Women's Independent Household Decision Making Power and its influence on their Autonomy in relation to Child Vaccinations: a mixed-method study among Women of Reproductive Age in Northwest Ethiopia

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Abstract

Background: The importance of women's empowerment in influencing health outcomes has received attention globally, but there is limited information in Ethiopia on the relationship between women's household decision making power and the autonomy of decision making in relation to child vaccinations.

Aim: The study aimed to assess the role of women's household decision making power on their autonomy in relation to child vaccinations.

Methods: A community based mixed method study design was conducted among women who had 12–23-month-old children in Wogera district, Ethiopia. The sample size was determined using a single population proportion formula for the quantitative aspect of the study and the data collection for the qualitative study continued until saturation. The quantitative data was collected using a piloted questionnaire. SPSS software was used for quantitative data analyses. X^2-square test was conducted to explore the association between women's household decision making power and their autonomy in relation to decision making around child vaccinations. Framework analysis was employed to analyse qualitative data using open code software.

Results: A total of 584 women participated in the quantitative study and 13 In-depth interviews (IDI) with 13 key informants (KII)were conducted for the qualitative study. Majority, 88.2% (95% CI: 85.7, 90.6) of the respondents have autonomy to vaccinate children. This study showed that nearly two-thirds, 61.6% of the women had household decision making power. Respondents of the qualitative study noted that women had low household decision making power. Women's household decision making power is associated with women's autonomy to vaccinate children (x^2=92.775[a], df=1, P<0.001).

Conclusions: The overall level of women's household decision making power was relatively low compared to EDHS reports whereas women's autonomy to chid vaccination was high. There was a strong relationship between women's household decision making power and their autonomy in relation to child vaccinations. It is therefore important to implement activities, for example, provision of behavioural change communication (BCC) in the community, that can improve women's household decision making power which in turn will influence child vaccination coverage. [*Ethiop. J. Health Dev.* 2021; 35(SI-3):86-97]

Key words: Women, Household decision making power, Women's autonomy, Vaccination

Background

Immunization against childhood diseases is one of the most effective public health interventions which has saved the life of millions of children. Immunization also prevents many more millions from suffering debilitating illnesses and lifelong disability[1]. For example between 2000-2014, measles vaccination prevented an estimated 17.1 million deaths globally[2]. Since, many of the vaccine preventable diseases are contagious or communicable, there is a high chance for the existence of an epidemic should vaccines be omitted. Through the Expanded program on immunization (EPI), which aimed to reach all children of the world, a high number of children still die each year from vaccine preventable diseases. These deaths mostly occur in developing countries where health systems may be weak and less able to cope with an overwhelming set of health problems[3].

Ethiopia's Federal Ministry of Health (FMOH) is working to increase child immunization coverage and equity which has a direct impact on the country's national plans and international commitments like the Sustainable Development Goals (SDGs)[4]. However, low immunization coverage and high defaulter rates have been observed from different surveys in Ethiopia including Ethiopian 2011 and 2016 Demographic and Health Surveys (DHS)[5, 6]. A significant variation in coverage of full immunized children was also observed across geographic areas in Ethiopia. For example, the vaccination coverage was 52.4%, 75.6%, and 91.7% in studies conducted in Wonago district (Southern Ethiopia), Minjar-Shenkora district, and Debre-Markos town[7-9].

This may reflect supply-side differences across geographic areas, or a lack of adequate focus on demand side barriers[10]. A recent analysis concluded that the agency and empowerment of women, and women's access to quality services can affect the likelihood of childhood immunization[11].

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The importance of empowering women and ensuring gender equality are recognized as a critical goal for global development (Sustainable Development Goal 5). However, many women in developing countries such as Ethiopia remain less empowered in many aspects of their lives. Women's decision-making power is an important feature of female empowerment.

In studies conducted in rural Nepal[12], Pakistan[13], Bangladesh[14], Ghana[15], and Ethiopia[16, 17], women's decision-making power within the household plays a significant role in determining the uptake of maternal health services. Furthermore, a study done in Bale Zone, Ethiopia noted that about half of the women had autonomy to take their child to a health facility, while 43.9% of women had autonomy to go to a health facility for their own health care service needs[18]. This can be a proxy for women's autonomy to decide on child vaccination uptake. A systematic review in low, lower-middle, and upper-middle income countries documented an association between women's decision making power and completing child immunization[19]. However, none of the studies conducted in Ethiopia assessed the relationship between women's household decision making power and their autonomy to take their child for immunization.

Methodology

Study design: A community-based study using a concurrent mixed method design (cross sectional for quantitative and phenomenology for the qualitative components), was conducted in Wogera district, Northwest Ethiopia from May to June 2020.

