



# Willingness to pay for medical care and its determinants in private health care facilities among Gondar city residents, Northwest Ethiopia: Cross sectional study

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## ARTICLE INFO

### Keywords:

Medical care  
Willingness to pay  
Northwest Ethiopia

## ABSTRACT

Medical care is a type of health service that mainly consists of investigation and diagnosis, treatment, rehabilitative care, and nursing care for the purpose of maintaining the structure or function of the body. A medical care payment is a sort of payment made for the diagnosis, cure, mitigation, treatment, or prevention of disease, sickness, or damage, which includes checkups and periodic exams. In low-income nations, out-of-pocket expenditures account for 60 % of overall health spending, compared to 20 % in high-income ones. Willingness to pay is perhaps the highest money that a person is willing to provide to ensure that a particular wellbeing care action is undertaken. Previous research works focused mainly on the patients' willingness to pay but not the amount they can afford. The focus of this study is to determine the level of willingness to pay, the mean amount of willingness to pay for medical care, and its major determinants. A community-based cross-section study was carried out among Gondar city residents from February 2022 to March 2022. The study participants were recruited by systematic random sampling. Four data collectors conducted interviews using a questionnaire. For analysis, the dataset was entered into Epi Info version 7 and transferred to STATA version 14. The descriptive part was summarized using summary statistics like mean, median, and standard deviation. Determinants of willingness to pay were identified using a Tobit regression model with a significance of  $p$ -value  $\leq 0.05$  and confidence interval (CI  $\neq 0$ ). Finally, the analyzed data was presented using tables and figures accordingly. The study involved 414 participants, with a response rate of 95.8 %. About 53.62 % of the participants were willing to pay for medical care and the average willingness to pay was 24.17 USD per year. They were more willing to pay if they were still working ( $\beta = 19.66$ ), currently married ( $\beta = 14.49$ ), had a family history of medical care ( $\beta = 25.74$ ), had good knowledge ( $\beta = 36.16$ ), had a history of medical illness ( $\beta = 16.64$ ), lived a long distance from the health facility ( $\beta = 1.98$ ), and had a high wealth index ( $\beta = 29.51$ ). The willingness to pay for medical care is below the actual cost. Designing a cost-recovery strategy with multi-tiered programs assigned to the most vulnerable individuals, such as the elderly, less educated, or seriously sick, is a strategic approach of the raising demand for service uptake and accessibility.

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## 1. Introduction

Medical care (MC) is a type of health service which mainly consists investigation and diagnosis, treatment, rehabilitative care and nursing care for the purpose of maintaining the structure or function of the body. MC payment is a sort of payout for sickness, illness, or injury diagnosis, cure, mitigation, treatment, or prevention, including checks and periodic exams [1]. The cost of MC is not regulated in the same way that other markets are and challenging to determine it [2,3]. Healthcare is one of the social security components in the domain of health and is vital for people's and society's well-being. It is a fundamental human right, and its implementation helps to achieve the different Millennium Development Goals. To minimize the negative economic repercussions of paying for medical treatment, a system that provides stable financial security for households should be considered, or services should not be provided at the price of financial disasters brought on by having to pay for the care. Users have to pay depending on their ability, and fee-free health care was seen as one method to promote fairness for the world's poor [4–6]. As a matter of fact, Ethiopia's health care finance strategy does not include the private medical system; rather, it is systematizing fee waiver systems, which are not currently used for all MC services. Previous studies centered mainly on the patients' WTP but not the amount. Moreover, the identified factors were for WTP as a proportion not a specific amount that is also highly setting-variant. So, it is less applicable beyond a study setting [7, 8].

In the period of SDGs, the global health spending increased to US\$ 7.8 trillion in 2017 from US\$ 7.6 trillion in 2016, more than three fourth of it was in fact for MC [9]. The mean total costs for medical intervention from America, European and Asian countries ranged from US\$132 to US\$ 567 b y the year 2006. Due to high medical costs, only 52 % of patients visit the hospital yearly, of which only 21 % can visit more than three times in a year [10–13]. Out-of-pocket payments for treatment and services are the most common method of funding health care in low-income nations which accounts for 60 % of overall health expenditure, but in high-income ones, it accounts for 20 % [14,15]. In Ethiopia, out of pocket payment for health care accounts close to 80 % [16]. Across the world, WTP for MC varied from 38 % to 93 %. However, the mean amount of WTP ranged from US\$8.5 to US\$ 250 [17–19]. WTP for African countries was low as compared to European and Asian nations [20–22]. In almost all the studies noted that WTP for health care was far lower than the actual cost patients were required to pay of the service [23,24]. Majority of previous studies reported that socio-demographic factors like gender, age, socioeconomic status, and educational level had great role in influencing the WTP for MC [2,7,8,25–27].

