# Influence of previous experience and socioeconomic characteristics on willingness to pay for physiotherapy in Poland

Justyna Proniewicz[a]

**Abstract.** The healthcare system in many countries is characterised by the co-existence of public and private medical services. Patients' decisions regarding the purchase of private health services are made taking into account the trade-off between the price of a treatment and its quality and the waiting time. The aim of this study is to find out which factors impact the willingness to pay for health insurance or the willingness to pay for medical treatment. The study demonstrates that besides socio-demographic characteristics, some negative experiences (e.g. unavailable treatments, long waiting times, long journeys involved) and the experience of already having paid for treatments impact the willingness to pay. The results suggest that negative experiences are likely to cause a change in patients' habits.
**Keywords:** willingness to pay, preferences, rehabilitation, health care financing, public health insurance
**JEL:** D12, D91, I11, I13

## 1. Introduction

When stating what their willingness to pay for healthcare services is, people often have to trade off the quality of medical treatment and the time they need to wait to receive it against the price of the services. Another issue is that the quality of services is not fully known before the purchase. Also, not all health services are the same, nor can all of them be provided at the same time by the same provider. Therefore, patient's willingness to pay for the general healthcare services and for the access to a more specific type of treatment might not be the same. Physiotherapy is one of those health services that are usually needed urgently, due to pain or discomfort. Moreover, a single series of treatment is often not enough to fully recover. Lack of relatively quick access to physiotherapy may result in chronic ailments. At the same time, there is a general sentiment among physiotherapists in Poland that they are paid too little. They often prefer to work at private medical facilities where they are offered better salaries. Such decisions affect the availability of physiotherapy in public facilities. The whole situation poses a question about how much patients value the access to physiotherapy; in other words, are they willing to pay for physiotherapy treatment, and if yes, how much? These questions might not be easy to answer. Physiotherapy services are specific in many ways, and possibly some changes in the

[a] SGH Warsaw School of Economics, Collegium of Economic Analysis, Institute of Econometrics, Department of Support and Decision Analysis, ul. Madalińskiego 6/8, 02-513 Warszawa,
e-mail: jp53741@doktorant.sgh.waw.pl, ORCID: https://orcid.org/0000-0002-6241-7341.

scheme for financing them should be introduced. This study focuses only on physiotherapy (not any other type of healthcare services).

Recently the average waiting time for an appointment within the public healthcare system in Poland has significantly increased, which fuelled the demand for commercial healthcare services (Najwyższa Izba Kontroli [NIK], 2014). As it is only possible to assess the quality of such services after they have been bought and used, patients' opinions about previous medical treatments might influence their future decisions in this respect. My research shows the elements of the past experience which are likely to affect future health-related purchases. This kind of analysis provides a broad view on the willingness to pay for physiotherapy, influenced not only by patients' demographic characteristics, but also by their previous decisions and their outcomes. The analysis focuses mainly on two effects influencing or the willingness to pay for healthcare treatment the willingness to pay for health insurance: the income effect and the impact of past experience.

The effect of experience results from the overall knowledge an experienced patient has. As mentioned before, a person who has already received several physiotherapy treatments is likely to use his or her knowledge about their quality and effectiveness while making similar decisions in the future. Each treatment received gives some additional information, i.e. arouses either positive or negative emotions, involves spending either substantial sums of money or no costs, is smoothly delivered or there are some issues. Following the Bayesian Updating theorem (Viscusi, 1985), this additional information is likely to influence one's valuation of a medical service through the freshly-acquired knowledge about its quality.

A person who remembers the procedures necessary to receive physiotherapy treatment within the public healthcare system as problematic might be reluctant to try them again, and might decide to try commercial physiotherapy services instead. There might be a few types of problems on the way to getting a physiotherapy treatment. Some treatments might be unavailable in the closest healthcare facility (lack of equipment or trained personnel), long waiting time might be involved, or a patient would need to travel far to receive services of a sufficiently high quality. Another factor here is that patients' habits might be difficult to change. For example, if somebody got accustomed to paying for physiotherapy, there is a chance he or she will continue paying in the future. A patient who knows the current treatment prices and is aware what quality and outcomes of this kind of treatment he or she might expect is likely to value future treatments higher than an unexperienced patient. A reverse situation might be expected in the case of patients who are used to receiving physiotherapy treatments through the public healthcare system, namely they are likely not to be willing to pay for such treatments (having been used to receiving them for free).