Study setting: The study was conducted in Wogera district, Northwest Ethiopia. The Wogera District is 41 kilometres from Gondar, the capital city for Central Gondar Zone. The district constituted of 41 (38 rural and 3 semi-urban) Kebeles. Kebele is the lowest administration unit. According to the woreda Health office report, there were a total of 243,594 population and 55,761 households in the district. The estimated number of reproductive age women, pregnant women, under one year, under two years, and under five children was 57439, 8209, 7576, 12301, and 32982 respectively. Majority of the population in the district were Orthodox Christian followers. The district has 47 public health institutions including one primary hospital, eight health centers, and 38 health posts. All health posts regularly provide vaccination services both in static and outreach programs while health centers and the hospital provide vaccination services at the facility. According to the woreda health office report, the full vaccination coverage at woreda level was 86.5% in 2019/2020.

Sample: The source population was all women who had children aged 12-23 months in Wogera district, northwest Ethiopia, and the study population was all women who had children aged 12-23 months during the data collection period in Wogera district, northwest Ethiopia.

In the qualitative study, in depth interviews were done with women who had children aged 12-23 months to express their experiences and what had been observed in their community regarding women's decision-making power and their autonomy in relation to child vaccinations. Similarly, health developmental armies and Health Extension Workers, who were serving the selected Kebeles, were key informants that described what they observed from the community regarding women empowerment in general and women's autonomy in relation to child vaccination because they are directly involved in child vaccination services.

Inclusion and Exclusion Criteria: All women who had children aged 12-23 months during the data collection period were eligible for this study whereas women who were not permanent residents in the study area were excluded.

Sample Size Estimation: The sample size for the quantitative study was estimated using a single population formula taking the proportion of women's autonomy on health care decision making(P)=58.4% from a study conducted in rural districts of Southern Ethiopia[20], 5% margin of error, and 95% confidence level.

$$N=\frac{Z\alpha/2^2*p(1-p)}{d^2}=\frac{1.96^2*0.58*0.42}{0.05^2}=374$$

After considering design effects of 1.5 for cluster sampling and 10% non-response rate, the final survey sample size became 598.

For the qualitative component, a total of 26 participants were involved. The sample size for the qualitative study was determined on saturation of information and accordingly we conducted 13 in-depth with 13 key informants' interviews.

Sampling Techniques: In the district, there were a total of 4725 children aged 12-23 months in the district. Stratified cluster sampling was employed to get the study participants for the qualitative study. Initially, Kebeles were stratified into semi-urban and rural. One Kebele from three semi-urban Kebeles and six Kebeles from 38 rural Kebeles were randomly selected using the lottery method which resulted in a total of 7 Kebeles/clusters. Since, there were no major differences in population size in the selected Kebeles, equal allocation of the sample was employed to each Kebele. Within each selected Kebele, every woman who met the criteria of inclusion was selected until the required sample size was achieved. For the qualitative aspect, a heterogeneous type of purposive sampling was used. Both women who completed child vaccinations and women who discontinued child vaccinations from both rural and semi urban Kebeles were purposively included in the in-depth interview. When there were more than one health extension workers who were serving each selected Kebele, any available one during the arrival at health post was selected as a key informant. Therefore, a convenient method was employed to recruit HEWs. Similarly, one HDA in each Kebele was purposively selected as a key informant.

Data Collection Techniques: Through the review of various research conducted on the topic, a structured questionnaire was prepared for the quantitative study

and unstructured guiding questions were used to collect qualitative data. The tools were developed by the research team in English and was translated to the local language, Amharic. Prior to data collection, data collectors were trained to use the quantitative data tool, which was pre-tested for clarity, logical order of questions, and cultural appropriateness.

Seven data collectors with bachelor or higher degrees in health sciences conducted the quantitative data collection. The quantitative data included socio-demographic characteristics of the study participants, status of child immunization, women's autonomy to decide on major purchases, family visits, obtaining antenatal care (ANC), decide on where to give birth, get health care for her illnesses, childhood illnesses, child immunization, and women's experience of physical violence. The principal investigator (PI) supervised the quantitative data collection processes. The PI and another interviewer with a Masters in Public Health (MPH) did the qualitative data collection. After obtaining consent from eligible mothers, quantitative data was collected using the interviewer administered questionnaire. The qualitative data was collected using in-depth interviews with women who had children aged 12-23 months and key informant interviews were conducted with health extension workers who have been providing vaccination services, and health developmental armies working in the selected Kebeles. The qualitative data was collected using audio recorders after obtaining informed consent. Field notes were also taken during the qualitative interview. Both the quantitative and qualitative data were collected concurrently.

Operational definition and measurement

- Women's independent decision-making power was measured as a composite measure of six indices of women's autonomy. These were women's autonomy to independently decide on major purchases, visit families or relatives, get antenatal care (ANC), decide on where to give birth, get health care for her illnesses, and childhood illnesses. The indices in this study were developed by considering previous studies [18, 21-23].
- A score of 0 (zero) was given when a woman reported having no autonomy for each variable or score of 1 when she reported having autonomy, with a total possible score of 6. Women who scored above 50% were categorized as having high decision making power and those with scores below this cut-off point were categorized as having low decision making power[18].
- A woman was considered to have autonomy to vaccinate her child when she reported that she is independently able to decide to get her child vaccinated.