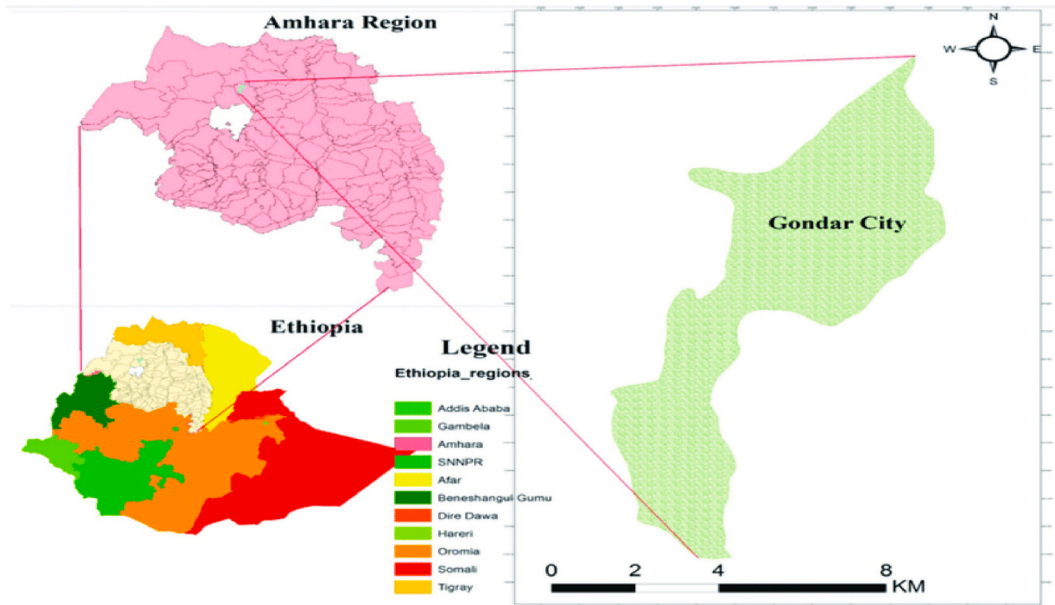
Willingness to pay could well be assessed from a variety of perspectives. Open-ended questions will provide the WTP total expressively, but close-ended questions can be addressed using a variety of approaches or tools. The Contingent Valuation Method (CVM) is a widely used non-market valuation tool. Dichotomous Choice (DC) is a typical inquiry design that has been put up to request that individual's response to their WTP for a predetermined offer amount [2,28,29]. In Ethiopia, MC in private health care facilities is being provided with a highly variable cost, non-customized system and not with a reasonable fair price [16,19,30–32]. There are tangible pieces of evidence that put private MC superior to its counter parts. Quality of care, short waiting times, privacy, direct visits from high-level specialists and personal counselling are the main reasons to prefer a private health facility. Parallely, these increase the cost of MC somebody needs to take. However, the existing level of WTP is less applicable to the study area because the cost of MC is highly setting-variant that draws much attention to plan this study.

There are reports of death in health facilities before receiving any type of treatment at home, at waiting area and at triage due to non-affordable high medical costs. So, this study figured out the mean cost of MC that participants were willing to pay which is used by policy makers for price setting. The study is also important to identify its major determinants. The generated knowledge is substantive for developing a cost-recovery model that assures self-sustaining and high-volume medical services. The findings could be potentially utilized by policymakers in the private sector to set target price.

## 2. Methods and materials

### 2.1. Description of the study area and period

This study was employed among Gondar city residents from February 2022 to March 2022. The study was conducted in Gondar city, which is located 738 km away from Addis Ababa, the capital city of Ethiopia [33]. According to the Central Statistics Agency (CSA) projection the total population and household units of the city were 412, 173 and 69,284 respectively in 2021. This population is composed of 205,737 males and 222,436 females. Based on the data from Gondar city administration statistics agency, the city is classified into six sub-cities and 24 kebeles (smallest administrative units).



Map of Gondar city (study area) adapted from Tamiru AT, Rade BK et al., 2020 [34].

There are eleven governmental health café facilities and more than thirty private health facilities in the city. The health care facilities situated in Gondar have provided a comprehensive clinical and community health services for eight zones and for about 14 million people living in the catchment area (Northwest Ethiopia). Based on the type of service and coverage, capacity, specialization, and accreditations; health care facilities available in the city are classified into health center, primary hospital, general hospital, specialized hospital, medium clinic, higher clinic and specialized clinic. The health care coverage of the city is increased from 30 % (2007) to 62 % 2018 [35]. The proportion of different health care service utilization ranges from 32.5 % to 75.3 % [31,36]. It was realized that the health care coverage and its utilization across different segments of the community of the city highly varied and the possible causes of this variation were not well researched.

## 2.2. Research design and sampling

Community-based cross-sectional study design was employed among Gondar city residents from February to March/2022. All individuals who were living in Gondar for at least six months can have a chance to be selected and considered as the study population. All adults  $\geq 18$  years old had an equal chance of selection and participation in this study.

The sample size is calculated with single population mean estimation formula [37], having an assumption of 95 % confidence level, standard deviation ( $\sigma$ ) of WTP from previous study done in Ethiopia [7] (US\$9.4), 5 % margin of error from the mean of WTP (US \$18.61), which is US\$0.93 (US\$18.61  $\times$  0.05). The sample size estimation is computed as follow:

$$n = \frac{[Z\alpha/2.\sigma]^2}{d^2} = \frac{[1.96 \times 9.4]^2}{[0.93]^2} = 392.4$$

The final sample size, considering 10 % for non-respondents was 432.