To measure the effect of experience, the analysis of the influence of the physiotherapy type received most recently on the willingness to pay was performed. This kind of analysis was necessitated by the fact that there are various types of physiotherapy treatments delivered and priced differently. Some kinds of physiotherapy are meant to reduce pain or discomfort. Some are offered rarely because they require highly specialised personnel or special equipment. Some are only partly financed by the National Health Fund (Pol. Narodowy Fundusz Zdrowia – NFZ) due to their high price. All the above shows that the patient's overall experience related to physiotherapy might be influenced by the type of treatment. The study deals with three main kinds of physiotherapy: kinesitherapy, physical therapy and massage.

The effect of past experience is definitely worth considering and testing, especially in the context of the Polish healthcare system. Scarce publications focus thoroughly on its aspects. But it is equally worthwhile to measure the impact of the number of treatments received (separately within the public and the private healthcare systems) on the patients' willingness to pay for physiotherapy treatment. In this study, I tried to address all the above-mentioned areas related to one's experience with healthcare services, namely: previous habits and preferences (e.g. private or public healthcare), needs in the past (number of treatments already received), kinds of physiotherapy treatments received (price range of treatments), problems encountered (e.g. long waiting time, unavailability of necessary treatments), and the effects of the treatment received (any improvements in the health state after the treatment).

The innovativeness of this study lies also in the fact that it analyses the degree of satisfaction with treatments either purchased in separate treatment series (usually around ten physiotherapy sessions in a series) or through a subscription allowing the use of physiotherapy (without any additional costs) for a year. In this second option, respondents were informed that the yearly subscription would enable them to use physiotherapy treatment as needed, anywhere in Poland, in quantity and form as prescribed to them. So another objective of this work is to check whether it is the same or a different set of determinants that impacts patients' willingness to pay for a series of treatments and their willingness to pay for a subscription. Following Exworthy and Peckham (2006), I expected that respondents would be willing to pay for the treatment and there would be relatively few answers expressing unwillingness to pay, i.e. 'protest answers'.

As experience is the key area studied in this work, the research sample consisted only of those individuals who received physiotherapy treatment at least once. Due to frequent injuries in sports, sportspeople often resort to physiotherapy, so a part of the respondents were selected from among the students and employees of a Warsaw-based sports college. Other respondents were recruited from among the students and

employees of one of medical colleges, as the author also needed answers from people familiar with patient care. The academic and professional knowledge of students and employees of these schools enabled the author to receive answers unbiased by media or trends.

Two methods were used to capture the relationships between the studied attributes and the willingness to pay: Welch's ANOVA test together with Games-Howell post-hoc test for the assessment of correlation, and the Bayesian network for the evaluation of causation between variables. The use of these two methods allowed a broad problem analysis and a better understanding of the influence of the respondents' characteristics and experience on their valuation. The author firstly checked whether the mean willingness to pay was different among groups divided by the attribute level, and secondly, assessed the force and direction of the influence.

## 2. Willingness to pay for healthcare

Most Polish citizens are entitled to the public healthcare financed by the government from taxes and contributions paid by each employed individual. However, as mentioned before, the public healthcare system has several shortcomings. One of them is long waiting time for appointments. Long queues for treatments are commonplace, which effectively forces some patients to use commercial healthcare services (especially when their health state makes it impossible for them to wait long, or when they are dissatisfied with the quality of public medical services). In Poland, the public healthcare system is coordinated by the already-mentioned National Health Fund (NFZ). Each month employed citizens pay the health insurance premium, thanks to which they can use health services in all the NFZ's medical facilities, but the waiting times, as indicated before, are long and still increasing. This applies especially to physiotherapy (please refer to the analyses of Agencja Oceny Technologii Medycznych i Taryfikacji, 2018). In 2015, the average waiting time for admission to a rehabilitation ward was 37 days for urgent cases and 347 days for not urgent ones. In 2018, the waiting periods increased to 51 and 464 days, respectively. For this reason, some people choose services offered by private medical centres, where they can receive medical help faster. Exworthy and Peckham (2006) demonstrated that patients are willing to pay more and travel further in order to reduce to the largest possible extent the waiting time for medical treatment. Needless to say, the fact that some patients are effectively forced to either pay for treatments or to wait for them for a long time negatively affects their assessment of the public healthcare system (Łosiewicz and Ryłko-Kurpiewska, 2015).

Patients' valuation of the access to the healthcare system provides information that might be useful in planning an extension of or changes in the range of medical

services or prices of the services offered by a medical services provider. It also helps medical services providers meet customers' needs and expectations more accurately.