Data Management and Analysis: The quantitative data was entered using EPI info version 7 and then transferred to SPSS for data cleaning, coding, and analyses. The data was cleaned, and each categorical variable was coded. Descriptive analyses were carried out and X^2-square test was done to assess the relationship between women's household decision making power and women's autonomy in relation to child vaccinations. The findings of the quantitative data are presented in text, graphs, and tables.

The qualitative data was transcribed to change the audio data to textual data and translated by instructors working at the University of Gondar who had experience in qualitative research. The qualitative data were analysed using Open code software version 4.02. Since authors preferred a deduction approach of analysis, framework analysis was employed for the qualitative data in which themes were identified and the data under each theme was coded.

Quality Assurance

Data collectors were given training for three days including the pre-test to determine the clarity of each question, the logic and the order/flow of questions and skip patterns, and to assess respondents' reactions to each question (i.e., to identify any problems relating to cultural insensitivity). This resulted in a few amendments like order and construct of questions. Training was provided for data collectors to assist with explaining the purpose of the study, to have a good understanding of each question, and to have adequate information regarding how to approach respondents and deliver questions. The data collectors also learned how to inform respondents about the purpose and confidential nature of the study to avoid social desirability bias.

To assure the data quality, the qualitative data was collected by the principal investigator and other researchers who had experience in collecting qualitative data. The data was also transcribed and translated by instructors working at the University of Gondar who had experience in qualitative research. The data collectors tried to make the interview in a private area though it was carried out in their home.

Ethical considerations

Ethical approval was obtained from the University of Gondar's Institutional Review Board (IRB). Study participants were given information about the study including the purpose of the study, benefits, potential risks like time elapsed during the interview, confidentiality, and their right to refuse to participate or to withdraw at any time from the study. Informed verbal consent was obtained from each eligible woman prior to data collection. Privacy during data collection and confidentiality of the data was strictly maintained. The data was collected anonymously. Raw data was not accessible to any individuals other than the investigators, data clerks, and data translators. Individual identifiers were not included.

Results

In this study, a total of 584 women who had children aged 12-23 months participated with a response rate of 97.66%. Their mean age was 29.97 years with a standard deviation of 6.48 years. Women in the age range of 25 to 34 accounted for more than half (52.2%) of the respondents. One-fifth of the participants were rural residents and nearly all (94.5%) of them were Orthodox

Christians. Slightly more than half of the participants (56.3%) and their partners (55.3%) had no formal education (Table 1).

Table 1: **Socio-demographic characteristics of women who had child aged 12-23 months in Wogera district, 2020**

SN	Variables	Frequency	Percentage
1	Age of the mother		
	</= 19 years	11	1.9
	20-24 years	109	18.7
	25-29 years	167	28.6
	30-34 years	138	23.6
	35-39 years	105	18.0
	40 years and above	54	9.2
2	Residence		
	Urban	115	19.7
	Rural	469	80.3
3	Religion		
	Orthodox	552	94.5
	Muslim	32	5.5
4	Current marital status		
	Married	546	93.5
	Divorced	33	5.7
	Widowed	5	0.9
5	Educational Status		
	No formal education	329	56.3
	Primary School	173	29.6
	Secondary school	48	8.2
	College and above	34	5.8
6	Mothers' Occupation		
	Housewife	513	87.8
	Merchant	19	3.3
	Government employee	27	4.6
	Others*	25	4.3
7	Husbands' age		
	20-24 years	5	0.9
	25-29 years	74	12.7
	30-34 years	117	20.0
	35-39 years	137	23.5
	40 years	125	21.4
	44 years and above	126	21.6
8	Husbands' educational status		
	No formal education	323	55.3
	Primary school (1-8)	176	30.1
	Secondary school (9-12)	54	9.2
	College and above	31	5.3
9	Husbands' Occupation		
	Farmer	476	81.5
	Merchant	30	5.1
	Employee	41	7.0
	Others*	37	6.3

*Student and daily labourer

Child Vaccination Status

Among the 584 study participants who had children aged 12-23 months, 447 (76.5%, 95% CI: 72.9-79.8) were fully vaccinated (Figure 1). The rest 131 (22.4%) had initiated vaccination but had not completed it, whereas 6 (1.1%) did not initiate vaccinations.