A two stages-sampling technique was applied to reach the final study subjects. Considering 25 % of the total kebeles as sufficient to represent the city, six kebeles were selected from the total by a simple random sampling technique. In selected kebeles, there were 20,441 households and each household assumed to have at least one adult and household head. A Proportional allocation was used to determine the number of sample households drawn from each selected kebele. The final household that consists of the interviewee was also selected by a systematic random sampling method using a sampling fraction of 47. To acquire a final interviewee, one adult was chosen from each selected household if there were two or more adults per household.

## 2.3. Data collection tool, type and procedures

This study used primary data through interviewer administered standardized questionnaire to elicit necessary information. Face to face interviews, focused group discussion and key informants were applied. The questionnaire was developed and adapted from previous published works [7,38] and first written in English and then translated into Amharic. The interview was administered separately to the selected participant by 4 data collectors to all eligible study subjects.

Regarding the data collection procedure, the amount of WTP was elicited by questions prepared with bidding format. First, a participant was asked about his/her interest in attending a private facility to get MC. If the participant is interested, he/she was asked

WTP for the first target price (ETB 1500), which was estimated by combining two options. A study done in Ethiopia in 2015 (7) reveals the mean actual cost of MC including advanced imaging and diagnostic procedures as 1850 ETB in (before 6 years). The value of the cost of MC after 6 years is supposed to range from 1500ETB to 2405ETB with 5 % discount rate. Additionally, the directors of two private health facilities were asked about the average MC cost. Based on their response, the cost ranges from 1500 to 2500 ETB on average. The bid was upped to 2000 ETB for a participant who accepted the initial bid. If the participant accepted this amount again, the offer was increased to 2500 ETB. At this stage, the participant was asked about the maximum WTP and whether or not the 2500 ETB offer was accepted or rejected. Similarly, if the participant rejected the initial offer of 1500 ETB, the bid was reduced to 1000 ETB. The maximum WTP was inquired of a participant who accepted this offer. However, when a person refused 1000 ETB, the offer was reduced to 500 ETB, and the individual was questioned about the maximum WTP.

The dependent variable was measured by contingent valuation method with a bidding price elicitation technique. Training was given for the data collectors regarding how to approach the participant, interview, content of the questionnaire. Then a pretest was also conducted in Debre-Tabor town on 5 % of the sample size before actual data collection to assure the understandability of questionnaire.

### 3. Methods of data processing and analysis

The returned questionnaires were checked for completeness and consistency of responses. Then data was entered into Epi Info version 7 and then exported to STATA 14 for analysis. Average WTP for MC per year was calculated as follows:

$$AWTP = \frac{\Sigma(WTP1 + WTP2 + WTP3..... + WTP414)}{414}$$

Note—1\$USD = 50.77ETB in March 2022 currency exchange rate.

**Table 1**  
Socio-demographic and economic characteristics of participants for WTP for MC and its determinants in Gondar city, Northwest Ethiopia, 2022 (n = 414).

Variables	Frequency	Percent (%)
<b>Sex</b>		
Male	220	53.1
Female	194	46.9
<b>Age</b>		
<28 years	111	26.8
29–35 years	114	27.5
36–42 years	90	21.8
>42years	99	23.9
<b>Current marital status</b>		
Married	255	61.6
Single	139	33.1
Divorced	12	2.9
Widowed	10	2.4
<b>Educational status</b>		
Unable to read and write	33	8.0
Able to read and write	30	7.2
Primary school	69	15.7
Secondary school	122	29.5
College/university	160	38.6
<b>Occupation</b>		
Government employee	150	36.2
Student	64	15.4
Housewife	63	15.2
Merchant	50	12.1
Daily worker	28	6.8
Farmer	22	5.3
Retired	9	2.2
Others*	28	6.8
<b>Working state</b>		
Currently working	313	75.6
Retired/unemployed	101	24.4
<b>Family size</b>		
≤4	298	72.0
>4	116	28.0
<b>Wealth index quantiles</b>		
Poor (1st quantile)	136	32.9
Medium (2nd quantile)	137	33.1
Rich (3rd quantile)	141	34.0

Others\*- religious leaders, carpenters.

Summary statistics, frequency distribution tables and figures were used to summarize and illustrate the descriptive data. Bivariable and multivariable Tobit regression analysis were used to identify factors associated with WTP after checking the fulfillment of model assumptions such as normality and homoscedasticity of error terms through Breush-pagan for heteroskedasticity test ( $X^2 = 1.92$ ,  $p = 0.14$ ) and multicollinearity via Variance inflation factor ( $VIF = 1.45$ ) as well as correlation contingency for categorical variables. The Tobit model fitness was assessed by psedo- $R^2$  (0.38). To assess the degree and existence of statistical association, regression coefficients ( $\beta$ ), 95 % confidence intervals, and a p-value of  $<0.05$  were considered.