Healthcare products and services differ from other products and services analysed by economists (Arrow, 1963). The demand for healthcare is not constant and is therefore difficult to predict. What is also difficult to foresee is the quality of healthcare services, so the decision to use them requires some degree of trust between the patient and the provider of the service. Additionally, the recovery process is as unpredictable as the illness itself, and moreover one cannot test healthcare services before purchasing them. The above-mentioned aspects matter when the profitability of specialised healthcare services and the allocation of resources (often scarce) within a particular (public or private) system are considered.

One of the indicators of a patient's assessment of medical services is the willingness to pay (WTP) value. This value represents the maximum price a person is ready to pay for a good that currently is not in his or her possession (Horowitz & McConnell, 2003). The willingness to pay is related to another value called the willingness to accept (WTA), which represents a minimum price a person is ready to accept to sell or give up a good which is currently in his or her possession. The willingness to pay and the willingness to accept usually differ from each other in such a way that the WTP is often smaller than the WTA. Horowitz and McConnell (2002) and O'Brien et al. (2002) showed in their research related to health that such difference might be even sevenfold. Horowitz and McConnell (2002) moreover noticed that a bigger difference is related to non-market and public goods (e.g. healthcare) than to typical market goods or money.

The concept of the willingness to accept might be difficult to understand for patients. For example, if a person has a medical treatment scheduled that would significantly improve his or her health and quality of life, it would be strange to ask this person about a price he or she is willing to accept to give it up to somebody else. Even if the patient is ready to provide such a valuation, it might not be the value we expected. Due to such issues, the value of the willingness to pay is used more often in studies related to health.

The WTP is usually calculated by the contingent valuation method or discrete choice experiments. The first of these methods uses a set of questions about the maximum amount the respondent is willing to pay for a specific good under defined conditions – for example, to start treatment for a given illness (Bayoumi, 2004). This yields a monetary value directly and allows the generalisation regarding different health states and levels of risk. However, the method is prone to many bias--inducing effects. In an ideal world, the answers should correspond very closely to

the values of the willingness to pay and the willingness to accept from a real-life situation, but usually they do not. The most effective test would be to compare values received in research with amounts paid or accepted by respondents on the market. Such tests are generally rare, but their results show differences between those values. These differences are often moderate in scale (Johannesson et al., 1999). It is also possible to compare respondents' valuation of healthcare services with their characteristics; for example, whether somebody's willingness to pay does not exceed his or her budget.

The second method, the discrete choice experiment, is based on a set of choices between defined and statistically independent pairs of scenarios (Ryan & Gerard, 2003). Each respondent's choice represents his or her utility from a given choice, based on the presented levels of the used variables. Such methodology allows the assessment of compromises between the levels of variables, but requires defining assumptions regarding the shape of the utility function. It is possible to calculate the monetary value using a cost function. The valuation of additional costs and the health insurance pricing usually uses this method (Ryan, 2004).

Many biases and effects influence consumers' willingness to pay (Brown & Gregory, 1999), e.g. the endowment effect, the income effect, the lack of substitutes and the lack of experience. We talk about the endowment effect when an individual values a good higher if he or she owns it or owned it in the past. The income effect, on the other hand, puts a limit (related to the respondent's salary) on the price one can pay for a given good. Lack of easy access or highly priced substitutes increases the valuation. Negative experiences might affect the valuation to such an extent that in some cases they even override the endowment effect.

Respondents' demographic characteristics also influence their willingness to pay for healthcare. Aizuddin et al. (2012) showed a significant relationship between the willingness to pay for healthcare services and the respondents' age, level of education, income, rural/urban place of residence, household size, and the quality of available healthcare services. Statistics from Poland (NIK, 2014) showed that the waiting time for starting physiotherapy in this country varied across regions, which indicates that respondents' place of residence influences the waiting times for this kind of services. Gonen and Bokek-Cohen (2018) demonstrated that emotions related to medical treatment influence patients' valuation of similar procedures. Also, socio-economic status and the level of satisfaction with previous physiotherapy treatments proved to be correlated with patients' willingness to pay for future treatments (Fatoye et al., 2020).

## 3. Methods

### 3.1. Design

The research was based on the author's custom survey form. Respondents were not paid for their participation in the study. The survey had a theoretical character, as the evaluated public good was not provided to participants following the end of the experiment. The responses were collected individually and were not shared.