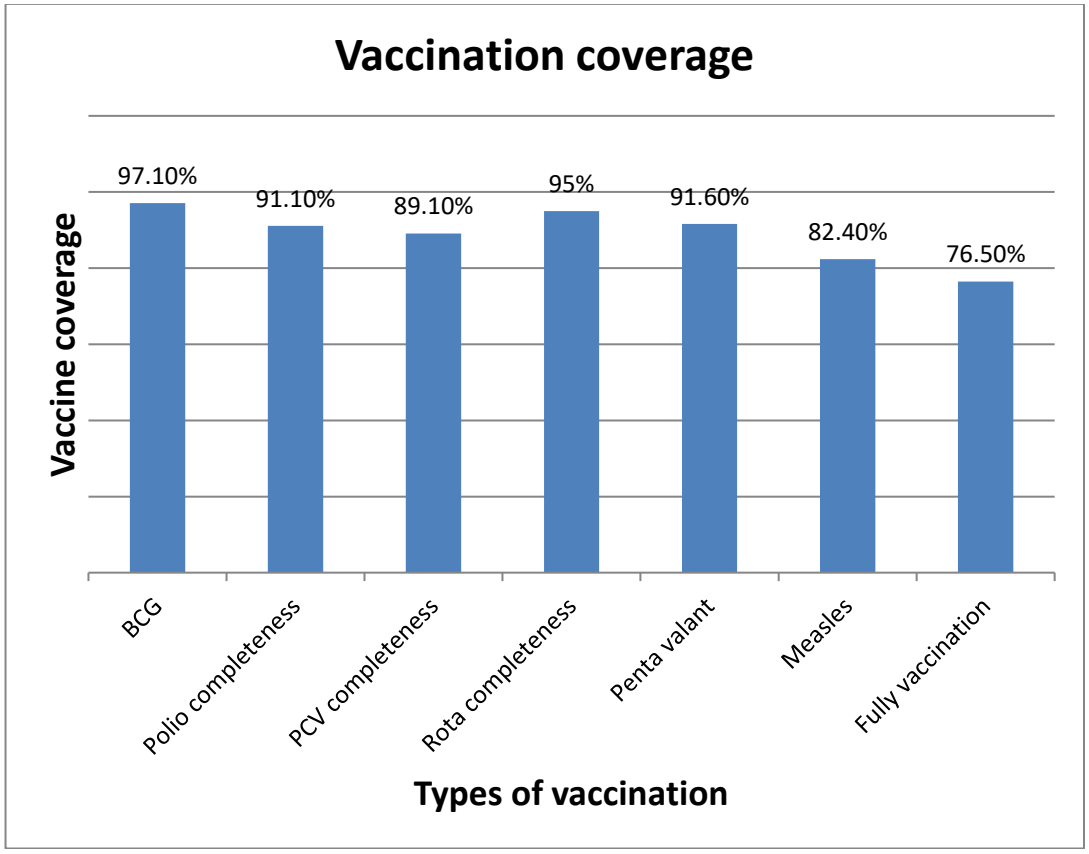

Figure 1: **Vaccination coverage by type of vaccine among children aged 12-23 months in Wogera district, 2020.**

Women's household decision making power and autonomy in relation to child vaccinations

Women were asked about their autonomy relating to various dimensions of household decision making power. Women's autonomy to vaccinate their child was 88.2% (95% CI: 85.7,90.6). To mention the percentage of women who had autonomy specific to each indices of women household decision making power, 85.6%, 85.10%, 82.2%, 32.9% and 30% of women had autonomy for medical care for child illnesses, ANC services, medical care for her illnesses, major household purchases, and visiting their families or relatives respectively. The composite measure of women's decision-making power across all six dimensions was 61.6% (95% CI: 57.9, 65.9) (Figure2).

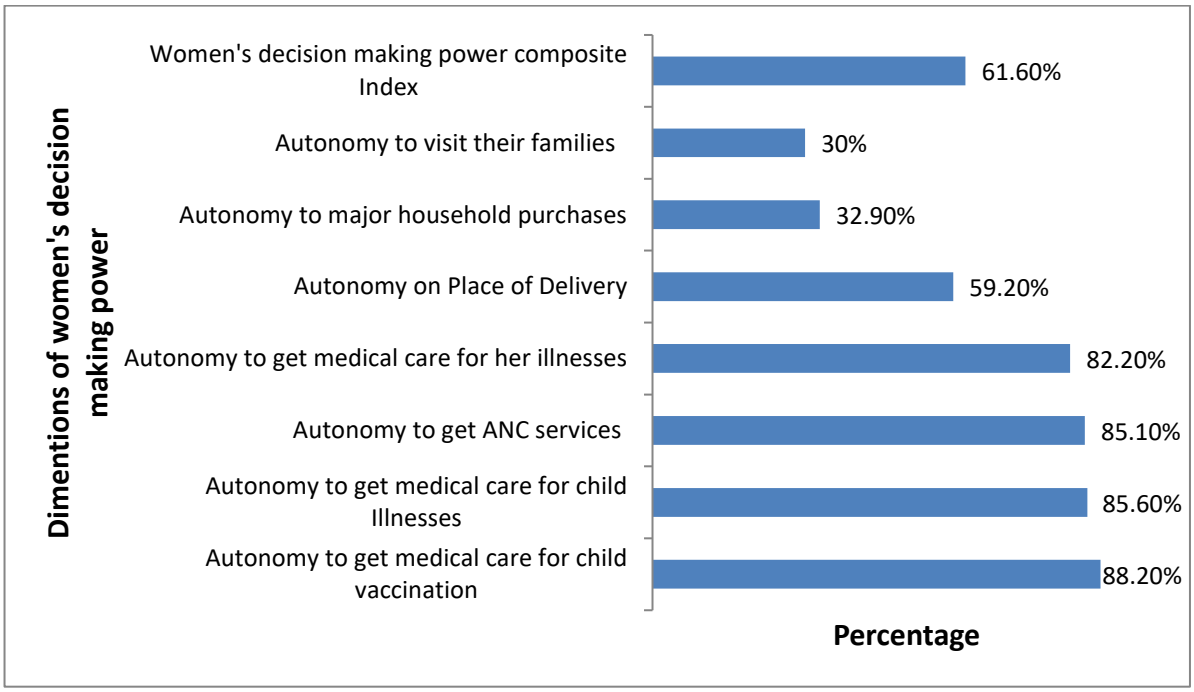

Figure 2: **Women's decision-making power by components among women who had a child aged 12-23 months in Wogera district, 2020**

