The Impact of Women's Decision-Making Power on the Quality of Life of Children under Five Years of Age in Benin

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Content

List of tables

Abstract

Using data from Benin's Demographic and Health Surveys (DHS, 2018), we examined the impact of the purchasing power of women on the quality of life of children under the age of five years. More specifically, the study examined the impact of the decision-making power of the woman on the nutritional status of children and also of nutritional status on children's immunization status, using a Multinomial Logit model with the households as the theoretical models. The results of our study generally show that when the woman is involved in decision making within her household, the nutritional status of children and their immunization status are satisfactory. Variables such as the age of the woman, her level of education, the level of education of the head of the household, the employment status of the head of the household, the main decision maker on the health of the children, the interval between child births, the level of wealth of the household and the sex of the child significantly improve the immunization status of children under the age of five years. However, variables such as the distance from a hospital, giving birth to twins and the order of birth have a negative impact on the immunization status of children. In regard to the nutritional status of children, variables such as the age of the woman, her level of education, the management of the income of the woman, the wealth level of the household, the fact that the child is a girl and the fact that the parents collectively decide on the health of the children lower the probability of the child being malnourished. However, variables such as birth order to the children, the fact that the children are twins and age of the child increase the probability of a child being malnourished. Initiatives and approaches therefore should be undertaken in order to increase the empowerment of women. The results of this study will have a positive impact on the nutritional status of women. In the short term, these recommendations should have an impact on the scholarly results of children, in the medium term on the labour market, and in the long term on sustained economic growth.

Key words: *Power, decision-making, quality of life, children.*

1. Introduction

Women's decision-making power has not received much attention in most developing countries. The few existing studies suggest that it is closely related to the socio-demographic characteristics of women and to the social context in which they live (Osamor and Grady, 2018). Over the past decade, however, household decision-making has received increased attention from researchers and policy makers. One of the reasons for this interest is to fill the gap left by development strategies that omit household behaviour and activities (Lawrence and Mancini, 2008). Since the 1995 Women's Conference in Beijing, an increase in women's power in households as compared to that of men, generally known as women's bargaining power, has become an objective in developing countries (Lepine and Strobi, 2013). In some African countries, faced with increased urbanization and persistent economic crises, women have found themselves increasingly involved in economic issues. However, although their participation in economic activities is increasing, inequalities between men and women remain in the various economic sectors. Indeed, several approaches have been put in place to improve women's participation in development (Dagenais and Piché, 2000). One of the approaches aims to help women improve their role as mothers by focusing on their health and that of the child, and on child care and nutrition. Indeed, women are at the frontline when it comes to child care in a household, affecting the well-being of individuals in each household. Women's empowerment thus enables the improvement of the nutritional status of children, which would have a significant impact on their development (Shafiq et al, 2019).

Over the past few decades, the empowerment of women has also been recognized not only as an important human right but also a means of increasing a household's benefits and generally contributing to economic development. As a primary childcare giver, a woman is usually the first to notice symptoms of illness in children and invest her time and energy to improve their health and nutrition (Ngom et al, 2003). Several studies have been carried out on the impact of negotiation on households, especially how it affects the standard of living of a household. According to Seebens (2011), preferences of men differ from those of women and individual preferences have an impact on the well-being of other members of a household. Jacquemet and Robin (2011) demonstrated that the percentage share of the surplus arising from marriage that goes to the husband is an increasing function of his income, whereas it decreases in regard to the income of the wife and that hobbies are inferior goods for men and normal goods for women. This finding not only shows the heterogeneity in preferences

between genders but also, most importantly, demonstrates the disparity in marriage benefits for men and women. Failure to take into account individual preferences within the framework of household decisions would most certainly lead to decreased individual well-being, especially for the woman, since the man is usually the head of the household. According to Osamor and Grady (2018), one of the most common social relationships in which decision making takes place is among couples/partners. Married or cohabiting couples make decisions together on several facets of their lives, including health care.

Benin's Demographic and Health Survey report (DHS, 2018) indicates that in 67% of reported cases, women participated in decisions related to visits by their families or relatives to healthcare centres, and that this type of decision was mainly arrived at by the woman in 21% of the cases. Close to five women out of six (46%) are involved in decision making in regard to their own health care and in 12% of these cases, they arrive at the decision themselves. In regard to making significant household purchases, the percentage of women associated in making the decision is 47% and only one out of six can women make a decision on her own. Overall, 36% of married women participated in making three decisions and 27% were not involved in any decision making. Such a state of affairs is not without consequences on the women themselves, and on their children. Our study recognizes the low level of involvement of women in decision making within and outside their households, thus the high levels of malnutrition among infants. Furthermore, in addition to its numerous consequences on health care and human capital, malnutrition also has repercussions on the socio-economic development of a country. The Government of Benin, through its reforms, created the National Council on Food and Nutrition to prioritize nutrition within the actions related to development and improving the standards of living among the country's population. It is, therefore, important to highlight all the factors that work in synergy with child nutrition, including gender equality, through improving women's participation in decision making.

In this regard, Hanushek (1998) argued that it is not surprising to find that the parent's role in guiding children is important. Consequently, preferences have a significant impact on the well-being of children. From this basic principle, we could then ask whether an improvement in the conditions of the parents automatically translates into an improvement in these indicators for their children. If this is the case then it would be a lever for taking action in order to achieve a certain level of well-being for children. A better distribution of power within the household increases the well-being of women themselves as well as that of their children. However, when women are kept away from making decisions related to income and other household resources, their children and they themselves risk having less to eat and being deprived of healthcare and education services (UNICEF, 2020). When women are in good health, educated and free to benefit from opportunities that are offered to them, their children thrive, resulting in double benefits for the women and their children. Decision-making powers of women are associated with the nutritional status of children in several low-income countries whereby women who have low decision-

making powers have a higher likelihood to have undernourished children (Carlson et al, 2015; Cunningham et al, 2015). Studies undertaken in sub-Saharan Africa have examined the empowerment of women in relation to nutrition (Rabaorisoa et al, 2017), their empowerment often being a set of economic, sociocultural, legal and/or political variables, which are measured through employment, ownership, attitudes towards domestic violence and decision-making powers.

Several empirical studies have indicated how women's decision-making powers have a positive impact on the well-being of children. Thus, according to Nordman and Sharma (2016), an improvement in the women's decision-making power and the empowerment of women is related to a more significant allocation of household resources to the benefit of children. According to these researchers, women's decision-making power has a positive impact on the percentage share of expenditure on education. Resources invested in children depend not only on available resources but also on the preferences of parents (Patel et al, 2007). In this regard, the importance of the role of women's empowerment in improving their well-being and that of their families should not be underestimated (Fuseini and Kalule-sabiti, 2016). This distribution of resources has an impact on nutritional status and depends on the negotiating power, or decision-making power, within a household (Mckenna et al, 2019). The degree of women's participation in decision making in a household could affect the health care of children or limit women's capacity to direct household income towards their children. Several studies have pointed out the positive link between empowerment of women in decision making and the nutritional benefits for children (Shafiq et al, 2019; Saaka.2020).

