor, building materials, and other environmental factors.

Discriminant analysis has two steps: (1) an F test (Wilks' lambda) is used to test if the discriminant model as a whole is significant, and (2) which of the independent variables differ significantly in mean by group.

4.3.1 Discriminant Analysis of the Variables:

The explanatory variables at their different groups mentioned above, are expected to have compound effects on the well-being of children if they considered within the whole set of the discriminating variables without grouping, and are expected to have a different within-group effect when considered as part of their groups. Thus, discriminant analysis was conducted, first for each group of variables separately as independent variables, building three regression models, in which child-well being and survival (Category of vulnerability or disadvantage) is the dependent variable, these models were built to find out the most discriminant variables at each group.

The analysis was conducted to find out the separate effect of each set of variables at their different groups (household, individual, and community) on the dependent variable, in order to determine the most discriminant variables at each group or level of analysis. This step will help in reducing the number of variables and selecting the most discriminant variables at each group. In a later step in this section, the discriminant variables at the three groups will be combined to facilitate the identification of the most discriminant variables in the general model.

4.3.2 Discriminant Models:

A discriminant model, is a latent variable (L) which will be created as a linear combination of discriminating (independent) variables, such that $L= b_1x_1 + b_2x_2 + ... + b_nx_n + c$, where the b's are discriminant coefficients which maximize the distance between the means of the dependent variable, the x's are discriminating variables, and c is a constant. One discriminant model was created for each of the` three groups of analysis. The number of functions is (g - 1), where g is the number of categories in the grouping variable, in our case the dependent variable has 7 groups, thus 6 discriminant functions were obtained.

To select our three models that include the ideal set of variables at each group or level of analysis, we have to subjugate variables of each group to a certain criteria of discriminant analysis. This criterion includes:

4.3.2.1 The eigenvalue:

The eigenvalue of each discriminant function reflects the ratio of importance of the function which classifies cases of the dependent variable. When there is more than one discriminant function; as it is the case of Khartoum study, the first will be the largest and most important, the second next most important in explanatory power, and so on. The eigenvalues assess relative importance because they reflect the percents of variance explained in the dependent variable, cumulating to 100% for all functions.

4.3.2.2 Measuring strength of relationships

R Squared canonical correlation, is the percent of variation in the dependent discriminated by the set of independents. The canonical correlation of the discriminant functions at each group are displayed a column in the "Eigenvalues" table, as appears in tables (3), (4), and (5).

When discriminant analysis applied to the variables at the household level in Khartoum State, 6 functions were obtained, the eigenvalue for the first function was (1.460) as table (3) shows, the percent of variance explained in the dependent variable by the combination of variables at this function is 43.6%, and it scored the highest canonical correlation coefficient (0.77) .

Table (3) Eigenvalues for variables at the household level.

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1.460	43.6	43.6	.770
2	1.132	33.8	77.4	.729
3	.290	8.7	86.0	.474
4	.216	6.4	92.4	.421
5	.177	5.3	97.7	.388
6	.076	2.3	100.0	.266

For the variables at the individual level, as it is shown in table (4), the eigenvalue for the first function was (1.567), explaining 68.7 of the variance of the dependent variable and providing the highest canonical correlation coefficient among the other functions (0.781).

Table (4): Eigenvalues for variables at the individual level.

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1.567	68.7	68.7	.781
2	.578	25.3	94.1	.605
3	.066	2.9	97.0	.249
4	.041	1.8	98.8	.200
5	.024	1.1	99.9	.154
6	.003	.1	100.0	.056

At the community level the sixth discriminant function for the set of variables was ignored in the analysis, because it has very small values. The analysis at this level dealt only with 5 functions, among them the first one shows the highest egenvalue (1.315) explaining 75.8 of the dependent variable, as shown in table (5) below.

Table (5): Eigenvalues for variables at Environment group.

Function	Eigenvalue	% of Variance	Cumulative %	Canonical

				Correlation
1	1.315	75.8	75.8	.754
2	.286	16.5	92.2	.472
3	.121	7.0	99.2	.328
4	.012	.7	99.9	.110
5	.002	.1	100.0	.042

4.3.2.3 Tests of significance:

Wilks's lambda varies from 0 to 1, with 0 indicating group means differ (thus the more the variable differentiates the groups), and 1 meaning all group means are the same. The F test of Wilks's lambda shows which variables' contributions are significant, and the smaller the lambda for an independent variable, the more that variable contributes to the discriminant function.

