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Research article

Correlates of child functional difficulties status in Ghana: A further analysis of the 2017/18 multiple indicator cluster survey

Nutifafa Eugene Yaw Dey [a], Emmanuel Dziwornu [b], Kwabena Frimpong-Manso [c], Henry Ofori Duah [d], Pascal Agbadi [e,*]

[a] University of Ghana, Department of Psychology, P.O. BOX LG 84, Legon, Ghana
[b] University of Health and Allied Sciences, Department of Psychological Medicine and Mental Health, School of Medicine, PMB 31, HO, Volta Region, Ghana
[c] University of Ghana, Department of Social Work, P.O. BOX LG 419, Legon, Ghana
[d] Research Department, FOCOS Orthopaedic Hospital, Accra, Ghana
[e] Department of Nursing, College of Health Sciences, Kwame Nkrumah University of Science and Technology, PMB, Kumasi, Ghana

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ABSTRACT

Background: Functional difficulties have long-term implications for children's physical, cognitive, emotional, social, and academic growth and development. Although the subject of functional difficulties has received enough scholarly attention in the developed world, few studies have addressed the issue in Ghana. Therefore, the study aimed to regress child, maternal and household and geographical level factors associated with the functional difficulty of children in Ghana.

Method: We analysed the 2017/18 multiple indicator cluster survey dataset. The study sample consists of weighted cases of 21,871 children within the ages of 5–17 years. Summary statistics were produced for the study variables. Bivariate analyses were performed to select significant correlates for the multivariate analysis. We accounted for sample design and weight before using Poisson regression techniques to do the bivariate and multivariate analysis.

Results: These factors were significantly associated with functional difficulties among 5–17 years old children in Ghana: not covered with health insurance, mothers who have a functional difficulty and those without information on their functional difficulty status, and children who dwelt in richer households compared to the richest households. Compared to the northern region, children from the remaining nine regions in Ghana were more likely to have had a child functional difficulty.

Conclusion: Given the results, the government of Ghana and other development partners should promote policies and programs to reduce the consequences of disability or functional difficulties in children by taking into consideration factors like mothers' functional difficulty, access to health insurance, and regional and economic disparities in Ghana.

1. Introduction

A person with a disability is one who suffers impairment in body structures and functionings, is limited in performing activities and is restricted in participating in family and society due to their interaction with health conditions as well as personal and environmental factors (World Health Organization, 2001). This implies that a person with a disability is likely to experience one or several forms of functional difficulties with varying degrees of severity, from mild, moderate, severe to profound (Rosenbaum et al., 2014). For instance, a child with cerebral palsy, relative to the severity, may experience functional difficulties in domains such as mobility (walking and fine motor), communication, self-care and playing with friends (Schiariti and Msse, 2015). Because of its changeable nature, the identification and assessment of functional difficulties are noted as an important diagnostic component and a target for disability treatment especially the chronic ones (Lollar et al., 2012). Therefore, functional difficulty in this study is used interchangeably with child disability, similar to its operationalization in Ghana's Multiple Indicator Cluster Survey Six (MICS6) dataset (Ghana Statistical Service, 2018). Everyone is susceptible to developing a disability, but the

* Corresponding author.
E-mail address: pascalagbadi@gmail.com (P. Agbadi).

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subjective and objective experiences vary across geographic and socio-economic characteristics (Mitra et al., 2013). Individuals in developed countries experience reduced severity of their impairments than those who reside in low and middle-income countries because developed countries have robust healthcare systems which allow for early detection and diagnostics coupled with good rehabilitation programs for affected individuals (Bright and Kuper, 2018; Kuper et al., 2014; Orach and Garimoi, 2009).

Globally, it is indicated that there are about 150 million children between the ages of 0–18 years who live with disabilities (United Nation's Children Fund [UNICEF], 2013). The prevalence in sub-Saharan Africa, although scarce, shows that 1 in every 7 children has some difficulties in major areas of functioning (Cortina et al., 2012). In Ghana, one out of every three children is estimated to have some form of major physical or mental disability (Ghana Statistical Service [GSS], 2013). Though helpful in providing relevant estimates to the growing numbers, challenges with these statistics include out-dated nomenclature and measures used in gathering data of disability, inadequate resources and statistical capacity existing in many countries, and the invisibility of children living in institutions and families in communities where stigma about disabilities is high (United Nations Children's Fund, 2013).