In conceptualizing the "decision-making capacity of women", as their capacity to influence decision making within the household, our overall research question is as follows: What is the impact of women's decision-making power on the quality of life of children under the age of five in Benin? More specifically, the study examined the impact of women's decision-making power on the immunization status of children and on their nutritional status. In order to do so, the data used was taken from Benin's Demographic and Health Surveys (DHS, 2018).

The rest of this paper is organized as follows: we begin to tackle the question by focusing on household models. This is followed by an empirical review of the decision-making power of women and the quality of life of children to identify the best model for this study in terms of methodology in order to examine the results and come up with recommendations and economic policies.

2. Literature review

This section deals with a summary of the literature on the subject grouped into two sub-sections: The first sub-section deals with the theoretical literature and while the second deals with empirical literature.

Household models: From unitary to new models

One could tackle women's decision-making power within a household without undertaking a review of the different household models. Such a clarification would allow us to situate the work in literature anchored in theoretical studies on households. In the economics literature, several models of household behaviour provide an explanation of how decisions are arrived at by members of a household. The economic representation of a household is one of the strands through which the theory has been applied rigorously over the past few years. Economists tend to consider a household as a unit that brings together resources and allocates those resources for consumption, production and investments, with a single set of preferences (Schmidt, 2012). The first reaction when one is asked to give an empirical understanding of a household would be to consider the household as an economic agent in the same manner as an individual and thus to directly apply the preferences theory (Couprie, 2004). Microeconomic analysis has almost always studied household behaviour using a single utility function that is maximized in relation to a budget constraint, although the household comprises several members (Donni, 2000). In such a case, the household choices, although being made by several members, are aggregated in a single choice, determined as a singular utility function. This approach, whereby individual preferences are aggregated within a system of social preferences, is said to be "unitary". The unitary model represents the basic Becker (1973) model, in the analysis of decision making in households, and its popularity is as a result of its specificities, in other words, its simplicity and adaptability to households. In this type of household, income from all the members is put together and managed by a sole individual, often the head of the household, and the individual preferences are aggregated into one social preference. All the evidence suggests that the members of the household have identical preferences which is often not the case. This has been the major argument given against the use of such a unitary model. This approach, although very simple, allows us to undertake rigorous empirical tests, to discover household preferences

in a non-ambiguous manner and to interpret empirical results so as to examine the impact of household behaviour on economic policies (Donni, 2000). The limitations of this approach, such as an absence of convincing theoretical justifications on the aggregation of individual preferences and the rejection of predictions generated by such results, have led to the development of a more generalized approach, said to be "collective", based only on the assumption of the effectiveness of resource allocation (Donni and Ponthieux, 2011).

Following this unitary approach that has remained for a long time the most popular approach in the analysis of household decisions, other approaches have been developed over the past few decades in order to respond to the shortcomings of the unitary model. These approaches, although varied, are all based on the same principle that stipulates that each individual within a household should be represented by characteristics that are specific to that individual and that there should be a provision for multiple decision makers within the household. The specificity of each one of them is based on their position in decision making. These "collective" models consider decision making within a household to be a process of negotiation that could be cooperative or non-cooperative according to the approaches, the result of the negotiation being a function of the parameter of variables, some of which are always related to the individual income of a specific household member (APE, 2004). The cooperative household approach is based on an assumption of Pareto efficiency. In other words, one cannot improve the well-being of one member of the household without negatively affecting that of another. The non-cooperative approach is, however, based on a Cournot Nash equilibrium model. Contrary to the cooperative model, the non-cooperative model has not always been efficient in the Pareto sense. There is thus a possibility of improving the well-being of a member of the household without necessarily causing the deterioration of another. In practice, since the empirical validation of such negotiation models requires much data, empirical tests have often been based on the definition from the level of threats or from the level of disagreement (Keita, 2011). These levels of threat depend on the income of each household member (generally the resources that each member controls and from which they can benefit in case of a disagreement) as well as the economic and social environment (state of the labour market if the person hopes to be employed, the status of the matrimonial union in case the person wants to re-marry, laws on allowances and emoluments given to the child-care giver, etc.) (APE, 2004). Despite these divergences in terms of the type of model used, researchers have tried to find properties that are similar to the unitary model, namely restrictions on household behaviour, which can be tested, as well as the possibility of identifying structural components by finding the characteristics of the preferences and of the negotiation process through observing household demands (Couprie, 2004).

Inasmuch as the unitary model continues to be used to explain the various phenomena within households, evidence in favour of a model whereby individuals within the household have distinct preferences have been of interest to researchers and policy makers. Thus, non-unitary models have begun to take precedence

over unitary models in explaining how household decisions are arrived at. The intrahousehold bargaining theory states that the well-being of children is reassured when women have a higher decision-making position level in domestic issues and more control over household resources. Other than being a place of consensus or a site of authoritarian decisions, the domestic sphere has proven to be a place where negotiation takes place, especially if the wife has a high position in decision making as a result of her financial empowerment.

Women's decision-making power and children's quality of life

Empirical studies have refuted the idea that parents agree on the manner in which manpower and other resources can be allocated in order to improve household well-being (Haddad et al, 1997; Vermeulen 2002). According to Bargain et al (2011), measures taken in developing countries often ignore the distribution of resources with families and the benefits arising from joint consumption. Therefore, the researchers used a process which includes distinguishing the percentage share of consumption by the father, the mother and the children in the collective model. Their results indicate that children occupy a reasonable fraction within the consumption of household resources, but not enough to avoid child poverty in relation to what is given as the conventional method of measuring poverty through per capita expenditure. The same study demonstrated that there is no discrimination against girls and that the most highly educated mothers have more power over the management of household resources.

Angelucci and Garlick (2016) indicated that optimum allocation of resources within households could differ according to the age structure of the spouses. The result of this difference in terms of well-being is that the youngest households invest less on the education of their children and that their expenditure on education is less sensitive to transfers from money received. Other results from these research indicated that the impact of the preferences of the parents on the children is not only due to the distribution of decision-making power, but also efficiency in terms of the nature of allocation of household resources. To this effect, Luz and Agadjanian (2015) demonstrated that women who have more decision-making power would be more favourable towards educating their daughters. This result indicates that a woman, who is the mother in a family, would not want her daughter to lack the level of empowerment necessary for her to participate in household decision making. As a result, by promoting the education of her daughters, the mother wishes to improve the decision-making power of her child later in life.