### 3.1. Model specification

A Tobit regression model was utilized in this study to fit for continuous responses in which the outcome variable was censored. Censoring thresholds may be set for all observations. The tobit model may be stated as  $y = x + e$  with a continuous outcome that is either observable or unseen. The tobit model assumes that the error term is normally distributed;  $e \sim N(0, 2I)$ . The amount of curiosity in a Tobit model may be the censored or uncensored result, depending on the task at hand. The data collection tool includes a double open-ended dichotomous choice bidding mechanism that is well suited to the Tobit regression model.

### 3.2. Ethical consideration

The University of Gondar's Ethical Review Board granted ethical approval with approval number of VP/RTT/05/749/2022. Officials from the chosen kebeles (administrative divisions) were notified through official letters received from the University of Gondar's ethical review board. Informed consent was taken and the participants were asked to participate after the goal of the research was explained to them. Simultaneously, individuals were given the entire opportunity to withdraw from or decline participation in the research. Each willing participant was then asked to provide written informed permission. Anonymity ensured the confidentiality of the information gathered.

## 4. Results

### 4.1. Participants' Sociodemographic and economic characteristics

A total of 414 study subjects participated in the study with a response rate of 95.8 %. The mean age of the participants was 36.5 years with a standard deviation of 11.89. About 54 % of the participants were aged  $\leq 35$  years and most of them were from 29 to 35 years of age. Nearly half of the study participants, 220 (53.1 %) were males. A major portion of the study participants, 351 (84.6 %)

**Table 2**  
Health-related features of study participants for WTP for MC and its determinants among Gondar city residents, Northwest Ethiopia, 2022 (n = 414).

Variables	Frequency	Percent (%)
<b>Awareness of MC</b>		
Yes	326	78.7
No	88	22.9
<b>Knowledge of MC</b>		
Poor	221	53.4
Good	193	46.6
<b>History of known medical illness</b>		
No	322	77.8
Yes	92	22.2
<b>Rate of health status</b>		
Good	212	51.2
Medium	122	29.5
Poor	62	15.0
Sever	18	4.3
<b>Previous MC visit</b>		
No	230	55.6
Yes	184	44.4
<b>Family/friend history of MC</b>		
Yes	230	55.6
No	184	44.4
<b>No of private health facility visits (n=184)</b>		
<3	100	54.3
$\geq 3$	84	45.7
<b>Distance from private health facility</b>		
<7 km	246	59.4
$\geq 7$ km	168	40.6
<b>Health insurance</b>		
No	234	56.5
Yes	180	43.5

had formal education of whom 36.8 % completed college/university education. Most of the participants were currently married 255 (61.6 %) while the remaining 38.4 % fell under single, widowed or divorced. Regarding the participants' occupational status, about 36 % of them were government employees followed by students (15.5 %) and housewife. Approximately three-fourths of the study participants (72 %) had a family size of <5 in their household. Additionally, a significant number (75.6 %) of study participants are still working or currently working of whom 150 (36.2 %) are government employees followed by merchants (Table 1).

## 5. Participants' health-related characteristics

Many of the participants, 326 (78.7 %), were aware of MC. Nearly half (53.4 %) of the participants had poor knowledge regarding MC. There is still a significant difference (25.3 %) between the level of awareness and knowledge about MC. Three-fourths (77.8 %) of the participants had no known medical condition/illness. Nearly half (51.2 %) of the study subjects currently had a good health status. More than half of the participants, 234 (56.5 %) said that they used community-based health insurance programs. Fifty-five percent of the participants had never been to MC or a PHCF. About 60 % of the study participants would come from a distance of 7 km or less to the PHCF from their homes (Table 2).

### 5.1. Participants' willingness to pay for medical care

About half, 53.62 % (222) (95 % CI: 48.68, %, 58.50 %) of the study participants were willing to pay some amount of money for MC and majority of them cited low waiting time and better service, as well as cleanliness were the main reasons for them to be willing to pay for the MC at PHCF (Fig. 1). Considering all the study participants, the average WTP per year for MC in PHCF was 24.17USD (95%CI: 21.14, 28.40) or 1258ETB. Regarding the participants' WTP for different MC services, 72.2 % were preferred and willing to pay for registration at PHCF followed by medicines/drugs (68.2 %). The least MC service participants were willing to pay for was nursing care and rehabilitation (See Fig. 2).

### 5.2. Group mean of WTP per year for medical care

The group means WTP among socio-demographic and economic characteristics had computed and some variations had been observed. The mean WTP for MC in PHCF was 28.52USD for males 8 USD lower than for females. Among different age groups, the mean WTP had less variation of which the maximum difference was about 5.1USD (22.4USD Vs 27.5USD). Married individuals had a higher group mean (26.77USD) than other categories of marital status. Additionally, being in the group of currently active working status had a higher mean WTP (28.70 USD) than those who were not currently working (See Table 3).