While adults are equally affected by disabilities, the burden for a child's disability is harsher (Kuper et al., 2014). This is partly because children with disabilities are mostly marginalized, highly discriminated, socially excluded and more likely to be exposed to serious illnesses (Kuper et al., 2014). Even worse, functional impairment of a child has long-term implications for their growth, capable of stunting their cognitive, emotional, social, and educational development (Dillmann et al., 2019; Hilton, 2017). In most cases though, children's disability has an impact on the well-being and quality of life of caregivers and parents, which in turn impacts the child (Firth and Dryer, 2013; Tseng et al., 2016).

Given the staggering numbers and the enormous effects of disability on children and their families, many low and middle-income countries (LMICs), including Ghana, have invested in policies and programs to reduce their impact. Ghana has signed several international charter/treaties (e.g., the United Nations (UN) Convention on the Rights of People with Disabilities, 2007 & 2012) and passed many national policies (e.g., the Persons with Disability Act 2006, Act 715) to protect the rights of persons living with disabilities through the elimination of discrimination, ensuring equal access in healthcare and promoting their general socioeconomic wellbeing (Ocran, 2019). In addition to these national policies, existing social interventions like inclusive education in Ghana, as well as the advocacy efforts of non-governmental organizations (e.g., Ghana Federation of Disability), have sought to improve opportunities for adults and children with disabilities in Ghana.

Despite the implementation of these significant efforts, its success has been riddled with various challenges, including the unavailability of financial resources to sustain the interventions and the difficulty in identifying the predisposing factors of child disability or dysfunction (Ametepee and Anastasiou, 2015). Cumulative evidence suggests that identifying and addressing modifiable correlates of disabilities among children can improve their functioning which would help them to develop optimally and contribute to national development (Metts and Mondiale, 2004; Saran et al., 2019).

Therefore, this study examines correlates of child functional difficulty among 5-17-years old in Ghana. Previous studies identified parental, biological, psychological, and economic factors and place of residence among the significant correlates of disabilities among children (Huang et al., 2016; Haworth et al., 2017; Kawakatsu et al., 2012; Wachs and Rahman, 2013; Walker et al., 2011; Wark, 2018). Some Ghanaian studies on child disability have identified low parental involvement, birth weight, duration of gestation, mother's education, place of residence, family income and high dependency, as correlates of functional difficulties (Ahulu et al., 2020; Bello et al., 2013; Quansah et al., 2016). However, these extant studies have methodological challenges, such as small sample sizes and samples limited to subpopulations. Due to these challenges, generalizing the findings to the entire population of children with disabilities is impossible. Our study overcomes these challenges and fills the gap in the literature by using nationally representative data to identify the correlates of functional difficulty among children in Ghana. We hope that the information provided will be useful for policymakers, researchers, and practitioners in designing integrated interventions for children and youth with disabilities and granting children the opportunity to reach their potentials. It is further hoped that the information serves to facilitate the drive towards achieving the Sustainable Development Goals (SDGs).

2. Study design

The design used in the study was based on secondary data analysis of the 2017–2018 Ghana Multiple Indicator Cluster Survey Six (MICS 6). As an international multi-purpose household survey project, UNICEF initiated the Global MICS programme in the 1990s to assist countries in the collection of globally comparable data on a wide range of measures about children and women. The MICS surveys assess key indicators that help countries to produce data for use in national development strategies, policies, initiatives, and programmes, and to track progress towards the SDGs and other internationally negotiated commitments (Ghana Statistical Service, 2018). Ghana MICS surveys are conducted by the Ghana Statistical Service (GSS), in partnership with the Ghana Health Service (GHS), Ministry of Health (MOH), and the Ministry of Education (Ghana Statistical Service, 2018). Funding is provided by UNICEF and other international donors. UNICEF provides technical assistance for the MICS (Ghana Statistical Service, 2018). The survey employed a multistage sampling methodology. Clusters which represented sampling units were randomly selected in the first stage. The enumeration areas which were defined for the 2010 Population and Housing Census of Ghana was used as the census frame to select the clusters. Stratification was used at this stage to account for the place of residence (i.e., urban stratum or rural stratum) (Ghana Statistical Service, 2018). The clusters were randomly selected during the first stage comprising 318 and 342 from urban and rural areas, respectively. Systematic sampling was then used to select households in the second stage. Data were obtained on 8965 children between the ages of 5–17 years from 8946 mothers/caretakers (Ghana Statistical Service, 2018).