For variables at the household level the first 5 functions were significant as table (6) shows, however, the first one was the most significant, as Wilks' Lambda for this function was the smallest (0.096), implies that the set of variables constituting this function are most discriminate the independent variable.

Table (6): Wilks' Lambda for variables at household group.

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 6	.096	801.541	150	.000
2 through 6	.236	493.677	120	.000
3 through 6	.503	234.709	92	.000
4 through 6	.649	147.648	66	.000
5 through 6	.789	80.903	42	.000
6	.929	25.184	20	.194

At the individual level set of variables, there were three functions showed significance, as indicated in table (7), however the first function is the highly significant one as its Wilks lambda was the smallest (0.216) implying more discrimination for the categories of the independent variable by the set of variables at the individual level.

Table (7): Wilks' Lambda for variables at individual level

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 6	.216	538.213	48	.000
2 through 6	.555	206.779	35	.000
3 through 6	.876	46.424	24	.004
4 through 6	.934	23.844	15	.068
5 through 6	.973	9.563	8	.297
6	.997	1.099	3	.777

At the community level, three functions were also significant, and as it is set by the rules of discriminant analysis, the first function was the most significant and discriminant for the dependent variable, with a smaller Wilks Lambda (0.296), as table (8) indicates.

Table (8): Wilks' Lambda for variables at community level

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 5	.296	430.318	30	.000
2 through 5	.684	133.960	20	.000
3 through 5	.880	45.192	12	.000
4 through 5	.986	4.898	6	.557
5	.998	.629	2	.730

4.4 Interpreting the discriminant functions:

Being subjected to the yardstick of discriminant analysis, The Standardized Canonical Discriminant Function Coefficients were generated for the variables at the three levels of grouping as shown in table (9). The analysis will be limited for the coefficients of the variables of function 1, as they represent the most and highly significant discriminating set of variables, and the other functions will be ignored. The standardized discriminant coefficients show the order of importance of variables of function 1 by unique contribution of each variable, these coefficients indicate the partial contribution (the unique, controlled association) of each variable to the discriminant function 1, controlling for other independents entered in the equation. The standardized discriminant function coefficients were used here to assess each independent variable's unique contribution to the discriminant function.

4.4.1 The Household Level:

For the variables at the household level, the standardized canonical discriminant coefficients of function 1 (the most significant function as assessed by its eigenvalues and Wilks lambda previously), thus these coefficients could be used to build the partial contribution discriminant model at the household level, which will be reduced later on to build the basic structure model at the household level.

Thus, the discriminant set of variables could be expressed by the model:

$$L= b_1x_1 + b_2x_2 + ... + b_nx_n + c$$

Where (L) is a latent variable created as a linear combination of discriminating (independent) variables.

Inserting the discriminant coefficients of function 1 from table (7), The discriminant model could be hitherto:

$$L = .620x_1+.315x_2+.038x_3-.026x_4+.238x_5+.153x_6-.010x_7-1.970x_8-.239x_9+.077x_{10}-.130x_{11}-.059x_{12+}.220x_{13}-.018x_{14+}.259x_{15}+.181x_{16}-.319x_{17}+1.897x_{18}+.188x_{19}+.166x_{20}+.268\ x_{21}-.015x_{22}+.146x_{23}-.041\ x_{24}-.031x_{25} + c$$

The x's are discriminating variables at the household level listed in the first column in table (9) subsequently and c is a constant.

This model shows the unique contribution of each independent variable at the household level in discriminating the dependent variable. For example, 0.620 in the first sell of the first column in table (9) is the contribution of the effect of the differentials in association of children to the higher, middle, or lower class on their susceptibility to the risk of being vulnerable or disadvantage; similarly, -.026; the coefficient of the variable mother education in same table amounting the contribution of this variable on the status of vulnerable and disadvantage children and the negative sign indicates a negative relationship between this variable and dependent variable i.e. the better the quality of education of mother, the less susceptibility of her child to the risks and dangers, and the less the quality of mother education the higher risk of her child to be vulnerable or disadvantage. However, father education is known in the literature of child well-being as of less effect on the children status than that of mother's, because the children at their early ages are mostly close to and dependent on their mothers rather than fathers. Never the less, the discriminant analysis excluded the two variables from the structure matrix which determine the most effective variables in the case of Khartoum, this may be due to the fact that no significant variations exist in the levels of education of women in the sample..