Adamowicz et al (2013) examined the impact of Pareto efficiency in the allocation of resources on health risks for children. Their study examined how changes in decision-making powers of parents affect their incremental willingness to pay to reduce the health risks related to their children. The analysis, which was based on

a collective model that includes health risks related to domestic production, allows for an observation of the differences in preferences and the risk perception for each spouse. The results indicate that the Pareto efficiency remains the same in cases where decision-making power is redistributed among spouses. Therefore parents see the health of their children as a public good and both spouses contribute to it. This indicates that for a given category of family income, the incremental willingness of the spouses to pay in order to guarantee the health of their children is determined by the decision of each parent, notably in regard to goods that reduce the health risks of children. This result demonstrates that a woman's decision-making power has a significant impact on the health status of children and that this does not put into question the efficiency of household allocations. In the collective household models, the well-being of children in general, and their health status in particular, is closely related to who is in charge of making major decisions within the household. It's no longer a question of single preferences or utilities. This is not in relation to individual preferences or personal utilities. The diversity in preferences could lead the two spouses to give their share of income to increase the well-being of their children. In a collective household model, the children are considered as a public good, and therefore both parents contribute to education and health care, which favours their well-being. Health care for women and for children is a normal good and an increase in income for a household increases the amount of resources allocated to children, as measured by an increased demand for healthcare services. The well-being of children in this type of household would be better than if only one person managed household income. Assuming the preference by women for the well-being of children in a cooperative household, if the decision-making power of women within a household increases with a relatively higher contribution of income, it would increase the amount of resources directed towards children and the consumption of healthcare services (Kasiwa, 2018).

According to Schmidt (2012), empirical results from developing countries demonstrate that an increase in the level of decision-making power of women is in tandem with a preference for goods that increase the well-being of children. By undertaking an empirical analysis of data from Bangladesh, the author arrived at similar conclusions that indicate that the healthcare indicators for children whose mothers have a high level of decision-making power as spouses are better than those in other types of households. This, therefore, indicates that decision-making power could be a lever through which actions could be undertaken to improve the healthcare status of children. The results of a study by Arulampalam et al (2015), present a similar view from the general empirical evidence arrived at by demonstrating the positive relationship between the level of empowerment of the mother and the nutritional status of the child. More specifically, the researchers demonstrated that the empowerment of mothers is related to an improvement of the long-term nutritional status of children in rural areas. Furthermore, the study demonstrated that children benefit from this empowerment, especially in regard to girls aged under

24 months and boys under 23 months. The implications of this study are that the means empowering women are real measures that lead to an improvement in the nutritional status of infants.

A study by Mikalitsa (2015) in Kenya used an approach that stratifies households according to who is the household head. As a result, the study distinguishes between three types of households: headed by men, de jure headed by a woman and de facto headed by a woman. Households headed de jure by a woman are termed as such either because she lives on her own or because she is a widow. In households headed de facto by a woman, the man is absent although he maintains contact with his family, and even sends them money. The results indicate that households headed de jure by a woman suffer the most from nutritional poverty and have a higher incidence of malnutrition compared to the other types of households. The explanation is that these women have limited resources and little access to resources because of the patriarchal nature of Kenyan society. The researcher demonstrated, furthermore, that children from households that are de facto headed by a woman are better nourished than children from households headed by men. This could be explained by the fact that women are, in general, more likely to spend money on nutrition and the well-being of children when they have control over family resources.

In the same manner, using a pension programme, Duflo (2000) demonstrated that the impact of money transfers depends on the beneficiary. Using data from South Africa, the researcher demonstrated that pension received by women has a higher impact on the anthropometric status of girls but little effect on that of boys. This suggests that households do not operate as unitary entities and that the efficiency of public transfer programmes depends on the gender of the beneficiary because the study concludes that the transfers have no effect if they are received by men. This highlights the differences in preferences according to the parent. In this regard, Dasgupta (2016) indicates the existence of a preference by mothers for health care for their children. The researcher thus examined the differences in the levels of malnutrition among girls and boys. He found that these differences exist when women have preferences amongst their children at the expense of girls and that these preferences become evident in decision making in the household. This suggests that women who are responsible for the nutrition of their young children allocate resources differently between boys and girls when they (women) are empowered in decision making.

Quisumbing and Maluccio (1999) remind us that the collective models stipulate that individuals in a household have different preferences and do not pool their income. That said, intrahousehold allocations reflect the differences in preference and the decision-making capabilities of members of a household. Using a sample of four countries — Bangladesh, Indonesia, Ethiopia and South Africa — the researchers through an empirical study rejected the validity of the unitary model in these four countries, although at various degrees. Their results indicate that the percentage share enjoyed by women has a significant impact on allocations towards other generations. These allocations are made in reference to expenditure on education and the clothing

of children. The study also highlights that the tendency of families preferring boys or girls differs according to regions within a country and also according to the countries under study. Chakraborty and De (2011), using a measure adopted from the level of empowerment of the woman based on the aspects of the household in which the mothers in families make their decisions, demonstrated that children with empowered mothers have a higher staying power in secondary school.

The impact of decision-making power on the child indicators could sometimes go against theoretical predictions on household prediction models. Using data from Nigeria, Salawu et al (2020) found that women empowerment had increased the nutritional diversity in households in a significant manner and, consequently, significantly reduced the possibility of lagged growth among children. By focusing on a situation whereby the head of the household, as a result of migration, lives outside the household, Chen (2008) demonstrated that empirical evidence from China goes against the unitary and cooperative models. Indeed, the study comprised observing and examining the impact of migration of the man on his children. The idea is that the absence of the head of household makes the woman the de facto head of the household. These results indicate first that in the absence of their father, the hours spent by girls on domestic chores increase whereas those spent by mothers decrease. Such a result is contrary to the unitary model which postulates that the members of a household re-evaluate their working time in order to compensate for the absence of one of the members. Furthermore, the study reveals that the healthcare and education indicators of children did not experience any changes during the migration of the man and with changes in household income. Such a result invalidates the non-unitary models in which the absence of the man increases the decision-making power of the woman who has a high preference for expenditure on education and the health care of children. This study highlights the complexity of the phenomenon both at the theoretical and empirical levels. The findings of Alfano et al (2011) put the effect of women's autonomy on child indicators into perspective. Indeed, examining the situation in different regions of India, these authors conclude that the effect of women's decision-making autonomy is not always significant in all cases. In areas where the impact of the empowerment of women is seen to be a determinant, it has an impact on the school-going age of children. A probable explanation would be that the independence observed from the empowerment in decision making by women and the education of children could be explained through the distribution of power which indicates that men remain the final decision makers.