### 5.3. Determinants of WPT for medical care in PHCF and their marginal effects

The study showed that married participants were willing to pay 14.49USD more than unmarried participants, keeping other variables constant, ( $\beta = 14.49$ , 95%CI 0.49, 28.49). The marginal effect of this variable revealed that changing marital status from currently unmarried to currently married increases WTP for MC in PHCF by 6.84USD from the mean WTP ( $dy/dx = 6.84$ , 95%CI: -1.27, 14.97).

Likewise, still working participants were willing to pay 19.66 USD more than the participants who were retired or unemployed, keeping other variables constant, ( $\beta = 19.66$ , 95%CI 4.83, 34.49). The marginal effect of this variable revealed that changing the working state from retired/unemployed to active working state increases WTP for MC in PHCF by 11.24USD from the mean WTP ( $dy/dx = 11.24$ , 95 % CI: 2.47, 20.01). Participants who had a family/friend history of MC were willing to pay 25.74 USD more than participants who had no family/friend with medical history holding other variables constant ( $\beta = 25.74$ , 95%CI 13.36, 38.12). The marginal effect of this variable depicted that having family/friend history of MC increases WTP for MC in private health care facility by 12.34USD from the mean WTP ( $dy/dx = 12.34$ , 95 % CI: 5.12, 19.55).

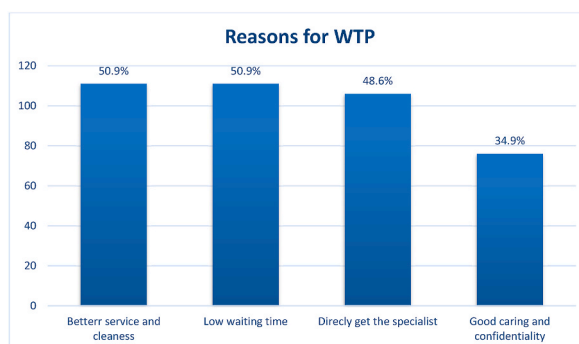


Fig. 1. Participants reason for WTP for MC in private health facilities among Gondar city residents, Northwest Ethiopia, 2022 (n = 222).

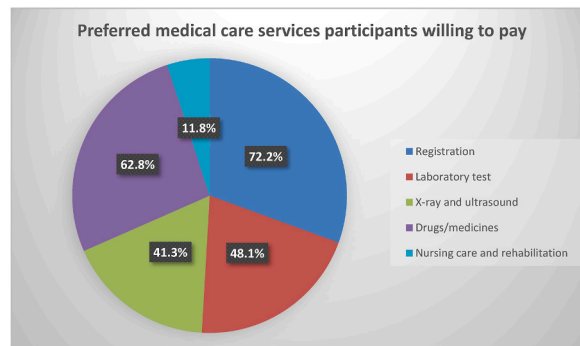


Fig. 2. Participants MC services preference to pay in private health facilities among Gondar city residents, Northwest Ethiopia, 2022 (n = 222).

Similarly, study participants who had good knowledge about MC were willing to pay 36.16 USD more than those who had poor MC knowledge, holding other variables constant, ( $\beta = 36.16$ , 95%CI:22.48, 49.83). The study indicated that having good knowledge increases WTP for MC in PHCF by 19.93USD from the mean WTP ( $dy/dx = 19.93$ , 95 % CI: 12.04, 27.81). Likewise, participants who had history of medical illness were willing to pay 16.64USD more than those participants who had no history of medical illness, holding other variables constant ( $\beta = 16.64$ , 95%CI: 0.49, 31.80). The marginal effect of this variable showed that having history of medical illness increases WTP for MC in private health care facility by 4.54USD from the mean WTP ( $dy/dx = 4.54$ , 95%CI: -4.80, 13.89).

It was also depicted that 1-km increment of distance from the health care facility, the participants' WTP increases by 1.98 USD, keeping the other variables constant, ( $\beta = 1.98$ , 95 % CI 0.37, 3.60). The marginal effect of this variable indicated that increasing distance by 1 km may increase the WTP for MC by 0.94USD from the mean ( $dy/dx = 0.94$ , 95%CI: -0.02, 1.90). Study participants who had a high wealth index (rich) were willing to pay 29.51USD more than those who had low wealth index (poor), holding other variables constant, ( $\beta = 29.51$ , 95%CI:14.38, 44.63). The study also indicated that having high health index (being rich) increases WTP for MC in PHCF by 17.61USD from the mean WTP ( $dy/dx = 17.61$ , 95 % CI: 8.76, 26.45) (Table 4).

## 6. Discussion and conclusions

The purpose of this research was to evaluate WTP for MC and its determinants since this evidence is important for designing a cost-recovery strategy that ensures self-sustaining and high-volume MC in PHCF. Although more than half of the study participants (53.6 %) were willing to pay something for MC, the average amount of money willing to pay for MC was 24.17USD which implied lower than the actual cost of MC in PHCF.

According to the proportion of WTP for MC in PHCF, this result was comparable with studies done in Debre Markos of Ethiopia (53.1 %) [32], Bugna district, Northwest Ethiopia (54.2 %) [19], Gemmachis District of Oromia, Southeast Ethiopia (49.5 %) [17] and Sierra Leone (51.9 %) [39]. This indicate that not much variation in MC had been observed recently. Contrary to this, the result obtained is greater than the studies conducted in Nepal (47.6 %) [40] Ghana [21], Burundi and Guinea Bissau [22]. Sample size variation and sampling technique (non-probability sampling) might be the source of the disparities.