However, the analysis is seeking for the most discriminating variables in order to reduce the number of variables by eliminating those of less effect and limit the analysis only for the variables of the highest discriminating power or the most effective variables. To determine those powerful variables, it needs to build first a structure matrix table to show the correlations of each variable with each discriminant function. That is, they are the correlations of each independent variable with the discriminant scores associated with each given discriminant function. These simple Pearsonian correlations are called structure coefficients or structure correlations.

Table (9): Standardized Canonical Discriminant Function Coefficients for variables at household level

Variables	Functions					
	1	2	3	4	5	6
Levels according to administrative Classification and coverage of services	.620	-.306	.171	.397	-.285	.050
Number of the family members	.315	-.056	.026	-.520	-.191	-.003
Father education	.038	-.351	.372	-.391	.297	.187
Mother education	-.026	.002	-.484	.173	-.907	1.441

Father occupation	.238	.307	.546	.256	-.059	.097
Mother occupation	.153	.040	-.334	-.012	-.187	-.790
Number of other working persons in the household	-.010	-.091	.230	.465	.441	.172
Sector of father Job	-1.970	-3.213	2.162	4.974	-1.030	-3.423
Household monthly consumption (000 L.E)	-.239	.140	.357	-.075	-.035	.018
Household consumption for the day before (000 L.E)	.077	-.021	-.228	.433	.091	.049
Household priorities	-.130	-.114	-.427	-.317	.462	.232
Ownership index	-.059	-.069	.353	.053	-.175	.587
Monthly household income (000 L.E)	.220	-.043	-.028	.143	.120	-.331
Children enrollment in preschool education and kindergartens	-.018	.006	-.003	-.032	-.074	-.010
Recreation for children	.259	-.139	.157	.023	.394	.078
The way of punishment for children	.181	-.188	-.107	-.098	.144	.298
Sector of mother Job	-.319	.924	.078	-.108	.338	-.106
Economic sector of father	1.897	3.279	-2.430	-5.272	1.208	3.273
Economic sector of mother	.188	-.896	.441	.565	-.190	.286
Residence of father	.166	.836	-.436	.385	-.099	-.112
Residence of mother	.268	.424	.769	.056	.881	-.374
Residence of the family	-.015	-.100	.088	.070	-.024	-.053
Ownership of the house	.146	-.012	.761	-.211	-.130	.066
Number of years of residence in the house	-.041	-.232	.247	-.018	.409	.151
If this house more expensive than the previous	-.031	.200	.022	-.168	-.405	-.189

The most discriminant variables appear on the top of variables in table (9) and branded by a star (*) (branded variables) as table (10) shows.

Table (10): structure matrix for variables at the household level.

	Function					
	1	2	3	4	5	6
Levels according to administrative Classification and coverage of services	.738*	-.326	-.048	.088	-.139	-.045
Ownership index	-.548*	.049	.189	.060	-.028	.232
Recreation for children	.441*	-.153	.048	.085	.285	-.042
Household monthly consumption (000 L.E)	-.434*	.091	.222	-.082	-.042	.096
The way of punishment for children	.383*	-.207	-.076	-.182	.148	.204
Monthly household income (000 L.E)	-.371*	.078	.152	.044	.059	-.014
Residance of the family	-.067*	-.027	.009	-.013	-.028	-.035
Children enrollment in prescool education and kindergartens	-.042*	.030	.010	.029	.015	-.024
Residance of father	.291	.708*	-.003	-.072	.221	.000
Father occupation	.330	.651*	.082	-.108	.221	-.019
Economic sector of father	.299	.534*	-.018	-.213	.202	-.046
Setcor of fathor Job	.293	.530*	-.011	-.200	.204	-.047
Father education	.235	.438*	.139	-.149	.253	.135
Ownership of the house	.307	.065	.420*	-.215	-.090	-.009
Household consumption for the day before (000 L.E)	.071	-.059	-.167	.444*	.085	-.001
Number of the family members	.241	-.234	-.006	-.378*	-.175	-.011
Mother occupation	.071	.209	-.088	.268*	-.087	.078
Number of other working persons in the household	-.060	-.199	-.043	.241*	.104	.066
Sector of mother Job	-.077	-.047	.195	.224*	-.003	.031
Economic sector of mother	-.082	-.052	.193	.222*	-.007	.031
Household priorities	-.008	.015	-.324	-.291	.434*	.293
If this house more expensive than the previous	-.033	-.036	.049	-.119	-.263*	-.047
Number of years of residence in the house	-.150	-.034	.218	-.044	.246*	.110
Mother education	.075	.260	-.076	.215	-.198	.586*
Residance of mother	.089	.238	.033	.194	.042	.333*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