Studies by Aminou and Monwanou (2022) on the impact of decision-making power on women and child nutrition, demonstrated a positive relationship between the decision-making power of the mother through her empowerment and the nutrition of her children. Examining the impact of the decision-making power of women on child nutrition in Pakistan, Shafiq et al (2019) found an insignificant impact in the decision-making level for women in regard to visits to healthcare facilities by the family, and the nutritional status of the children. However, they found a significant and negative impact between the size of the family and the nutritional status of children, and the household's wealth level.

Conceptual framework of the study

According to the 2018 World Economic Forum, Benin is ranked 138 out of 149 in the Global Gender Gap Index, which indicates that the country has gender gaps that are significantly higher than world and sub-Saharan Africa averages in the domains of business, politics, education and health. Despite the progress made in terms of the empowerment of women since the adoption of a national gender policy in 2008, gender disparities remain at all these levels. A state-of-the-art survey of Benin revealed persistent gender disparities in terms of access to basic social services (education, health care and social services), justice (not respecting women's rights), resources (employment, finance, land and capacity building) and access to decision-making organs. Such inequalities create problems in regard to development (efficiency and sustainability), social justice, respect for human rights and good governance. Indeed, although women represented close to 47% of the active population in the country in 2019, social and civil legislation is strongly influenced by traditions and customs, and women still have to ask for permission from their husbands for things such as going to visit their relatives, their proper health care and other things (DHS, 2018). This gender inequality is not without consequences for the quality of life of children. Indeed, mothers are often the primary care givers for their children, and they therefore play a significant role in the nutritional status of their children. However, the low social status of women is not considered as a contributing factor. Very few studies specifically focus on the decision-making power of women, and to the best of our knowledge, no study exists that examines women's decision-making power and the quality of life of children in Benin. Furthermore, although DHS uses standardized measurements for decision making in several countries, there is no uniform definition for decision-making power in the literature, and it is not clear which dimensions in decision making, if any, are used to predict children's malnourishment. The objective of this study was to indicate, using convincing data, the relationship between gender inequality through women's decision-making power in a household and the quality of life of children through their nutritional and immunization status.

3. Research methodology

The main objective of the study was to examine the impact of the level of women's decision-making power on the quality of life of children under the age of five years. To do this, we utilized cooperative household models that stipulate that the two spouses should be involved in decision-making within a household.

Theoretical framework

Resources invested in children depend not only on available resources, but also on the preferences of parents. The parents' preferences are not necessarily similar; consequently, the results of the actions by mothers and fathers could differ (Browning and Chiappori, 1998). We formulated a hypothesis according to which mothers have a higher preference for the health care of their children when compared to fathers. Therefore, for a couple that have a child we will denote the wife as 1 and the husband as 2. Each has a time unit for which they could dedicate to labour or to the child's healthcare. We denoted by w_i the wages; γ_i the negotiation level; and α_i the time spent with the child. The interest that each parent has for the child is indicated as φ for the mother and β for the father. The problem for the two spouses is to maximize Equation 1:

$$\gamma_1 u(c_1) + \gamma_2 u(c_2) + \alpha_1{}^{\varphi}\alpha_2{}^{\beta} - \mu\,[c_1 + c_2 - (1-\alpha_1)w_1 - (1-\alpha_2)w_2] \qquad (1) \quad (1)$$

The first order conditions are written as:

$$\gamma\, u'(c_1) = \gamma_2 u'(c_2) = \frac{\varphi_{\alpha_1}{}^{\varphi-1}\alpha^{\beta}}{w_1} = \frac{\beta\alpha_1^{\varphi-1}\alpha_2^{\beta-1}}{w_2} = \mu \qquad (2)$$

We assumed that the husband has a lower capacity to contribute to the quality of life of the child ($\beta = 0$) such that $\alpha_2 = 0$. This does not prevent him from deriving a certain level of satisfaction from seeing his children being treated well and in good health. Therefore, we formulated a simple expression for α_1, which will represent the childrens quality of life (QV):

$$\alpha_1 = QV \quad \left(\frac{\varphi}{\gamma_1 u'(c_1) w_1}\right)^{1/(1-\varphi)} \qquad (3)$$

With this model, the quality of life of the child depends positively on the negotiation power of the mother and her preference for the child, and negatively on the utility margin of consumption and the salary of the mother. For the rest of this study, we formulated a hypothesis according to which μ is a constant, therefore did not need to consider the household's consumption level. The quality of life of the child Q would then be:

$$QV = (\gamma_1 | w_1)^{1/(1-\varphi)} \quad (4)$$

The wages of the wife were approximated to the type of remuneration as is formulated on the base that we use and since she earns more than her husband. The preferences for mothers for their children are innate according to the hypothesis of the "good mother" and are thus immeasurable but positive in terms of the quality of life of her children. Children are generally modelled according to the attributes of the household under parental authority, rather than as distinct economic agents who have individual utility functions. Their health status thus appears as a combination of several factors, namely the women's negotiation power, the preference of the mother for children and other socio-economic and demographic factors.

The reduced form of the estimation model is taken from Equation 5:

$$QV = f(\gamma_1, w_1, X_i QV = f(\gamma_1, w_1, X_i) \quad (5)$$

With QV the quality of life of the child, was approximated by the immunization status and the nutritional status of the children; $(\gamma\ the\ woman's\ bargaining\ power)$ measures the involvement of the woman in household decision-making, including those decisions related to the children's healthcare; $Xi\ socio-demographic\ factors$ brings together the variables likely to act on the quality of life of the children; and w_1 the employment status of the mother which provides information on whether or not she works.

Definition of data and variables

Measurement of the decision-making power of the woman

Decision making was addressed in the questionnaire using a set of five questions related to five household decisions. The question was framed as "Who usually makes decisions…" and the options that were added to the clause were such as purchase of household goods; decisions on the healthcare of the wife; visiting families and friends; and management of wife's income and that of the husband. The responses are based on four main modalities which are "only the respondent"; "the respondent and his/her spouse"; "only the spouse"; and "somebody else". Within the framework of this study, we kept in mind the fact that in the analysis of the decision-making power of the wife, not considering her as the head of the household falls within the premise of the assumptions used in the non-unitary models and, therefore, in the collective models. In this regard, she would have decision-making powers if she is associated with making decisions within the household. Thus, the first two modalities in the responses are

those that we considered as responding to cases that follow the collective model. The rest of the cases excluded the involvement of the wife in decision-making. Each decision was, therefore, examined and measured using a binary variable that took the value of 1 each time a woman is involved in decision making, and 0 if not. We also added the fact that the woman is involved in the healthcare decisions for the child. This took a value of 1 if the woman makes the decision on her own or together with her husband, and 0 if not.

Because our objective was to examine the impact of decision-making power of the woman on the quality of life of children, we focused on household decisions that have an impact on the quality of life of the children. This then relates to cases where the woman is involved in: "the management of her own income"; the management of the income of her spouse"; and "the decision on health care of the children". We, therefore, had three variables of women's decision-making power. In order to make a more thorough analysis, we considered each of the modalities of the variable "decision-making-power" individually, as indicated in the base model.