The Relationship between women's household decision making power and their autonomy to vaccinate their child

A Chi square test was done to identify whether women's household decision making power is associated with women's autonomy to vaccinate their child. All dimensions of women's household decision making power were found to have an association with women's autonomy to vaccinate their child. There was strong evidence of a relationship between women's autonomy to vaccinate their child and autonomy to get medical care for child illnesses (chi-square=259.253[a], df=1, p<0.001), autonomy to get medical care for her own illnesses (chi-square = 195.360[a], df=1, p<0.001), and autonomy to get ANC (chi-square = 130.436[a], df=1, p<0.001). In addition, women who were empowered to make decisions regarding the place of delivery, major purchases, and visit families/relatives were also more likely to be empowered in relation to child vaccinations than their counterparts. These differences were significant (x^2=26.901[a], x^2=28.858[a], and x^2=4.468[a] respectively, df=1, p<0.001). The composite measure of woman's decision-making power also showed a relationship with women's autonomy to vaccinate their child (x^2=92.775[a], df=1, P<0.001) The degree of freedom for each variable is 1(Table 2).

Table 2: **The relationship between women's autonomy to vaccinate their child and women's household decision making power and physical violence**

SN	Dimensions of women's household decision making autonomy	Autonomy to vaccinate their child		Chi-square test	P-value
		Autonomous	Non autonomous		
1	Autonomy to get medical care for child illnesses				
	Autonomous	485 (97.0%)	15 (3.0%)		
	Non autonomous	30 (35.7%)	54 (64.3%)	259.253[a]	P<0.001
2	Autonomy to get medical care for her illnesses				
	Autonomous	465 (96.9%)	15 (3.1%)		
	Non autonomous	50 (48.1%)	54 (51.9%)	195.360[a]	P<0.001
3	Autonomy to get ANC				
	Autonomous	470 (94.6%)	27 (5.4%)	130.436[a]	
	Non autonomous	45 (51.7%)	42 (48.3%)		P<0.001
4	Autonomy to decide place of delivery				
	Autonomous	325 (93.9%)	21 (6.1%)	26.901[a]	
	Non autonomous	190 (79.8%)	48 (20.2%)		P<0.001
5	Autonomy to decide on major purchases				
	Autonomous	189 (98.4%)	3 (1.6%)	28.858[a]	
	Non autonomous	326 (83.2%)	66 (16.1%)		P<0.001
6	Autonomy to visit families/relatives				
	Autonomous	172 (98.3%)	3 (1.7%)	24.468[a]	
	Non autonomous	343 (83.9%)	66 (16.1%		P<0.001
7	Women's overall decision-making power				
	Highly empowered	354(98.3%)	6 (1.7%)	92.775[a]	P<0.001
	Less empowered	161 (71.9%)	63 (28.1%)		
8	Ever experience of Physical violence				
	Yes	145(86.3%)	23(13.7%)	0.796[a]	
	No	370(88.9%)	46(11.1%)		P=0.396

Qualitative Results

Respondent character tics: Thirteen women who had children aged 12-23 months participated in the in-depth interview, and six health extension workers (HEWs) and seven health developmental army (HDA) participated as key informants. Nineteen out of twenty-six respondents for the qualitative study were aged 30 years and above (Table 3).

Table 3: **Socio-demographic characteristics of the qualitative study participants**

SN	Participant's composition		Number
1	Age	<30	7
		30-34	10
		>/=35	9
2	Residence	Urban	4
		Rural	22
3	Occupation	Housewife	13
		HDA	7
		HEW	6
4	Education	No formal class	6
		Primary (1-8)	10
		Secondary and above	10

Findings from the qualitative assessments are presented under three main themes: I) barriers of women's empowerment, II) gender roles in child immunisation and III) barriers to child immunisation.

Barriers of women's empowerment

Different barriers of women's decision-making power were identified. These barriers are adherence to the male dominance tradition, perceived fear of conflict, women engagement status in income generating activities, poor community level legal measures, and educational status.

Adherence to the male dominance tradition

Adherence to the male dominance tradition related barriers include, barriers which are acquired/shared from their fathers and grandfathers or from families. Its manifestations are numerous, including the cultural acceptability of dominance, deciding on behalf of other family members, making major decisions, mentality or knowledge differences; males are naturally aggressive and demand that females should accept it; their wives should respect their decisions. In Ethiopia, husbands are mainly engaged in income earning activities as compared to their wives. For example, in 87.8% of participants in this study were housewives. Financial inequality between partners can attribute for male dominance in every aspect decision.