However, this result was below the figures obtained in Hong Kong (78.3 %) [41], China (91 %) [42], Malaysia (75 %) [43] and Wolaita Sodo, Ethiopia (61.3 %) [25]. Both the Hong Kong and China studies involved patients with chronic medical illnesses attending hospitals and the bidding format was used for eliciting the WTP after setting the target prices based on the estimated market price and the target price was higher as compared to the present study. A difference in target price and research setup might be attributed to the disagreement. The studies done in Malaysia and Wolaita Sodo are Systematic reviews and institution based respectively which could cause discrepancies from study to study.

The average WTP was 24.17USD) (95%CI; 21.14, 28.40). This result was higher than other community-based studies conducted in India (6.5USD), Nepal (7 USD) Sierra Leone (8.5USD) and Northwest Ethiopia (9.52USD). This difference could be explained in a way that due to the study period variation, the effect of inflation and price change in medical supplies increased. As a result, the hypothetical price and bid format should be based on the current market price which in turn had a direct effect on the cost required at PHCF. Another reason for the discrepancy could be justified as there were sample size and sampling techniques (non-random) differences.

However, this result was lower than the studies done in Hong Kong (68.38USD) [41] and China (128USD) [44]. The above studies involved advanced diagnostic imaging and admission costs. The willingness study in Hong Kong includes home care services that potentially increase the hypothetical target price. Other institution-based studies in India [45] and Indonesia [46] among patients attending outpatient and inpatient departments had shown a higher value of WTP for MC. This may be due to payment scheme differences (India-private social health insurance). There were also studies about population and study time variations as the nature of the research was sensitive to time and population size. The bidding format used for eliciting the WTP was higher as compared to the present study.

Overall, this amount of money suggests that the WTP corresponds to the government subsidized price for MC at general and tertiary hospitals, but it was less than the present cost of MC in PHCF. Non-affordability (71.9 %), expensiveness (54.7 %), inappropriate care

**Table 3**  
Mean WTP per year for MC in PHCF, Northwest Ethiopia,2022 (n = 414).

Variables	Frequency	Mean WTP (95 CI%)
<b>Sex</b>		
Male	220	28.52 (24.61, 32.43)
Female	194	20.53 (17.27, 23.78)
<b>Age</b>		
<28 years	111	24.52 (21.04, 28.01)
29–35 years	114	22.49 (19.54, 25.44)
36–42 years	90	24.97 (20.86, 29.07)
>42years	99	27.50 (23.43, 31.57)
<b>Marital status(currently)</b>		
Married	255	26.77 (22.84, 30.69)
Single	139	22.99 (19.80, 26.18)
Divorced	12	14.77 (11.75, 17.78)
Widowed	10	10.99 (9.431, 12.56)
<b>Occupation</b>		
Government employee	150	21.85 (18.08, 25.62)
Student	64	39.61 (33.55, 45.68)
Housewife	63	14.38 (12.04, 16.71)
Merchant	50	28.92 (25.65, 32.20)
Daily worker	28	2.18 (1.76, 2.60)
Farmer	22	22.06 (19.54, 24.57)
Retired	9	4.92 (3.75, 6.09)
Others	28	52.89 (46.77, 59.02)
<b>Working state</b>		
Currently working	313	28.70 (24.07, 33.34)
Retired/unemployed	101	23.507 (20.26, 26.75)
<b>Family size</b>		
≤4	298	21.38 (18.30, 24.46)
>4	116	33.48 (28.80, 38.16)
<b>Awareness of MC</b>		
Yes	326	26.63 (22.86, 30.41)
No	88	17.88 (14.89, 20.86)
<b>Knowledge of MC</b>		
poor	221	34.87 (30.66, 39.08)
Good	193	15.95 (13.16, 18.73)
<b>History of known medical illness</b>		
No	322	25.27 (22.19, 28.34)
Yes	92	24.37 (20.34, 28.40)
<b>Rate of health status</b>		
Good	212	24.70 (20.55, 28.86)
Medium	122	22.25 (19.20, 25.30)
Poor	62	32.07 (28.97, 35.16)
Sever	18	17.50 (15.67, 19.34)
<b>Previous MC visit</b>		
No	230	25.27 (22.19, 28.34)
Yes	184	24.37 (20.34, 28.40)
<b>Family/friend history of MC</b>		
Yes	230	31.33 (27.32 35.34)
No	184	16.57 (13.64 19.49)
<b>No of private health facility visits(n=184)</b>		
<3	100	24.40 (21.59, 27.21)
≥3	84	26.30 (22.92, 29.69)
<b>Distance from PHF</b>		
<7 km	246	23.40 (20.13, 26.68)
≥7 km	168	26.77 (22.67, 30.88)
<b>Health insurance</b>		
No	234	25.12 (21.18, 29.07)
Yes	180	24.50 (21.11, 27.88)

(26.6 %) and disease conditions (14.1 %) were the main reasons cited to be unwilling to pay for MC in PHCF.