Measuring the nutritional status of a child

A commonly used measurement for the nutritional status of a child is the anthropometric status of children aged under five years. Height-for-age is considered to be a long-term measurement of the nutritional status and a proxy for the measurement of the chronic nutritional status of a child. Height-for-age was selected as a dependent variable for this study because of its potential reactivity to bargaining power within the household. In developing countries, deficits in human growth are mainly caused by two avoidable factors: inadequate nutrition and infections. Genetic factors are significant during adolescence and, therefore, the height of a young child, according to their age, depends on cumulative investment in nutrition and health care over the course of the lifetime of that child (Duflo, 2000). To measure nutritional status, the World Health Organization (WHO) uses nutrition length/height for age z-scores, weight-for-age z-scores, and weight-for-length/height z-scores (names that are given to the anthropometric indicators). The three indicators are international nutrition status measurements and are used in the literature tackling the question of nutrition (Senauer and Garcia, 1991; Shefieian et al, 2013; Ijarotimi et al, 2016). Among these indicators, we opted to use the height-for-age z-score. We chose this indicator because lagged growth in a child is the main cause for learning lag for children (Mwisha-kasiwa, 2017). The values of these indicators are indicated in the database of DHS.

Measurement of the immunization status of a child

The immunization status of a child is measured through the number of vaccines received by the child. Since our target children are those aged from 0 to 5 years, it would be biased to take into account the number of vaccines received without considering the age. We thus used the age of the child, classified using the WHO standards in regard to vaccination. In the first year of life, a child should be given nine compulsory vaccinations. For those aged between 0 and 6 months, the recommended

number of vaccinations is seven. Children who have received at least four vaccines in this period of time are considered as not having had a good immunization status. From six months to one year, children should be given four vaccines in addition to the seven already received. Children who have not received at least six vaccines in this period of time are considered as not having had a good immunization status. From the age of 1 year, children may receive boosters for various vaccines. Our analysis was undertaken through age brackets using the available boosters.

Specification of the model

As indicated above, quality of life was calculated through the nutritional and immunization status of the child. We considered the following as our basic model:

$$QV = \beta_0 + \gamma_{(pouvoir\ de\ négociation\ de\ la\ femme,)} + \beta\ (facteurs\ sociodémographiques) \quad (6)$$

The equations to be estimated from our above model in order to examine the nutritional and immunization status of children are:

$$N_i = \alpha_0 + \gamma(pouvoir\ de\ décision\ de\ la\ femme) + \sum_1^K \pi P_k + u_i \quad (7)$$

By taking into account the indicator variables of women's decision-making power:

$$N_i = \alpha_0 + \gamma\ PD + \sum_1^K \pi P_k + u_i\ N_i = \alpha_0 + \gamma\ PD + \sum_1^K \pi P_k + u_i \quad (8)$$

Where N_i is the z-scores indicating the nutritional status of the child; α_0 a constant term: P_k the matrix of explanatory variables; π the vector of estimated parameters; and u_i as the error term.

In regard to the immunization status of the child, we have:

$$V_i = \beta_0 + \gamma\ (pouvoir\ de\ décision\ de\ la\ femme) + \sum_1^K \beta_K X_k + \varepsilon_i \quad 9$$

By taking into account the indicator variables of women's decision-making power:

$$V_i = \beta_0 + \gamma\ PD + \sum_1^k \beta_K X_k + \varepsilon_i \quad (10)$$

Where V_i is the nutritional status of the child; β_0 a cosntant γ a coefficient allowing us to examine the impact of the decision-making power index; X_k the matrix of explanatory variables likely to have an impact on the nutritional status of the child; β_K the vector of estimated parameter; and ε_i the error term.

The econometric forms of Equations 11 and 12 are:

Nutritional status:

$$N_i = \alpha_0 + \gamma\ PD + \pi_1 NEF + \pi_2 NEH + \pi_3\ AF + \pi_4\ SEF + \pi_5\ NR + \pi_6\ NE + \pi_7\ AE + \pi_8\ J + \pi_9\ LR + \pi_{10}\ SEX + u_i \quad (11)$$

Immunization status:

$$V_i = \beta_0 + \beta_{0*}\ PD + \beta_1 NEF + \beta_2\ \mathrm{NEH} + \beta_3\ AF + \beta_4\ SEF + \beta_5\ NR + \beta_6\ NE + \beta_7\ AE + \beta_8 LR + \beta_9\ sex + \beta_{10}\ Dis + \beta_{11}\ IN + \beta_{12}\ RN + \varepsilon_i \quad (12)$$

Table 1 provides information on the independent variables in the two econometric models.

Table 1: Tabulation of the variables codebook

Variables	Abbreviation	Definition of the variable
Decision-making power of the woman	PD	Considers the involvement of the woman in the household decision-making process, notably in management of income and in the decisions on child healthcare
Education level of the mother	NEM	Considers the level of education of the woman and is disaggregated according to the study cycle
Level of education of the father	NEP	Considers the level of education of the man and is disaggregated according to the study cycle
Age of the mother	AM	Considers the age of the mother; is a continuous quantitative variable
Age of the child	AP	Considers the age of the child; It is a continuous quantitative variable
Employment status of the woman	SE	Provides information on the type of job the mother has; is a qualitative variable
Wealth level of the household	NR	Provides information on the wealth level of the household; is a qualitative ordinal variable
Number of children in the household	NE	Provides information on the siblings in the household; is a discreet quantitative variable
Area of residence	LR	Provides information on the area of residence of the household. It is dichotomous and takes a value of 1 if it is in an urban area, 0 if it is in a rural area
Sex of the child	Sex	Provides information on the sex of the child; is dichotomous and takes the value of 1 if it is a girl, 0 if it is a boy.
Distance	Dis	Considers the distance between the household and the closest health centre
Birth interval	IN	Allows measurement of the interval between child births
Order of birth	RN	Allows for the measurement of the child's position among the siblings; is a discreet quantitative variable
Twins	jum	Provides information on whether the child is a twin or not. It takes the value of 1 if affirmative, and 0 if not

Source: Author

4. Results

Descriptive analyses

A description of the statistics from some variables contained in our DHS database was undertaken.

Table 2: Percentage share of vaccinated children according to the distance between the health centre and the home

Variables		
	Explanatory variable: distance	
Explained variable	Modalities	
Immunization status	Accessible	Not accessible
0	15.21	21.40
1	0.78	0.77
2	3.48	3.02
3	1.63	2.46
4	3.75	3.49
5	3.36	3.49
6	4.77	5.53
7	3.60	5.97
Total	12,687	

Source: Author, using data from DHS 2017–2018.