2.1. Data collection and instrument

The field data collection instrument included 6 questionnaires: 1) Household questionnaire, 2) Water Quality Testing Questionnaire, 3) Questionnaire for Individual Women, 4) Questionnaire for Individual Men, 5) Questionnaire for Children Under Five, and 6) Questionnaire for Children Age 5–17. For this study, we used data compiled from the Children Age 5–17 questionnaire which was administered to the randomly selected child's mother or caretaker living in the household.

2.2. Study variables

The dependent variable under investigation was functional difficulty status of children 5–17years which was measured as a binary response (Yes or No). The Ghana multiple Indicator Cluster surveys operationalized children with functional difficulty or disability as a child experiencing any form of impairment (even among those using assistive devices) in any of these domains: seeing, hearing, walking, communication, learning, controlling behaviour, self-care, remembering, concentrating, accepting change, making friends, anxiety and depression (Ghana Statistical Service, 2018). The functional difficulty variable was created as a binary response variable in the dataset by MICS 6 after responding "A lot of difficulties", "Cannot at all", or "Daily" to questions within the above-listed domains.

The independent variables which were also categorical are classified under child, maternal and household levels. Child level variables include gender, age, education, and health insurance cover. Maternal level variables include age, education, and functional difficulty status. Household and geographical level factors include household wealth, place, and region of residence (Ghana Statistical Service, 2018). See Table 1 for categorical coding of each of these variables. These variables were selected based on literature and their availability in the dataset (see Ahulu et al., 2020; Bello et al., 2013; Quansah et al., 2016) (see Table 2).

2.3. Study sample

The unweighted dataset on 5–17years old children contained 8965 cases. Given that the data comes from a two-staged survey design, we applied weighting before analysis. Therefore, the study sample consists of weighted cases of 21,871 children within the ages of 5–17 years.

2.4. Data access, preparation, and analysis

The MICS data is freely available at the Global MICS Programme's page at https://mics.unicef.org/surveys after electronic request. Data was obtained after electronic access was granted to the last author. We did the preliminary cleaning and analysis in Statistical Package for the Social Sciences (SPSS) version 24. We weighted the data before we undertook univariate, bivariate, and multivariate analysis (Poisson regression). We estimated prevalence ratio estimates of functional difficulty rather than odd ratios. This was achieved using the "glm" command in the Statistics and Data (STATA) software version 14 and we selected "Poisson" to produce prevalence ratio (PR) estimates instead of using a logistic model to report odd ratio. We accounted for sampling design by setting the data into complex survey mode using the "svyset" command in STATA to adjust for clusters, stratification, and sample weights. This approach was appropriate as it helps to prevent underestimation of the standard errors (SE) of the confidence interval (CI) of the PR estimates. Given that the DHS is a cross-sectional survey, we used Poisson regression to estimate prevalence ratios. Prevalence ratios are preferred over odd ratios when using cross-sectional datasets and the justification for using Poisson regression to estimate prevalence ratios are sufficiently explained elsewhere (see Barros and Hirakata, 2003; Santos et al., 2008; Zou, 2004; Zou and Donner, 2013). We reported crude PR estimates and adjusted PR estimates of predictors of functional difficulty among children in Ghana. Variables that were significantly associated with the outcome in bivariate analysis were included in a multivariate analysis.

2.5. Ethics

MICS 6 reported that they obtained informed child assents and parental/adult/caretaker consent before interviewing children/teenagers aged 5–17years. The last author applied and obtained the permission to use the MICS 6 data for our study [See attached supplementary file]. Data was already anonymised and de-identified before it was downloaded. No additional consents were sought by the authors.