Many women reported that culturally males are superiors than females. Hence, unlike many women, it is culturally acceptable for men to be dominant, decide on behalf of other family members, make major decisions independently. Males are considered leaders while females are followers. A 38-year-old woman for example tried to express the acceptability of male dominance in this way:

> "*The difference [between male and female] is adopted/inherited from their fathers…. like the former time, they do not provide a right to females at this time"* code IDI2.

This woman stated an Amharic proverb: *"Set biawuk-bewonde yalk"*, which literally means, though a woman has the knowledge, the decision maker must be male. This outlines that males are the main decision makers. A 27-year health developmental army (HDA) also mentioned a commonly used proverb in the community to express females' decision-making scope is limited in the home ": *"set bemajet-wond bedji"* which literally means that females' decisions are limited to indoor/household activities whereas males' decisions should be on matters which can be accomplished outside the home. A 33-year-old health extension worker strengthen women's description on male dominance "

> *"... culturally we adopted from our previous ancestors men considered themselves as a head and a leader of the household on the opposite women considered as ignorance and minor,..."* code KII-HEW4.

Though there is a variation in residence, traditionally females are treated as inferior to males by their mentality, awareness, and knowledge and hence their decision-making power is not the same. For example, a 28-year-old rural woman said that

> *"Females unlike males do not think and do things right.... males' idea and thought are better than female..."* code IDI12.

This study explored that scope of males and females on decision making and shouldering responsibilities varies by sex. There is socially determined roles and responsibilities for males and females. Females are considered as unable to take on big responsibilities. In this case, males are responsible for decision making.

A 22-year-old housewife, non-educated woman said the following:

> "*The decision maker for our property is male. Mostly, females are engaged in household activities while males are expected to engage in activities which is done outside home. We females are not in position to decide on big issues. Since it [inequalities in decision making] comes from former time (comes from mothers and fathers), males are superior to female. Equality is seen in urban but not in rural community.... depends on individual behaviour"* code IDI5.

Males are treated as naturally aggressive that enable them to make independent decision at any circumstance and females should accept it. 38 years old HDA said the following:

> "*The difference existed because male is more hard/restrictive while females are reluctant. Males exert pressure on females.... This male dominance existed because of intrinsic aggressive behaviour of males. It is natural.*" code KII-HDA2.

Women side factors

In this study, different women's side factors that contribute for gender inequality was identified. The most mentioned ones were perceived fear of conflict, not engaging in activities which generate an income, and women's attitude towards independent decision making on major purchases.

Women's perceived fear of conflict

One side factor that contribute to gender inequality in household decision making is perceived fear of conflict. Males are the decision makers in every aspect of their family life. In this study for example, only 30% and 32.9% of women can independently decide to visit their family and on major purchases. If a woman deicide independently without getting approval from their husband, they will be physically abused. Intimate partner violence of any form is prevalent in Ethiopia[24]. Fearing this conflict or violence, results in women hesitating in making independent decisions. In this study, many women responded that women do not struggle to maintain their gender equity and autonomy in household decision making matters. This is due to fear of possible consequence that is conflict and violence.

A 35-year-old non-educated woman for example reported the following reason for gender inequality

"We are superior and inferior. That is, males are superior, and females are inferior because males, using their masculinity, can insult or physically attack (beat) females. Females are inferior because she always begs their husband for money to buy household goods or to get their child treated for its illness. That is, females are not allowed to hold/keep money. The difference between males and females may be because it comes from their fathers." code IDI4.

Not engaging in income generating activities

Women's engagement in activities which can generate an income was identified as a factor for women decision making power in household activities. Participants in this study responded that women who were not engaged in income generating activities are relatively less empowered in decision making than their counterparts. This problem is common amongst rural women.

A 32-year-old housewife woman from rural community said the following to explain the finance related reason for gender inequality in relation to household decision making:

A 38-year housewife woman reported as:

"Women have no autonomy on major household decisions because women are economically dependent. Women who are especially a housewife have no money because they are not involved in income generating activities." code IDI11.

Additionally, a 42-year-old health developmental army (HDA) intensify women's saying:

"Also, many women are busy in preparing foods for the families as well as caring children, but not involved income generating activities and have no money. This directly affects women autonomy. On the other hand, many males work in income generating activities like crop production and rearing livestock. This makes males think the household properties are only for them" code KII-HDA5.

Women's attitude towards independent decision making on major purchases

The study participants have different outlooks on women's independent decision making on major purchases mentioning examples like cattle and dresses for the rural women and television, refrigerators, and dresses for urban women. Many of the respondents responded that purchasing these expensive items/goods through the independent decision making of women is not appropriate while it is appropriate if it is done independently by males. This comes from the tradition that males are leaders and that major decisions should be made by males. However, there were women who said that the decision on major issues should be made through couple discussions.