Table 2 shows the relationship between accessibility of health centres from households and taking of vaccines. We observed that 15.21% of children in the accessible zones and 21.40% of children in the accessible zones were not vaccinated; and 0.78% of the children in the accessible zone and 0.77% children in the inaccessible zone of Benin received one vaccination. The accessibility of health centres from a household is, therefore, a determinant for the immunization status of children. This finding is similar to that arrived at by Antai (2009), whereby children whose mothers

lived in communities that had a higher percentage of prenatal maternal medical services had a higher chance of being fully vaccinated. The proximity of a healthcare centre to the completion of a series of vaccinations is recommended. This observation is similar to that of previous studies undertaken in Ethiopia and other middle-income countries, indicating that access to health care is an important factor in considering the use of immunization services by children (Wado et al, 2014).

Table 3: Descriptive statistics of some variables of the model

Modality and percentages				
Variables				
Management of the income and nutrition of children	The woman participates		The woman does not participate	
	Malnourished children	Well-nourished children	Well-nourished children	Malnourished children
Income of the woman	45.88%	54.12%	40.98%	59.02%
Income of the spouse	40.96%	59.04%	44.45	55.55
Sex of the head of household	Man		Woman	
	84.14%		15.86%	
Marital status	Never been declared	Married	Cohabiting	Others
	1.38%	74.12%	18.17%	6.12 %
Main decision maker in regard to the children's healthcare	Wife alone	Husband alone	Both spouses	Others
	16.72%	37.03%	46.02%	0.23 %

Source: Author, using data from DHS 2017–2018.

Results in Table 3 indicate that 45.88% of the malnourished children and 54.12% of well-nourished children had mothers who participated in the management of their own income; and 40.98% of malnourished children and 59.02% of malnourished children in Benin had mothers who did not participate in the management of their own income. In relation to the management of spouse's income, when a wife was associated with the management of her husband's income, 40.96% of the children were malnourished. In households where both spouses managed the husband's income, 59.04% of the children were well nourished; 44.5% of the malnourished children had mothers who did not participate in the management of their husband's income. An analysis of the data in Table 3 indicates the impact of the woman's decision-making power in the management of her income and that of her husband on the nutritional status of children. This impact is, however, more significant in Guinea than it is in Benin. Studies in Africa have demonstrated that in regard to women with the same levels of income, households in which women have more control over their

income have a higher chance of being secure (Kennedy and Haddad, 2007). In most families, mothers spend more time than fathers taking care of the children, and it is mothers who play a more significant role in decisions related to the health care and nutrition of children. It is important that they have the power to manage when it comes to managing the joint income from both spouses.

Most households were headed by men (Table 3). This allows us to consider the base sample from our data as comprising homes headed by men. Indeed, households headed by women were not included in our analysis of cooperative households as the woman lives on her own and thus makes all household decisions. The descriptive analyses of marital status of the woman showed that 43,513 of the women surveyed lived with a spouse either as a husband or in cohabitation. For the rest of our study, the sample of women considered will be that of such women, the rest being excluded since the cooperative model can only be effective in a household with a partner and at least one woman.

The DHS data show that from half of the households surveyed, women were associated with healthcare decisions for children, whether alone or with her spouse. This variable is also pertinent for our analysis since the involvement of women in household decisions is a signal that allows us to capture the negotiation power within the couple.

Table 4: Summary of household characteristics and immunization status of children

Characteristics of the children / Characteristics of the household	Children aged less than 24 months		Children aged more than 24 months
	All the appropriate vaccines for the age bracket	No vaccine received	All the appropriate vaccines for the age bracket
Economic well-being quantiles			
The lowest	37.3	25	33.7
Second	45.4	13.1	43.9
Average	57	7.5	48.8
Fourth	55.4	5.5	51.7
Highest	61.8	2.7	59.9
Level of education of the mother			
Illiterate	58.5	47.0	43.6
Primary	71.4	57.3	50.1
Secondary 1st cycle	75.8	58.3	57.7
Secondary 2nd cycle	81.7	66.4	61.1
Area of residence			
Urban	54.8	7,4	53.0
Rural	49.2	13.0	43.4
Order of birth			
1	52.5	6.6	48.6
2–3	52.5	10.7	48.7
4–5	50.9	12.1	48.5
6+	47.8	15.3	41

Source: Author, using data derived from DHS 2017–2018.

The above table provides information on household characteristics and children's immunization status. The basic immunization coverage of children aged between 12 and 23 months varied according to the level of education of the mother. For mothers who were illiterate, 15% of children had not received any vaccine against 5% when

the mother had secondary level of education or higher. Although a higher level of education did not necessarily mean full vaccination, it reduced the gap in terms of immunization coverage. The area of residence and the household's wealth level were both explanatory factors of the immunization status of children.

5. Discussion

Econometrics results of women's decision-making power and the nutritional status of children

Table 5: Women's decision-making power and the nutritional status of children

Variables	Coefficients
Age of the woman	0.765 (0.843)
Level of education of the woman (reference: illiterate)	
Did not complete primary school	20.737* (11.049)
Completed primary school	2.410 (16.837)
Did not complete secondary school	-7.457 (13.459)
Completed secondary school	103.279*** (33.277)
Tertiary	7.942 (38.580)
Level of education of the man (reference: illiterate)	
Did not complete primary school	0.247 0(8.465)
Completed primary school	4.644 (10.862)
Did not complete secondary school	-0.657 (18.413)
The man's sector of activity	
Agriculture	26.878** (11.381)
Employed	5.566 (19.571)

Trade and Self-Employment	9.198 (9.718)
Employment status of the woman (reference: employed)	- 0.018** (0.235)
Main decision maker on the children's health care (reference: wife and spouse)	11.487* (11.450)
Management of the wife's income (reference: wife and spouse)	18.313** (9.066)
Management of the couple's income (reference: wife and spouse)	12,125** (7,39)
Area of residence (reference: urban)	-4.891* (9.261)
Wealth level of the household	
Poor	-3.884 (10.952)
Average	27.554** (11.249)
Rich	17.771 (11.570)
More Wealthy	36.659** (15.254)
Order of birth	-10.539*** (3.944)
Twins	-34.213** (15.998)
Age of the child	-40.353*** (2.517)
Sex of the child (reference/ daughter)	21.976*** (5.500)
Number of living children	9.168** (4.249)
	N=5 992 R^2 = 0,69

Source: Estimation using data derived from DHS 2017–2018.
Notes: Standard deviation in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

The above table shows the econometric results of women's decision-making power and the nutritional status of children. From the results of our estimations, it is evident that the age of the woman positively and significantly improves the nutritional status of children. In other words, as a woman grows older, she becomes more experienced in matters of child care. This result is in line with those of most studies undertaken on

the nutritional status of children, which suggest that children born of young mothers, and more specifically adolescents, are more likely than children born of adult mothers to suffer from malnutrition.