3. Results

3.1. Sample characteristics

About two out of ten children have functional difficulty in Ghana (20.67%). There were more boys (51.27%) than girls (48.67%) in the study sample. Many of the children were within the age group of 5–9 years (43.78%). Majority of the children are in primary school (58.13%). Approximately, six out of ten children are covered with health insurance (56.50%). Detail summary statistics report on the weighted study variables are in Table 1.

3.2. Correlates of child functional difficulty

We performed bivariate analysis and regressed child, maternal and household level factors upon child functional difficulty. The factors that were significantly associated with the study outcome were health

Table 1. statistics of study variables (weighted cases).

Variable	N (%)
Response variable	
Child has a functional difficulty	
(0) No	17,350 (79.33)
(1) Yes	4,521 (20.67)
Child level factors	
Child gender	
(0) Boys	11,214 (51.27)
(1) Girls	10, 657 (48.73)
Child age	
(0) 5–9 years	9,576 (43.78)
(1) 10–14 years	8,451 (38.64)
(2) 15–17 years	3,844 (17.58)
Child education status	
(0) Pre-primary or none	4,044 (18.49)
(1) Primary	12,714 (58.13)
(2) Post-primary	5,113 (23.38)
Child covered with health insurance	
(0) Yes	12,357 (56.50)
(1) No	9,515 (43.50)
Maternal level factors	
Mother has a functional difficulty	
(0) No	14,508 (66.34)
(1) Yes	1,841 (8.42)
(2) No information	5,522 (25.25)
Mother's education	
(0) Pre-primary	8,122 (37.14)
(1) Primary	4,492 (20.54)
(2) Junior secondary	7,118 (32.55)
(3) Senior secondary	1,498 (6.85)
(4) Post-senior secondary	641 (2.93)
Household and geographical level factors	
Household wealth index	
(1) Poorest	4,867 (22.25)
(2) Poorer	4,901 (22.41)
(3) Middle	4,485 (20.51)
(4) Richer	4,134 (18.90)
(0) Richest	3,483 (15.92)
Rural-urban residence status	
(0) Urban	9390 (42.93)
(1) Rural	12,481 (57.07)
Region of residence	
(1) Western	2,163 (9.89)
(2) Central	2,199 (10.05)
(3) Greater Accra	1,942 (8.88)
(4) Volta	1,880 (8.59)
(5) Eastern	2,569 (11.74)
(6) Ashanti	5,120 (23.41)
(7) Brong Ahafo	2,102 (9.61)
(0) Northern	2,559 (11.70)
(8) Upper East	756 (3.46)
(9) Upper West	581 (2.66)

Note. Figures beside category indicate the coding. Zero "0" assigned for the reference category.

insurance cover for children, mother's functional difficulty status, mother's education status, household wealth, and region of residence. These factors were then included in a multivariable Poisson regression model, and the results indicated that children with the following characteristics were more likely to have had a functional difficulty: children who are not covered with health insurance [APR = 1.33, 95% CI: 1.44, 1.55], children of mother's who have a functional difficulty [APR = 1.64, 95% CI: 1.30, 2.06] or have no information on their functional difficulty status [APR = 1.17, 95% CI: 1.00, 1.37], and children who dwelt in richer households compared to the richest households [APR = 1.39, 95% CI: 1.10, 1.75]. Compared to the northern region, children from the remaining nine regions in Ghana were more likely to have had a child functional difficulty: Western [APR = 2.40, 95% CI: 1.65, 3.49], Central [APR = 2.03, 95% CI: 1.42, 2.89], Greater Accra [APR = 1.77, 95% CI: 1.18, 2.63], Volta [APR = 3.68, 95% CI: 2.55, 5.30], Eastern [APR = 3.45, 95% CI: 2.44, 4.89], Ashanti [APR = 2.45, 95% CI: 1.71, 3.52], Brong Ahafo [APR = 2.45, 95% CI: 1.76, 3.42], Upper East [APR = 1.88, 95% CI: 1.34, 2.65], and Upper West [APR = 2.67, 95% CI: 1.90, 3.75].

Table 2. Socioeconomic and demographic correlates regressed upon child functional difficulty status.