Identifying the most discriminating variables, a multiple discriminant analysis was limited for those branded variables to find out their impact on the dependent variable, and to reproduce refined standardized canonical discriminant function coefficients as

table (11) indicates, this new canonical discriminant function facilitates building the basic model at the household level.

Table (11): Reduced Standardized Canonical Discriminant Function Coefficients of the branded variables at the household level

Variables	Function					
	1	2	3	4	5	6
Levels according to administrative Classification and coverage of services	.779	.529	-.314	-.583	.210	.079
Ownership index	-.148	1.231	-.080	-.054	-.633	-.543
Recreation for children	.214	.401	.969	.070	.063	-.218
Household monthly consumption (000 L.E)	-.221	.278	-.054	.380	1.186	-.209
Monthly household income (000 L.E)	.284	-.295	.452	-.508	-.119	1.045
The way of punishment for children	.298	.198	-.222	.874	-.135	.185
Residence of the family	.048	.268	-.040	-.078	-.068	.688
Children enrollment in preschool education and kindergartens	-.034	.081	.014	-.061	.010	-.122

The discriminant coefficients of function 1 (coefficients at the first column) were used to construct the discriminant model for the eight variables which identified as the most discriminating variables by the structure matrix. Thus the Discriminant effect of the variables at the household level on the dependent variable could be expressed using these variables as follows:

$L = .779x_1 - .148x_2 + .214x_3 - .221x_4 + .284x_5 + .298x_6 + .048x_7 - .034x_8 + C$

Where L is a Latent variable represents the linear combination of discriminating variables on the dependent variable. x_1 is the level of stratification of the child according to administrative classification and coverage of services, x_2 is the ownership index, x_3 is the recreation for children, x_4 is the household monthly consumption, x_5 is the monthly household income, x_6 is the way of punishment for children, x_7 is the residence of the family, x_8 is children enrollment in preschool education and kindergartens.

The sequence of the eight components of the model indicates their importance in terms of their contribution to the variation in the dependent variable.

The effect of the "class or level of stratification" on the well being of children was highly significant indicating the strong association between the socio-economic environment surrounding the child, the quality of the household's / community living, and child well-being.

The effect of quality of life of household and community on child well-being and survival remains the most important; this is confirmed by the existence of the variable at the front in both the standardized canonical discriminant function coefficients table and the structure matrix. The coefficient indicates how the socio-economic conditions in addition to the availability of the basic needs and adequate coverage of services for the child determine his / her well-being or exposure to the risks of being vulnerable and disadvantage. This finding manifested the argument of the study; that the status and well-being of children in Khartoum State varies according to their socio-economic class, and according to the availability of basic needs, and the quality of the surrounding environment.

The second discriminant variable was the "ownership index", this index constructed by the study for the household's ownership of assets and wealth, as an indicator of the economic status of the household. This index shows that household economic status and its stock of wealth and assets is an indicator of its ability to provide the children with the adequate life and welfare and enable them to grow adequately, or in contrary, deprive them from the basic needs and expose them to the risks and dangers. This analysis explains the existence of poor healthy conditions for children and negative phenomena observed among children of poor quarters of Khartoum State, such as street children, school drop-out, and begging.

Another two economic indicators were among the most discriminant variables at the household level, namely; "Household's monthly consumption" and "income". The significance of these two variables in addition to the ownership index has left no ground to ignore the effect of the economic situation of the household on the well-being of its children. Household consumption means provision of food, health,

education, recreation … etc, and household income determine the quantity of this consumption and its level of coverage to the household's requirements, particularly for children.

The Analysis displayed “the effect of recreation provision for children” as an important determinant factor for the status of children. This factor interplays with physical, psychological and spiritual needs of the child and contribute very much to the formation of the child's character. Given this finding, children in poor settlements in Khartoum, Omdurman, and Khartoum North are suffering much of their deprivation from recreation facilities and means, resulting from the inability of their families to manage and provide with these recreation needs. The bearings of this deprivation affect the children's characters and influence their behavior.