Our results demonstrated that when a woman has a certain level of education, even primary school level, the risk of malnutrition for their children is reduced. These results agree with those arrived at by Kataria (2013) who found for a positive result between the education of the mother and the nutritional status of children in India. Yamano et al (2003) and Glewwe (1999) also studied mechanisms through which education could improve the nutritional status of children and concluded that the education of parents, especially that of the mother, is a key driver for improving the nutritional status of children.

The results of our estimations demonstrated that the nutritional status of children aged under five years improves significantly and positively when the head of the household is employed. More specifically in the case of our study, the type of employment that improved the nutritional status of the child was agriculture. We could thus attribute this improvement in the nutritional status to the availability of food as a result of practising agriculture. In other words, even without money, households that are headed by people who are farming would have food to provide to members of their family, including their children.

The results also indicate that when women are provided with a job it increases the risk for malnutrition among children. Although such a finding contradicts those from studies on the empowerment of women and the well-being of women, it could be explained through the fact that, women who are in the labour market do not have adequate time to take care of their children, especially young ones. Equally, given that well-developed baby-sitting services are scarce in Benin, the quality of services provided for mothers in terms of child care could perhaps be the source of malnutrition among children.

When a woman participates in the management of her own income, it had a positive and significant impact on the nutritional status of the child. This result could be justified by the hypothesis of the "good mother" which stipulates that women have a tendency to take better care than men of their offspring. These results are in agreement with those arrived at by Brunson et al (2009) who studied the Rendille community in Kenya. Their results showed that the empowerment of women in order to improve the nutritional status of children probably involved the strengthening of maternal control over the limited household resources, including money and produce from their livestock such as milk, which could be directly consumed or sold in order to obtain money. Having improved control over such resources would allow women to improve the range of food normally provided to their children, improving their nutritional status.

From an analysis of the results from our estimations, it is evident that when a couple makes decisions on the healthcare of children, it has a positive and significant effect on the nutritional status of the children. These results are similar to those arrived at in a study in Ethiopia, which showed that when a husband and his wife make decisions on

healthcare jointly, the children are 74% times less likely to develop severe malnutrition than when the decision is made by only the wife. This agrees with the results from a study of Congo (McKenna et al, 2019) which demonstrated how the decision-making power of the woman in a household would improve the nutritional status of children.

The results from these two studies showed that the wealth level of the household would improve the nutritional status of the children and decrease the probability of malnutrition in the two countries. This result agrees with that from UNICEF (2020) that demonstrated that the economic status of a household is also a significant determinant of a child's nutritional status. The wealthier the household, the better nourished the children. Studies have identified poverty as the main determinant for malnutrition in developing countries which perpetuates an intergenerational transfer of a poor nutritional status to children and prevents social improvement or equity (Glewwe, 1999). Higher household income also strengthens the capacity of families to cope with economic and environmental shocks.

Our results showed that malnutrition in children is significantly correlated to the order of birth. Children in the first born run a significantly higher risk of lagged growth than children in lower orders. The higher risk among first order children may be due to lack of experience of mothers after their first child birth in terms of child care and feeding, which are key elements for better nutrition. Parents pay less attention to children who are older relative to that paid to a new baby who needs much attention and care.

Studies have shown how the risk of malnutrition for children younger than one year is low (Sommerfelt et al, 1996). Studies carried out in Philippines arrived at similar results, indicating that larger families are more likely to have malnourished children (Islam et al, 2014). These results could be attributed to the inability of mothers to provide adequate care to their young children, particularly in cases where a family has more than one child of pre-school going age. The results also agree with those from other studies that show that the probability of malnutrition in children is strongly related to gender parity (Pryer et al, 2002)

The probability that a child would be malnourished increased with the fact that the child is a twin. This result could be interpreted through the fact that having twins increases the number of mouths to feed which is difficult for some families to handle.

The age of the child was correlated to their poor nutritional status. Taking care of two young children at the same time is a difficult exercise for many mothers due to the several tasks that they undertake and the presence of other children who also need care within the household. From our estimations, we observed that the probability that a child would be malnourished diminished when the child is a girl. This could be explained through the preference for daughters by mothers. This observation is in accordance with results of an empirical study that showed that mothers would prefer to allocate resources towards improving the health status of this daughters in Peru and in Vietnam (Novella, 2013). This also agrees with the results of a study by Thomas (1993) which, through using a woman's level of education as a proxy for her decision-making power, found that with a higher level of education of the woman, or

in other words, a higher level of decision-making power, girls have a higher z-score as compared to boys. Equally, these results corroborate those arrived at by Wamani and al (2007), who demonstrated that young boys are more likely to suffer from problems of malnutrition in sub-Saharan Africa, contrary to those in Asia, due to discrimination against girls.

Econometrics results of women's decision-making power and children immunization status

The estimation equation of the woman's decision-making power on the immunization status of children is presented as follows:

$$V_i = \beta_0 + \gamma\ (woman'sdecision\ making\ power + \sum_1^K \beta_K X_k + \varepsilon_i$$

By taking into account the indicator variables of women's decision-making power:

$$V_i = \beta_0 + \gamma\ PD + \sum_1^K \beta_K X_k + \varepsilon_i$$

Where V_i is the vaccination status of the child; β_0 a coefficient γ constant for examining the effect of the decision-making power index; X_k the matrix of explanatory variables likely to impact upon the immunization status of the child (among others such as distance from the home to the hospital, the socio-economic status of the parent, the area of residence etc.); β_K the vector of estimated parameters; and ε_i the error term.

Table 6: Decision-making power and the immunization status of children

Variables	Coefficients (marginal effects)
Age of the woman	0.006*** (0.002)
Education level of the mother	
Did not complete primary school	0.051** (0.020)
Completed primary school	0.057* (0.035)
Did not complete secondary school	0.028 (0.023)
Level of education of the man (reference: illiterate)	
Did not complete primary school	0.074*** (0.019)
Completed primary school	0.116*** (0.020)
Did not complete secondary school	0.083** (0.040)
Age of the children	
0–12 months	0.61** (0.015)
12–23 months	0.075* (0.021)
23–36months	-0.003*** (0.175)
Decision-making power of the woman (reference: not involved in decision making of the household)	
Main decision maker on the children's health care (reference: wife and spouse)	0.111*** (0.037)
Management of the wife's income (reference: wife and spouse)	0.010* (0.023)
Management of the couple's income (reference: wife and spouse)	0.089** (0.044)
Distance from a hospital	-0.041** (0.019)
Area of residence (reference: urban)	-0.037 (0.055)
Employment status of the woman (reference: employed)	- 0.345** (0.136)
Wealth level (reference: very poor)	
Poor	0.144*** (0.030)
Average	0.146*** (0.033)