Variable	PR [95% CI of PR]	APR [95% CI of APR]
Child level factors		
Child gender		
Boys	1 [ref]	
Girls	1.02 [0.89, 1.17]	
Child age		
5–9 years	1 [ref]	
10–14 years	0.96 [0.84, 1.10]	
15–17 years	0.94 [0.78, 1.14]	
Child education status		
Pre-primary or none	1 [ref]	
Primary	0.96 [0.79, 1.16]	
Post-primary	0.84 [0.68, 1.05]	
Child covered with health insurance		
Yes	1 [ref]	1 [ref]
No	1.36** [1.18, 1.56]	1.33** [1.44, 1.55]
Maternal level factors		
Mother has a functional difficulty		
No	1 [ref]	1 [ref]
Yes	1.76** [1.39, 2.23]	1.64** [1.30, 2.06]
No information	1.18* [1.01, 1.38]	1.17* [1.00, 1.37]
Mother's education		
Pre-primary	1 [ref]	1 [ref]
Primary	1.24* [1.01, 1.54]	1.07 [0.87, 1.32]
Junior secondary	1.14 [0.97, 1.35]	1.04 [0.87, 1.25]
Senior secondary	1.04 [0.80, 1.36]	1.08 [0.83, 1.41]
Post-senior secondary	1.01 [0.66, 1.54]	1.21 [0.76, 1.92]
Household and geographical level factors		
Household wealth index		
Richest	1 [ref]	1 [ref]
Poorest	1.24 [0.98, 1.56]	1.27 [0.96, 1.68]
Poorer	1.26* [1.02, 1.56]	1.17 [0.92, 1.49]
Middle	1.32* [1.05, 1.67]	1.19 [0.91, 1.55]
Richer	1.46** [1.16, 1.83]	1.39** [1.10, 1.75]
Rural-urban residence status		
Urban	1 [ref]	
Rural	1.10 [0.95, 1.29]	
Region of residence		
Northern	1 [ref]	1 [ref]
Western	2.57** [1.80, 3.67]	2.40** [1.65, 3.49]
Central	2.19** [1.55, 3.07]	2.03** [1.42, 2.89]
Greater Accra	1.81** [1.24, 2.65]	1.77** [1.18, 2.63]
Volta	3.92** [2.69, 5.71]	3.68** [2.55, 5.30]
Eastern	3.67** [2.63, 5.13]	3.45** [2.44, 4.89]
Ashanti	2.58** [1.82, 3.65]	2.45** [1.71, 3.52]
Brong Ahafo	2.42** [1.75, 3.35]	2.45** [1.76, 3.42]
Upper East	1.96** [1.39, 2.75]	1.88** [1.34, 2.65]
Upper West	2.71** [1.94, 3.80]	2.67** [1.90, 3.75]
Strata		20
Primary sampling unit		660
Population size		21,871.24

PR: Prevalence ratio; APR: Adjusted Prevalence Ratio. *p≤0.05; **p≤0.01.

4. Discussion

The study aimed to regress child, maternal, household, and geographical level factors associated with the functional difficulty of children in Ghana. The significant factors associated with child functional difficulty were health insurance coverage, the functional difficulty status of the child's mother, household wealth index, and the child's region of residence.

Children who do not have health insurance are more likely to suffer from functional difficulty compared to those who were covered. This association could be bidirectional. First, serving as a proxy to healthcare access, children who are uninsured in this study may be unable to access specialized treatment that could prevent the development of functional difficulty. Not possessing health insurance in LMICs has been found to impact children's healthcare access, health-care utilization, quality of care, and health outcomes (Bright and Kuper, 2018; Mitra et al., 2017; Szilagyi, 2012). On the other hand, it is also possible that having a functional difficulty limits access to healthcare services as reported in other studies (Eide et al., 2015; Vergunst et al., 2017).