“The way of punishment” is also presented by the analysis as one of the most discriminant variable. Families have their various ways to punish and advise their children, hard and rigid dealing with children results on naughty and complicated characters of children. In contrary, smooth handling for children and oral advices enable the children to think of their behavior and strength their characters.

Among the most discriminating variables was also the “residence of family”. Two other related variables were tested, namely, “father residence” and “mother residence”, however, their effect on the child well-being was not as significant as the family residence. This implies that the most ideal community for the child to grow in, is the family, and that, both of the parents have complementary roles in satisfying the child's needs and none of them could replace the other's role.

The last discriminant variable that showed importance at the household level was the “enrollment of children in kindergartens and preschool education”. This is a crucial phase in early childhood where children learn from their teachers and their classmates, and where they consider and examine their talents and capabilities. In the case of Khartoum, enrollment of children in kindergartens and preschool education

was limited for children of the higher and some of the middle classes, While most of those in the lower class were deprived from this important stage, this is because of their families inability to cover their cost of education or because of their instability.

It could be concluded from the analysis at the household level that all the discriminant variables at this level are either of an economic nature, or influenced by another economic variable. Thus, the socio-economic status of household could be considered as an influential determinant of the child well-being, and if it is to protect the children, it should first enable the families to provide them with their needs and to fight poverty which lies behind all discriminant factors.

4.4.2 The Individual Level:

Applying the same procedures at the individual level, a standardized canonical discriminant function Coefficients were derived as Table (12) below shows. Coefficients of variables at function (1) are the constituents of the most discriminant set of variables.

Table (12): Standardized Canonical Discriminant Function Coefficients for variables at the individual level.

Variables	Function					
	1	2	3	4	5	6
Sex of the head of the household	.351	.935	-.139	-.487	-.308	.285
Age of father	.082	-.249	.017	.152	.969	-.507
Age of mother	.262	.429	-.400	.489	.154	.246
If the child born vulnerable or disadvantaged	.402	.285	.576	.532	-.201	-.305
Relation of V & D child to the head of the household	.626	-.414	.146	-.421	-.938	-.658
Sex of V & D	.211	-.121	-.306	.221	1.016	.668
Age of vulnerable or disadvantaged child	-.018	-.122	.510	-.375	.317	.156
If there is special meals for the children of the household	.037	-.095	.301	.140	.113	.748

Following the same discriminant analysis criteria, a structure matrix is again formed to select out the most discriminant variables at the individual level, among the variables at this level. The structure matrix in table (13) below indicates that the most discriminant variables are: the "relation of the vulnerable and disadvantage child to the head of the household", and the "sex of the V&D child".

Table (13): Structure Matrix for variables at the individual level.

	Function				
	1	2	3	4	6
Relation of V & D child to the head of the household	.818*	-.484	-.183	-.186	.031
Sex of V & D	.786*	-.462	-.218	-.130	.135
Sex of the head of the household	.347	.679*	-.005	-.570	-.018
If the child born vulnerable or disadvantaged	.383	.213	.665*	.474	-.280
Age of vulnerable or disadavantaged child	-.119	.051	.613*	-.356	.185
Age of mother	.094	.237	-.414	.577*	.295
Age of father	.164	.235	.015	-.120	-.370
If there is special meals for the children of the household	.147	-.115	.325	.166	.750*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

A reduced standardized canonical discriminant function for these two discriminant variables was derived to determine the coefficients of these two variables at the discriminant model for this level as shown in table (14).

Table (14): Standardized Canonical Discriminant Function Coefficients of the branded variables at the individual level.

Variables	Functions	
	1	2
Relation of V & D child to the head of the household	.763	-2.787
Sex of V & D	.249	2.879

The discrimination of these two variables on the dependent variable could be expressed in the following model:

$L = .763\ x_1 + .249\ x_2 + C$

Where L is the latent variable, x_1 is the relation of the vulnerable and disadvantage child to the head of the household, x_2 is the sex of the V&D child, and C is a constant. In fact the effect of these two variables is identical, as most of the children were reported as sons or daughters for the head of the household, on the other hand the sex of the vulnerable or disadvantaged child was of course mail or female, thus, the effect of these two variables was similar and implies that in the case of Khartoum, male children are more susceptible to the risks and dangers than females, this result is in contrast with what is known in the literature i.e. as female child are at most danger than males in several societies particularly in the third world, and this is due to socio-cultural factors. Thus this finding should be focused on, and the phenomena should be subjugated to further studies and analysis to find out the discriminant factors.