Gender role on child immunization

Along with women's household decision making power, it is imperative to explore women's autonomy in relation to child vaccinations, effects of household decision making power on women's autonomy in relation to child vaccinations, and male involvement in vaccinations**.**

Women's autonomy in relation to child vaccinations

In this qualitative study, the status of women's independent decision-making power on child vaccination was explored. Almost all the respondents gave similar responses. They agreed that the decision-making power is in the hands of the mother. Many couples in the community have a high value for child vaccination that women can freely decide and get a child vaccinated.

35-year uneducated women said the following to describe their autonomy to get vaccination for their child:

*"For vaccination, no problem. Let alone here in my village, if it is at Gedebiye [a town which is found far from their residence], I will not ask my husband. Not only me, but every woman in my village also goes for child vaccination without requesting their husband.... Unlike decision on household activities, all women in my community have full autonomy for child vaccination. In my community, males do not oppose their wife for child vaccination..."*code IDI4.

Do women's household decision-making power affect their autonomy in relation to child vaccinations?

Women and all other respondents were also asked to describe their experiences and observations regarding the relationship between women's household decision making power and their autonomy in relation to child vaccinations. Almost all the respondents reported that these two dimensions of assessment of women empowerment were found to be unrelated. Women's differences in household decision making power do not affect their autonomy on child immunization. That is, women can independently decide on child vaccinations, regardless of their household decision making power.

A 28-year-old, not educated women said that

"For child vaccination, females simply go and let children vaccinated without getting permission from their husband. When we go to church, if we see women giving vaccination, we simply go to get child vaccinated. Since vaccination prevents cold like diseases, they recommend us to strictly make child vaccinated. There is no difference in vaccination between women who have autonomy and who has no autonomy on household activities." code IDI6.

From her day-to-day observation, a 29-year-old heath extension worker (HEW) said the following which supports the women's report:

*"No variation. All [women who have and do not have household decision making power] are the same regarding decision of child vaccination. The difference in household decision does not have impact on vaccination. All women can decide freely about the vaccination***." code** KII-HEW6.

Role of males in child vaccination

In this qualitative study, we tried to have an insight on males' involvement in child vaccination and to identify how males influenced, which may be positive or negative, on initiation and completion of child immunization. Many of the participants reported that

males have a positive influence on child immunization. Though respondents alleged that child vaccination is mainly the responsibility of women, males are found to have major contribution in it. Their contribution includes informing or making their wife aware of the vaccination day/schedule, reinforcing them to initiate and/or complete the vaccination, and few males follow up on health extension workers (HEWs) for cancelled vaccination schedules and participate in community mobilization for child immunization.

Another 22-year-old woman says the following regarding the role of males on child vaccination:

> *"...Males do not take the responsibility of getting their child vaccinated but reinforce us to vaccinate our child. So, females will take the responsibility. In myself as well as in my community, there is no male who directly carry and make their children vaccinated. There are males who push their wife to vaccinate their child but there are also some [Men] who do not worry whether his wife take the responsibility and make their child vaccinated or not. Some men advise their wife not to discontinue the vaccination. My husband asked me to initiate my child vaccinated ....but he did not reinforce me to make vaccination complete."*

In addition to immunization service users, a 30-year-old HEW witnessed the roles of males to make the immunization program effective.

> "*Male's involvement in vaccination is very good. About them benefit of vaccination and even for family planning, males are good. They usually accompany us when we made community sensitization and awareness program. I have been five years working here, I found males' support is good. Males reinforce their wife for child vaccination but do not bring their children to vaccination area. Though few males come with their wife for child vaccination, but majority consider child vaccination is a responsibility of females."*

Barriers of child vaccination

Different actual barriers for initiation or completion of child vaccination are mentioned by respondents such as women's increased workload. Actual and/or perceived fear of side effects are also barriers for child vaccination. The workload for women especially in the rural community is extremely high. They are engaged both in household and farming activities which may be in part to blame for discontinuation of child vaccinations. Additionally, the presence of other commitments mainly related to social factors contribute towards the discontinuation of child vaccinations.

A 38-year-old rural woman reported the following:

> *" Women will not initiate or complete child vaccination when they get problem, travelled to somewhere for any reason during vaccination date. For example, I did not complete child vaccination because of series illness my husband faced and finally died. Otherwise, in my community majority completed the vaccination."* code IDI11.

Similarly, another 38years old housewife also forwarded similar ideas:

> *"In this area, reason of women for not initiating or completing child vaccination is women work overload, travelling to far area for social purposes for example to visit relatives, for mourning or wedding),..."* code IDI2.

A 35-year-old un-educated woman noted the following to advise on how vaccine side effects contribute towards vaccine discontinuation:

> *"For the ninth month vaccine [measles], I purposively leave it thinking that the child cannot tolerate its effect because the child is weak. There is a thought in my community that the ninth month vaccine is strong that weak children cannot cope up its side effort."* code IDI4.

Discussion

Our study examined whether women's household decision making power, was associated with women's autonomy to decide in relation to vaccinations.