We also found that mothers' disability was related to a child's functional difficulty. Although no information is provided in the dataset as to whether the experience of functional difficulty between mother and child is domain distinct or indistinct, the result is nevertheless consistent with many genetic studies indicating an increased chance of heritability once a parent has a disability (Kong et al., 2018; Vickers and Gibson, 2019). From these studies, it is well documented that each parent passes down some genetic materials to their offspring as well as dysfunctional materials. This suggests that if a mother has a disability, a child is at increased risk (almost 2-fold for this study) of also acquiring a disability compared to a child without a mother without a disability. This finding confirms those of a recent study from Norway suggesting that a mother's prenatal depression can be genetically transmitted to their offspring (Hannigan et al., 2018). Similarly, studies have reported that child visual or hearing impairment are heritable such that an affected mother could pass on genetic materials that could make a child vulnerable (Bosch et al., 2016; Kochhar et al., 2007; Liew et al., 2014; Shearer et al., 2017). Nevertheless, it is possible that children of mothers who had functional difficulties experience some childhood neglect due to their mothers' incapacities thereby creating the social context for the development of a disability or functional difficulty if not of genetic origin. This finding nevertheless encourages the practice and establishment of free screening for newborn babies and comprehensive data collection of family history at all health facilities across Ghana to ensure the early detection of a disability and quick intervention implementation (Therrell et al., 2020).

The fourth wealth quintile is a step lower than the richest. Belonging to a lower wealth quantile, as found in this study, is associated with a higher chance of reporting a functional difficulty than the richest household. Poorer household wealth has widely been linked to many poor health outcomes including disabilities among children, adolescents, and adults in LMICs (Banks et al., 2017; Quansah et al., 2016; Pinilla-Roncancio et al., 2020). This implies that not belonging to the highest wealth quintile in a society creates greater exposure (such as poor access to quality healthcare) to the vulnerability of suffering from a disability. Thus, the general narrative

would have been to assume that poverty (corresponding with the finding in the bivariate analysis) can expose the growing child to challenges such as malnutrition and resulting anaemia and increased risk of infection which can also cause severe anaemia and other childhood morbidities. These childhood illnesses in a poor child can cause physical and cognitive growth retardation which increases the likelihood of developing a functional difficulty. Nevertheless, we found in the multivariate analysis that residing in the poorest and poor households have no significant relationship with child functional difficulty relative to those from the richest household.

Our finding also indicated that the region a child lives in had a significant relationship with child functional difficulty. In other words, all nine regions (namely, Greater Accra, Volta, Ashanti, Central, Western, Brong Ahafo, Eastern, Upper West and Upper East) had great odds of being associated to child functional difficulty than Northern region. On the other hand, it also implies that the Northern region has the lowest odds associated with child functional difficulties in Ghana. These results are consistent with the GSS census report demonstrating a regional distribution of childhood dysfunction and disability across all 10 regions (Ghana Statistical Service, 2013). The reasons behind this finding are presently unknown to the authors but we believe that it is multifaceted and perhaps due to the widespread deficiency in healthcare provision, inequality, disability stigma and poverty status that is characteristics of both rural and urban areas within all regions of Ghana (Adua et al., 2017; Ametepee and Anastasiou, 2015; Annim et al., 2012; Baffoe, 2013).

4.1. Strengths and limitations of the study

A great strength of this study is its nationally representative and large dataset. This allows for the conclusions to be generalized nationwide. Thus, we have provided a national estimate of the burden of functional difficulty in Ghana. Despite the merits, this study is not without limitations. The findings do not delineate causation. The conclusions are, therefore, limited to associations between the predictors and the outcome variable. Another limitation is with the use of secondary data. We were restricted by variables available in the dataset and could not control for all factors that may be associated with child functional difficulties including disability severity.

5. Conclusion

This study examined the correlates of child functional difficulty in Ghana. Children who were not covered with health insurance, mothers reporting a functional difficulty, richer households and all regions of residence compared to the northern region (namely Volta, Western, Central, Greater Accra, Ashanti, Eastern, Brong Ahafo, Upper East and Upper West regions) were significantly related to child functional difficulty. The government of Ghana and other development partners should promote policies and programs to reduce (if not eliminate) the consequences of disability or functional difficulties in children by taking into consideration factors like mothers' functional difficulty, access to health insurance, and regional and economic disparities in Ghana.

Declarations

Author contribution statement

P. Agbadi, H. O. Duah: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

N. E. Y. Dey, K. Frimpong-Manso, E. Dziwornu: Conceived and designed the experiments; Wrote the paper.

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Data availability statement

Data associated with this study can be requested from https://mics.unicef.org/surveys.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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