4.4.3 The Community Level:

For the variables at this level, function 1 in table (15) introduces the most discriminant function, including the coefficients of the discriminant variables concerning the environment surrounding the child.

Table (15): Standardized Canonical Discriminant Function Coefficients for variables at the Community level.

Variables	Functions					
	1	2	3	4	5	6
Type of the house	.244	-.278	-.178	-.808	.341	-.268
Building materials	-.196	.707	.423	.154	.023	.041
Number of the rooms	-.253	.306	-.072	.913	.654	.194
Area of the house in squired kilometers	-.105	-.246	.384	-.204	-.400	.305
Source of drinking water	.395	-.190	.519	.259	.283	-.705
Number of years of residence in the house	.184	-.017	.354	-.544	.034	.251
Type of the light in the house	.499	.043	-.330	-.112	.308	.883
Type of latrine in the house	.297	.243	.237	.233	-.368	.125
Waste collection in the house	.130	.348	-.622	.188	-.212	-.113
Waste collection outside the house	-.061	.424	.127	-.083	-.043	-.135
If there animals or birds live in the house	-.130	-.250	.020	.397	-.170	-.040

The discriminant analysis, resorted to the structure matrix as table (16) shows, for the selection of those most discriminant variables to include in the model at this level.

Table (16): Structure Matrix for variables at the community level.

	Function					
	1	2	3	4	5	6
Type of the light in the house	.742*	-.067	-.097	.082	.242	.474
Source of drinking water	.730*	-.119	.350	.286	.230	-.345
Type of laterine in the house	.618*	.264	.196	.220	-.417	.038
Building materials	-.217	.562*	.283	-.193	.269	-.034
Waste collection outside the house	.171	.496*	.097	-.106	-.141	-.123
If there animals or birds live in the house	-.077	-.393*	.050	.261	-.295	-.025
Waste collection in the house	.169	.514	-.516*	.080	-.273	-.124
Number of years of residence in the house	-.113	.181	.406*	-.280	-.167	.257
Number of the rooms	-.393	.192	.092	.313	.615*	.257
Type of the house	-.049	.139	-.122	-.437	.580*	-.195
Area of the house in squaired kilometers	-.262	-.056	.331	.025	.018	.449*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

The branded variables of function 1 in the first column in table (16), are the most discriminant variables, this set of variables includes: “type of the light in the house”, “source of dinking water”, and “type of latrine in the house”, as similar as in the previous two levels, these three variables were used as the components of the discriminant model at this level, however, the coefficients of these variables should be identified again as for instance the combination of variables is differ and consequently the contribution of each variable will change according to the interaction between these variables. Thus, a new standardized canonical discriminant function for these discriminant “branded” variables was constructed, to determine the coefficients as table (17) shows.

Table (17): Standardized Canonical Discriminant Function Coefficients of the branded variables at the community level.

Variables	Functions		
	1	2	3
Type of the light in the house	.486	-.260	-1.000
Type of latrine in the house	.409	.976	.095
Source of drinking water	.432	-.566	.922

Including the coefficients of variables of function 1 in table (15), the discriminant model at the community level is constructed as:

$L = .486\ x_1 + .409\ x_2 + .432\ x_3 + C$

Where L is the latent variable to represent the discrimination of the dependent variable by the independents, x_1 is the "type of the light in the household", x_2 is the "type of latrine in the household", x_3 is the "source of drinking water for the household", and C is a constant.

The "type of the light" in the household confirmed by the analysis as the most discriminant variable at this level, this is due to the large variations in the types of light and availability of electricity between the different areas of Khartoum State, where quarters at the higher and parts of the middle class enjoy an adequate light from a variety of sources including electricity and generators, while children of other quarters at the lower and parts of the middle class stay at gloominess without adequate light in their households. In fact the availability of light has many indications on the environment surrounding the child and on the household ability to provide other basic needs for the child, this includes the need of children to review their lessons, to play, watch TV, and to enhance their talents and perform their hobbies at night.

The second discriminant variable; "type of the latrine", is an important healthy and community indicator, it tells much about the adequacy of the environment surrounding the child, and to what extent children are protected from pollution and infections resulted from inadequate latrine and unhealthy habits. While some households of the study have access to adequate types of latrine, others at the third class make their excretion in the open space and not far from the living area.