The study implicated that MC is now provided in both the public and private sectors via health insurance and out-of-pocket spendings. However, the prices of PHCF are rising continuously and becoming unaffordable for the majority of people. This may not lead to long-term financial sustainability for both the service supplier and the recipient. The study's findings imply that if the government or private sector intends to provide sustainable health care for all with domestic resources while increasing MC coverage and uptake, it is critical to develop an inclusive cost-recovery model and health promotion that can ensure service accessibility, reasonable and affordable prices, self-reliance, and equity. Ethiopian health care finance strategy proposes systematizing fee waiver systems, although such techniques have not yet been used to PHCF.

Moreover, there is a tendency to establish public-private partnerships and integrate most medical services at all health care levels.



**Table 4**

Maximum likelihood of tobit econometric analysis for determinants of WTP for MC among Gondar city residents, West Ethiopia, 2022 (n = 414) 192 participants were left censored, D-Dummy variable; N-numeric variable; R-reference category; \*significant with p-value 0.05 to 0.01, \*\* p-value 0.01 to 0.001, \*\*\*p-value <0.001.

Variables for MWTP	Category	Adjusted $\beta$ Coefficients	Standard error	t-value	p- value	95 % CI Lower, upper	Dy/dx (95 % CI)
Age	N	0.05	0.28	0.18	0.858	-0.514, 0.61	0.091 (-0.24, 0.42)
Male (R-female)	D	6.81	5.96	1.14	0.253	-4.90, 18.53	2.66 (-4.18, 9.51)
Married (R- currently not married)	D	14.49	7.12	2.03	<b>0.043</b>	<b>0.49, 28.49</b>	<b>6.84(-1.27, 14.97) *</b>
Formal Education (R-no formal education)	D	15.50	9.93	1.56	0.119	-4.02, 35.04	8.60 (-2.31, 19.51)
Still working (R- retired/unemployed)	D	19.66	7.54	2.61	<b>0.009</b>	<b>4.83, 34.49</b>	<b>11.24(2.47, 20.01) **</b>
Family size	N	4.72	1.88	2.51	0.510	1.62, 8.42	3.14 (0.97, 5.30)
Family/Friend history of MC	D	25.74	6.29	4.09	<b>0.000</b>	<b>13.36, 38.12</b>	<b>12.34(5.12, 19.55) ***</b>
Knowledge about MC(R-poor)	D	36.16	6.95	5.20	<b>0.000</b>	<b>22.48, 49.83</b>	<b>19.93(12.04, 27.81) ***</b>
Awareness about MC (R-No)	D	10.10	8.90	1.13	0.257	-7.40, 27.61	7.40 (-2.52, 17.33)
Previous medical examinations (R-No)	D	0.10	10.14	0.01	0.992	-19.83, 20.04	-3.74 (-15.68, 8.20)
Number of health care facility visit	N	-1.40	2.86	-0.49	0.624	-7.04, 4.23	-1.01 (-4.43, 2.39)
Systemic illness (R-No)	D	16.64	7.70	2.16	<b>0.031</b>	<b>1.49, 31.80</b>	<b>4.54(-4.80, 13.89) *</b>
Self-reported health rate (R-Good)	D	7.03	7.14	0.98	0.326	-7.02, 21.08	0.005 (-8.65, 8.66)
Medium Wealth index (R-poor)	D	11.47	7.85	1.46	0.145	-3.96, 26.92	9.37 (0.58, 18.17)
Rich Wealth index (R-poor)	D	29.51	7.69	3.84	<b>0.000</b>	<b>14.38, 44.63</b>	<b>17.61(8.76, 26.45) ***</b>
Having Health insurance (R-No)	D	2.27	6.27	0.36	0.718	-10.07, 14.6	3.09 (-4.08, 10.26)
Distance from health care facility	N	1.98	0.82	2.42	<b>0.016</b>	<b>0.37, 3.60</b>	<b>0.94(-0.02, 1.90) *</b>
Hospital health care facility (R-clinics)	D	10.76225	6.26	1.72	0.087	1.56, 23.08	2.42 (-4.72, 9.57)
<b>Constant</b>		-114.75	18.51	-6.20	0.000	-151.14, -78.36	
<b>/Sigma</b>		51.83	2.65			46.61, 57.06	

The Ethiopian government develop a working guideline to set a target price for medical services and this study also revealed a comparable level of WTP with the current MC prices in general and tertiary hospitals.

The study also noted that concerning the impact of working state on WTP that the participants in a state of still working were willing to pay 19.66USD more than the participants who were retired/unemployed. This result is supported by previous studies in rural Taiwan [2] and Ethiopia [7] but others concluded that WTP was not affected by the working state [47,48]. In fact, being employed can be related to greater productivity and it is a major means of generating income that can cover the medical cost. This implies that retired/unemployed persons would be a potential target for cost-recovery.