We found that the decision-making power of women was not consistent across the six different dimensions. It was found high for ANC service utilization, getting medical care for herself and for child illnesses. This might be due to a perceived risk susceptibility and/or perceived severity of illnesses for these medical conditions and hence their partners might not blame their wife for independent decision making to seek care. However, women in this setting were less empowered to make autonomous decisions regarding major household purchases and visiting their families or relatives. This may be explained by the fact that many Ethiopian women, particularly those living in remote rural areas, are housewives who are highly engaged in household activities and care for children, and their engagement in earning activities is therefore limited. Hence, women have less access to money and remain largely financially dependent on their husbands. As a result, women may have fewer opportunities to purchase goods without the approval of their husbands. Our qualitative findings supported this notion that financial inaccessibility among women, limits a woman's ability to decide on major purchases.

Our finding indicated that nearly two-thirds of the study participants had overall household decision making power which was consistent with another study conducted in Southern Ethiopia (58.4%)[17] but slightly lower than what was reported in the 2016, 2011 and 2005 Ethiopian Demographic and Health Surveys[23, 24]. This observed difference might be due to variation of employment status; i.e., only 4.6% of the study participants in this study were employed while 29% in EDHS 2005, 38% in EDHS 2011, and 33% in EDHS 2016 were employed[24]. If women are economically empowered and have financial access, it becomes easier for them to make decisions on matters related to major purchases and health care seeking behaviors which in turn improve the overall decision-making power. Employed women might also have better information about their rights and skills to negotiate with and and in terms of confronting their husbands to uphold their

rights. The qualitative component of this study also supports this explanation that women's poor decision-making power is largely dependent on their financial accessibility.

Our analysis showed that household decision making power of women is associated with their autonomy regarding decisions to vaccinate their child. This finding is supported by the EDHS 2016 report, which states that women who had household decision-making power were more likely to use health services[24]. This was also observed in a study using the 2005 and 2011 EDHS data[23]. Similarly, studies conducted in Ghana and rural India reported that the different forms of women's autonomy had an association with maternal health service utilization[15, 25]. If a woman had a right to take the decision on her health care, it would be easy to do so in matters related to child immunization because mothers usually prioritize their children. Interestingly, the qualitative component of this study does not verify this relationship. This might be due to the mothers' level of understanding on the different components/indices of women's household decision making power, which might be low. For example, their husbands may not directly compete against their wives for their decision on child vaccinations, but the women may be overloaded with different activities and/or may not have financial access to seek health care including child vaccination services. Women's household decision-making power may directly or indirectly affect women's autonomy on child vaccinations. The number of participants in the qualitative part of our study was small and the non-random nature of the sampling technique in the qualitative study, the results may not be generalizable., However, the women who participated in the qualitative study might have autonomy in making decision in all aspect/dimensions of women's household decision making indices as well as women's autonomy in decision making on child vaccinations as reported by them.

Limitation of the study

Since the data were collected using interviewer administered techniques, responses regarding child vaccination status may have been affected by social desirability bias. It may be important to hear about women's autonomy to make decisions on child vaccination from the husbands and this may be the limitation of this study.

Conclusion

This study examined both the level of women's household decision making power and its influence on women's ability to make autonomous decisions regarding their child's vaccinations. Major variation was observed among indices of women's household decision making power. The overall composite measure of women's household decision making power in this setting was low as compared to the recent EDHS reports whereas women's autonomy on child vaccination was adequate. Women's perceived fear of conflict, not engaging in income earning activities, and adherence to the male dominance tradition or belief, low awareness, and knowledge; variation of socially assigned roles and responsibilities for males and females and considering males as naturally aggressive were identified as major barriers of women's household decision-making power. Women's household decision making power directly or indirectly affects women's autonomy in relation to child vaccinations.

Recommendations

To improve women's autonomy in relation to child vaccinations, the following are recommended:

- The local as well as the regional minister of finance together with other relevant sectors including nongovernmental organizations (NGOs) need to strengthen their contributions in empowering women financially by implementing measures that could enhance access to micro finance supports (such as grants).
- Additionally, the woreda women's affairs together with woreda health office, including health extension workers (HEWs), and other concerned bodies need to enhance advocacy to enhance women's right to equality and negotiation power.

It is important to implement activities like provision of behavioural change communication (BCC) in the community, that can improve women's household decision making power which in turn will influence child vaccination coverage.

Abbreviations

ANC: Antenatal Care, EDHS: Ethiopian demographic and health survey, FMOH: Federal Minister of Health, HDA: health developmental army, HEW: Health Extension Workers, IRB: institutional Review Board, MPH: Masters in Public Health, NGOs: nongovernmental organizations, PI: principal investigator, SDG: Sustainable Development Goals.

Declarations

Ethical approval and consent to participate

This was approved by the Institutional Review Board of the University of Gondar and received ethical clearance. Besides, study permission was obtained at each level of the health system. Finally, written informed consent was obtained from each study participant.

Availability of data and materials

Data will be available upon reasonable request from the corresponding author

Conflict of interest

All authors declared that they have no conflict of interest.

Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current Journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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