The third discriminant variable; "source of drinking water", is also an important indicator for the child nutrition, health, and protection. Unsafe source of drinking

water found at the households of the third class could be a source of many complications for the nutrition and health of children at this class. There are still households bringing drinking water from wells and stagnant ponds.

4.4.4 The General Model:

Completing the three levels of analysis, and identifying the most discriminant variables at each level, the analysis will utilize the selected most discriminant variables from the three levels of analysis by joining them into one set of independent variables in order to investigate their effect on the well-being of children.

The standardized canonical discriminant functions in table (18) is constructed, and as explained before, the coefficients of function 1 are the most discriminating set of variables.

Table (18): Standardized Canonical Discriminant Function Coefficients of the most discriminant variables.

Variables	Functions					
	1	2	3	4	5	6
Levels according to administrative Classification and coverage of services	.299	.054	-.353	.600	-.572	.307
Ownership index	.056	.579	.610	.603	-.273	.725
Recreation for children	.082	.271	.115	.049	.627	.387
Household monthly consumption (000 L.E)	-.128	.066	.371	.220	.482	.303
Monthly household income (000 L.E)	.106	-.060	-.107	-.292	-.084	-.792
Children enrollment in prescool education and kindergartens	-.065	.080	.022	.025	-.044	.141
The way of punishment for children	.058	.043	-.542	.500	.436	-.151
Residance of the family	-.003	.116	.074	.191	-.094	-.392
Relation of V & D child to the head of the household	.664	-.192	.556	.111	.764	.552
Sex of V & D	-.098	-.453	-.015	-.202	-.708	-.643
Type of the light in the house	.357	.095	.031	-.575	-.151	.517
Type of laterine in the house	.090	.748	.441	-.364	.024	-.270
Source of drinking water	.196	.249	.230	.439	.055	-.437

Applying the discriminant analysis criteria, the Eigenvalue of this function was found the highest, as table (19) shows, explaining 75.9 of the variability in the dependent variable with a correlation coefficient 0.83.

Table (19): Eigenvalues for the set of most discriminant variables.

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	2.190	75.9	75.9	.829
2	.481	16.7	92.6	.570
3	.103	3.6	96.1	.306
4	.082	2.8	99.0	.275
5	.026	.9	99.8	.158
6	.005	.2	100.0	.067

Wilks' Lambda for this function was the most significant, as table (20) indicates.

Table (20): Wilks' Lambda for the set of most discriminant variables.

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 6	.172	613.798	78	.000
2 through 6	.549	208.975	60	.000
3 through 6	.814	72.032	44	.005
4 through 6	.897	37.787	30	.155
5 through 6	.971	10.408	18	.918
6	.995	1.591	8	.991

However, more analysis is to be conducted to select the variables that contribute more to the variations in the means of the dependent variable, a structure matrix was constructed for the most discriminant variables to emerge. The structure matrix of table (21) elects the first five variables of the matrix as the most discriminating variables among all the variables at the different levels of analysis, and from which the general model should be built after another round of discriminant analysis for these discriminating variables with the dependent variable.

Table (21): Structure Matrix for the set of most discriminant variables

	Function					
	1	2	3	4	5	6
Relation of V & D child to the head of the household	.690*	-.530	.336	.077	.156	-.086
Sex of V & D	.661*	-.525	.283	.058	.028	-.156
Levels according to administrative Classification and coverage of services	.641*	.142	-.348	.232	-.371	.181
Type of the light in the house	.603*	.288	-.157	-.374	-.071	.212
Source of drinking water	.600*	.338	.038	.206	-.040	-.254
Type of laterine in the house	.456	.590*	-.065	-.260	-.008	-.248
Ownership index	-.434	.079	.555*	.376	-.130	.179
Household monthly consumption (000 L.E)	-.351	-.041	.518*	.264	.234	.092
Monthly household income (000 L.E)	-.301	.031	.429*	.039	.101	-.187
Children enrollment in prescool education and kindergartens	-.038	-.006	.045	-.080*	-.007	.047
Recreation for children	.367	.192	-.209	-.182	.525*	.241
The way of punishment for children	.330	.116	-.463	.353	.465*	-.204
Residance of the family	-.045	.018	.080	.128	-.088	-.427*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

Limiting the analysis for the “branded” five variables as independents and "categories of vulnerable and disadvantage children" as dependent variable, the coefficients of these independents were derived as table (22) shows, so as to form the general model.