Married participants were willing to pay 14.49USD for MC more than those who are currently not married. This finding is in line with studies done in Malaysia and China [8,42]. This suggest that the marriage partner should give positive input for seeking MC. Moreover, married individuals could get additional financial sources from their marriage partner. However, studies also found that WTP for MC was not significantly affected by marital status in nations where the thoughts about marriage and resource ownership are different [3,13,49].

Participants who had family/friend medical history were willing to pay 25.74USD more than those who had no family/friend history of MC in PHCF. This finding was supported by other studies that were done across the world. Family history of morbidity and care can affect WTP for MC in PHCF(7). This may be explained in a way that persons with family or friend history of MC had better awareness and knowledge about it and become more willing for the care. From their close observation, participants could easily understand the complications and consequences of late coming and not seeking MC for some comorbid. Hence, they develop a higher tendency to receive early and timely intervention that increases their adherence to WTP for MC[50].

On the other perspective, the study also showed that participants who had good knowledge regarding MC were willing to pay 36.16USD more than the participants who had poor knowledge. Similarly, previous studies had reported that persons with good knowledge about MC were more willing to pay for the MC(51). Well-informed and knowledgeable individuals were early adopters of new services and care strategies. There were established temporal relationship between knowledge and practice in MC-seeking behavior so individual should tend to be willing to pay for the service they intend to receive [51]. This finding implies that increasing the knowledge of individuals had a positive effect on their WTP for MC in PHCF.

Regarding wealth index, Participants who had a high wealth index (rich) were willing to pay 29.51USD more than participants with low wealth index (poor) for MC in PHCF. This finding is in line with many other studies done in Malaysia [43], Burundi [21], Ghana [22] and Ethiopia [7]. The possible explanation for this relationship can be verified as when wealth increases, there is a high preference to attain better service and good quality. On the contrary, wealth is a major constraint for seeking better services, especially in the private sector. Individuals who do have a higher wealth index could easily be able to pay and willing to accept the bid with the best possible service in MC [52].

Participants who had history of medical illness were willing to pay 16.64USD more than those participants who had no history of medical illness. The finding agrees with previous studies done in different parts of the world [16,28,30,47,48]. The history of medical illness is the primary reason to visit health care facilities. Repeated visits and receiving MC boosts awareness and knowledge of MC that

puts positive influence on the WTP level [44,53].

The study also depicted that for every 1-km increment in distance from the health care facility, the participants' WTP increased by 1.98USD. The explanation might be that the direct and indirect economic burden due to the distance from the PHCF enforced service seekers to accept the available options of payment schemes [47,54]. This implies that repeated follow-up was unlikely as the distances increased from the health care facility and participants had a right tendency to be willing to the offered bids that allowed them to get the service. This promotes greater WTP and utilization of the service [47].

However, Participants' age, sex, educational status, family size, previous history of medical examination, number of health care facility visits, self-reported health rate, awareness, type of health care facility and health insurance were not significantly associated with WTP for MC. Similar as well as contradicting findings were reported by many previous studies [16,28,30,47,48].

The limitations of this study include relatively small sample size and the lack of diversity among participants. These factors may limit the generalizability of the findings to larger populations with more diverse characteristics. On the other hand, the application of the bidding eliciting approach with well-described scenario and drawing participants from different kebeles of the city is considered as a strength, it must be understood within the context of some hypothetically induced overestimation of willingness to pay. This study also did not consider enhancement packages for willingness to pay and willingness to pay was not tailored to the consumers' ability to pay for the services. It is also conceived that the findings would be augmented with qualitative research to capture the reasons for unwillingness to pay for medical care in private health facilities in detail. This explanation is included in the main manuscript at the end paragraph of the discussion section.

In conclusion, almost half of the study subjects were willing to pay for MC which was below the figures of previous studies. Willingness to pay for MC in PHCF among adults of Gondar city residents is much lower than the actual cost of the MC currently incurred.

Marital status, working state, family/friend a history of MC, knowledge about MC, having history of chronic medical illness, wealth index and distance from health care facility were determinants of WTP for MC. The major reasons for WTP were better service, low waiting time direct physician visit and confidentiality. On the contrary, non-affordability, expensiveness, inappropriate care, and disease condition were the main reasons for their unwillingness to pay for MC in PHCF.

The primary recommendation goes to policy makers and planners to design a system for private health sectors that can sustain the care program with available resources by covering high volume. It is also strategic to set affordable prices and initiate early intervention to develop a cost-recovery model. Like public health sectors, multi-tiered packages attributed to neediest people as in retired, less educated, severely ill and poor. Secondly, the researchers shall augment these findings with qualitative research to explore perceptions behind unwillingness to pay for medical care. It is better to design a study that considered WTP with affordable packages and tailored with the consumers' ability to pay for the services.

#### Data availability statement

The data associated with this study has not been deposited into a publicly available repository because the necessary data was included in article/supp. material/referenced in the article.

#### CRediT authorship contribution statement

**Gizachew Tilahun Belete:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Dr Yibeltal Walle:** Methodology, Software, Supervision, Visualization, Writing – review & editing.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2023.e21143>.

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