Rich	0.178*** (0.031)
More Wealthy	0.157*** (0.034)
Sex of the child (reference/daughter)	0.024** (0.012)
Order of birth	-0.019*** 0.006***
Twins	-0.101** (0.043)
Number of observations	N=5 992

Source: Estimation using data derived from DHS 2017–2018.
Note: Standard deviation in parentheses; *** p<0.01, ** p<0.05, * p<0.1/

The results of the estimations demonstrated that the age of the woman improved the immunization status of the child in a significant manner. In other words, the older a woman is, the more experience she has in terms of maternal healthcare and the better she takes care of her children. This could be explained by the fact that older mothers understand the impact and the importance of immunization of children than younger mothers due to their experience in maternal care. The same has been noted in a study carried in Nigeria by Babalola (2009). In terms of the education level of the woman, we observed that it was only at the level of failed to complete primary school and completed primary school that an improvement was seen in the nutritional status of the child. This could be explained by the fact that women who have received even a minimal level of education are generally more likely than those who are illiterate and, therefore, unable to use available resources to improve their own health and the immunization status of their children.

Children whose mothers had attained at least a secondary school level of education were more likely to complete a series of vaccinations than children whose mothers were illiterate. Education increases sensitization on the role of immunization services, and this sensitization is important in influencing the use of immunization services (Wado et al, 2014). Women's education has an impact on the well-being of children through various channels. In terms of socioeconomic status, women who are better educated tend to live in households that are richer, with wealth and household income having an impact on the well-being of the children through the purchase of goods and services in the market which in turn have an immediate impact on the health of the children. Level of education of the head of the household has a positive and significant impact on the immunization status of children. This indicates that the better educated the head of the household, the better he understands the importance of vaccinations in the life of children and the more he becomes invested in it.

Our results showed that head of the household being educated improved the immunization status of the children, but more so the effect was even more significant when the head of the household was engaged in trade or self-employed.

Our results showed that children aged under two years were fully vaccinated compared to those of a higher age bracket. This finding could perhaps be attributed to the fact that in Benin, the vaccination of babies who are younger than one year old is free (completely subsidized by the state), which gives a positive and significant coefficient sign. Beyond the age of one year, all the vaccinations, including the booster shots of those already received in the early months, come at a cost which hampers the ability of mothers, including those who are willing to have their children vaccinated, to continue with the immunization schedule.

When the main decision maker for children's healthcare is the woman, the immunization status of the child significantly and positively improved. This result is in line with that from a study done in Ethiopia by Wado et al (2014). The researchers showed that in participating in decision making related to health, the use of healthcare facilities (a dimension in the empowerment of women) could allow women to come to a decision independently from their spouses on vaccinating their children.

Our results demonstrated that pacing births improved the immunization status of children. In other words, women had more time to dedicate to their children when the interval between two children is long.

The distance between the place of residence and the hospital had a negative impact on the immunization status of the children. This confirms the results from Adenike et al (2017) who concluded that distance from primary healthcare services was significantly associated with the immunization status of the children. This could be related to socio-economic factors and to the transport costs related to attending each vaccination session, especially if the healthcare facilities are not close by.

The level of wealth variable was significant at all levels especially at the level of rich and very wealthy households. Several other studies have also found a relationship between wealth status and immunization status (Babalola, 2009). Children from well-off families could be more likely to have their immunization status verified and to receive the missing doses of their vaccine when they go to a healthcare centre, than would be the case for children from poor families. The higher the wealth index of the household, the higher the chances the children are fully vaccinated.

The variable sex of the child significantly improved the immunization status of the child in Benin. The reference to the level of the variable sex is "girl", in other words girls had a higher chance of being vaccinated than boys. In regard to the birth order of children, it had a negative impact on the immunization of children. The order of birth of a child was related to a decrease in the probability of receiving vaccinations such that a higher order (rank in siblings advanced) implies a lowering of the probabilities in terms of receiving vaccinations. This result is a bit of a paradox in our study, as we expected it to have a positive impact. The more children a woman has, meaning she is experienced in maternal matters, the more she learns about the advantages of vaccinations for children. This result, as surprising as it was, could be interpreted by the fact that the mother is taking care of several children and thus has less time to attend to the younger ones. As the number of children under the age of five in a household increased, the probability that the younger ones will be fully vaccinated diminished.

This could be because women with several children under the age of five years bear a higher burden in caring for children and are thus unable to take their younger children to receive immunization services (Wado et al, 2014). This finding agrees with a study undertaken by Washbrook et al (2011) according to which among children born from parents having a child under the age of five years, those born in families that had two to three children had lower chances of being fully vaccinated. According to some researchers, children born into larger families had a lower immunization coverage (Roy, 2010). The more the children in a family increases, the higher the likelihood that the resources available to the family could be exhausted, and parents would be more preoccupied with meeting the needs of their children. Another explanation could be that mothers would tend to be less persistent the more children they have (Abadura et al, 2015).

Finally, the twin births had a negative impact on the immunization status of children. This could indicate that the mother had several children to handle at the same time, limiting access to immunization.

6. Conclusion and policy implications

This study evaluated the impact of women's decision-making power on the quality of life of children measured by immunization and nutritional status. The results obtained from our econometric estimations demonstrated that variables such as the age of the woman, her level of education, the level of education of the head of the household, the employment status of the head of the household, the main decision maker on the health of the children, the interval between child births, the level of wealth of the household, and the sex of the child significantly improved a child's well-being. However, variables such as the distance from a hospital, giving birth to twins and the order of birth had a negative impact on the immunization status of children. In regard to the nutritional status of children, variables such as the age of the woman, her level of education, the management of the income of the woman, the wealth level of the household, the fact that the child is a girl, and the fact that the parents collectively decide on the health of the children lowered the probability of the child being malnourished. Variables such as the birth order of the child, the fact that the child is a twin, the age of the child, increased the probability of a child being malnourished. Several studies have shown that malnutrition is a reflection of poverty, with people not having enough money to buy food. Immunization is one of the most essential aspects of public health interventions and a good strategy for reducing early childhood morbidity and mortality. Building healthcare centres in inaccessible zones or sending healthcare workers into such zones helps improve the immunization status of children.

Efforts to improve the quality of life of children must be done through various indicators, namely improving the nutritional status and the immunization status of children. The role of the woman in the well-being of children has been elaborated throughout this study. Giving wives more control over the family's income could contribute to an increase in expenditure on the quantity and quality of food. Women's income could strengthen their negotiation power within a household by improving their social position, which would help them in terms of decision making within the household. Policies targeted towards the improvement of the quality of life of children consider the empowerment of mothers and sensitising them about the importance of immunization in the lives of their children.

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