Table (22): Reduced Standardized Canonical Discriminant Function Coefficients of the most discriminant variables.

Variables	**Functions**				
	1	2	3	4	5
Relation of V & D child to the head of the household	.648	-.371	-.118	.889	-2.324
Sex of V & D	-.051	-.480	.154	-.753	2.454
Levels according to administrative Classification and coverage of services	.315	.301	-.377	-.911	-.293
Type of the light in the house	.398	.210	1.061	.031	-.047
Source of drinking water	.211	.445	-.697	.750	.329

The general discriminant model can now be constructed as follows:

$L = .648x_1 - .051x_2 + .315x_3 + .398x_4 + .211x_5 + C$

Where L is the latent variable representing the discrimination made by the explanatory variables on the dependent variable, x_1 is the "Relation of V & D child to the head of the household" x_2 is the "Sex of vulnerable or disadvantaged child", x_3 is the "Level of classification according to administrative Classification and coverage of services", x_4 is the "Type of the light in the house", x_5 is the "Source of drinking water", and C is a constant.

Discriminant variables concerning the sex of the child showed significant effect on the status of children, this was confirmed by the analysis, as the relation of V & D child to the head of the household and the Sex of vulnerable or disadvantaged child were on the front of the variables of the discriminant function which indicate their importance. This finding raised the existence of a phenomenon of gender differential in child well-being and survival in Khartoum, however abnormally; the bias is on the advantage of the female child. Conversely, most of the gender biases found in developing societies was discriminating females, and males preference was common particularly in Sudanese and Arab societies. This phenomenon needs further investigation as recommended before to identify the causal factors.

The classification of children into levels or strata, confirmed the assumption that children well-being differ and vary according to their surrounding socio-economic and cultural environment. The classification of children of Khartoum into three strata or levels, made by the study, showed significant effect on the status of children and confirmed by the analysis as main determinant of child well-being

The last two variables of the discriminant function, indicates the effect of the surrounding environment on the child well-being, but interestingly, the existence of those two variable together in the discriminant function, clarifies that household and quarter or society environments are together determine the well-being of the child. The existence of an adequate source of drinking water and light in the house explains the existence of other needs and services and indicates the ability of the household to provide similar services, conversely, the inadequacy of the source of drinking water or light in the house indicates the deprivation of the child from other basic needs, the light of the house is a household indicator, explains the nature of life in the household and the adequacy of the household services, on the other hand, the source of drinking

water is a community indicator which interplay with other factors to manifest the adequacy of nutrition and health services in the household and in the community as well, both of these indicators determine the well-being of the child either directly or through other intermediate variables.

5. Conclusion and Recommendations:

The study has subjected the variables that influence child well-being and survival to a thorough investigation and analysis over several stages and procedures. This analysis resulted in determining the most discriminant variables over the three levels of analysis (household level, individual level, and community level). The discriminant variables from all over the three levels were combined in a general discriminant model including the most discriminant variables. The analysis reveals the association of the most discriminant variables with the socio-economic and environmental situations in the child's household. Urgent actions for poverty alleviation and socio-economic support is required in the poor quarters of Khartoum State, and in particular for the poor quarters in peripheries of the three towns (Khartoum, Omdurman, and Khartoum North). Poor families of V&D children should be supported to satisfy the basic needs of their children, the support should extend to the poor quarters where poor children live, this could be through the initiation of public utilities at these communities with consideration to the children of special needs and disadvantaged children. Public awareness on protection of children from risks and dangers is also required, particularly for the households of V&D children, where further awareness on the ideal ways to deal with their children and to respond to their needs.

The analysis also reveals an unprecedented phenomenon of gender differentiation, male children of the sample from Khartoum state were more susceptible to the risks and experienced more vulnerability and disadvantaged than female child. Further investigation should be conducted for this phenomenon, and the causal factors should be determined.

The study recommends the determination of child-wellbeing indicators to measure how MENA countries are moving toward promoting and achieving child welfare. The well-being of children could be measured by an index that composed of health, social, material, behavioral, emotional well-being and … etc. Another indicators should be made for the child poverty, child gender related development, child development welfare, early childhood well-being, school aged child well-being and disadvantaged and vulnerable child well-being.

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