The survey form consisted of three open-ended and 17 close-ended questions, of which four were related to the experience with physiotherapy treatment, seven to the willingness to pay for physiotherapy, and nine to patient's demographic characteristics. Open-ended questions, regarding the willingness to pay for a series of physiotherapy treatments and the willingness to pay for a yearly subscription (that would allow the use of physiotherapy when needed) were presented as short scenarios in which respondents were asked to imagine that they did not have access to physiotherapy within the public healthcare. They were asked about the amount they would pay for (a) one series of treatments, or (b) a yearly subscription enabling them to use physiotherapy treatment without limits (a and b options as separate valuation questions). They could use the evaluated good in any healthcare facility in Poland. The price for the evaluated service would have to be paid in advance, before its consumption. The 'I do not want to pay' option was also provided, in order to avoid the protest effect.

The respondents were told that their answers regarding the evaluation of healthcare services would help recognise the necessary changes in the Polish healthcare system as well as improve the quality of services. Respondents were also informed that the aim of the study was to find both the areas where the Polish healthcare system needed improvements, and those which were worth preserving (as functioning well). Figure 1 presents variables from the survey and their definitions. Most of the outcomes were nominal.

**Figure 1.** Three sets of variables used in the study

| Name | Meaning |
|---|---|
| Variables related to experience with physiotherapy | |
| Treatment Type | Dominating type of the respondent's last physiotherapy (physical therapy, kinesitherapy or massage) |
| Improved Health | Any health improvement as a result of the last physiotherapy treatment/series |
| Difficulties | Any problems with receiving physiotherapy treatment (e.g. long waiting time, faraway travels) |
| Treatment Range | Respondent's opinion about the range of treatments available at his/her place of residence (very broad, sufficient or poor) |

**Figure 1.** Three sets of variables used in the study (cont.)

| Name | Meaning |
|---|---|
| **Variables related to the willingness to pay for physiotherapy** | |
| WTP Treatment / WTP Subscription | Respondent's WTP for a series of physiotherapy treatments / for a subscription for physiotherapy treatments |
| Tax Deduction | Respondent's deduction of physiotherapy costs from taxes |
| Max Distance | Maximum distance that the respondent is willing to travel to receive physiotherapy |
| Freq NFZ / Private | Number of treatments financed by the NFZ/by the respondent receivied within the last 10 years |
| Lst Pymt Scheme | Way of financing the respondent's last physiotherapy (by NFZ or privately) |
| **Variables related to demographic characteristics** | |
| Population | Population of the respondent's place of residence |
| Salary | Respondent's salary |
| Phys Family | Respondent's family member/s who also used physiotherapy |
| Age | Respondent's age |
| Sex | Respondent's sex |
| Residence | Respondent's place of residence (urban or rural area) |
| Education | Respondent's education level (secondary or higher) |
| Type Work | Type of work performed by the respondent (mental, physical or mental-physical) |
| Work Exp | Respondent's work experience |

Source: author's work.

## 3.2. Procedure

Data received from the survey was analysed by means of two methods: Welch's ANOVA test and the Games-Howell post-hoc test for the assessment of correlation, and the Bayesian network for the evaluation of causation between variables.

Fisher's analysis of variance (ANOVA) is based on the $F$-test. It determines whether there are statistically significant differences between the means of the analysed groups. If the equal variance assumption within groups is violated, it is possible to use Welch's ANOVA test (Delacre et al., 2019), which is insensitive to unequal variances. Combinations of groups created on the basis of the socio-economic and demographic characteristics can be compared with each other by means of the Games-Howell post-hoc test. Although having a similar form to Tukey's test, the Games-Howell test does not assume equal variances and sample sizes (Lee & Lee, 2018; Shingala & Rajyaguru, 2015). It was designed on the basis of Welch's degrees of freedom correction using Tukey's studentized range distribution. The test employs different pooled variances for each pair instead of the same pooled variance. As variances in this study are heterogeneous, this test was used to compare the average values of the willingness to pay between groups.

The impact of the experience on the willingness to pay was assessed by means of the Bayesian network. This kind of a model consists of three main elements (Stephenson, 2000):

- $V$ – set of variables;
- $A$ – set of directed arcs between variables; together with $V$ creates a graphical structure $G = (V, A)$;
- $P$ – set of conditional probabilities of all variables given their respective parents, where $P = (v|\pi_y): v \in V$, and $\pi_y$ is a set of parents of $v$.

Variables and arcs together form a directed acyclic graph (DAG), where all edges need to be directed, and no cycles are allowed. Directed edges indicate which variables influence the given variable. Firstly, the network structure needs to be learnt on the basis of constraint-based or score-based algorithms. After having learnt the structure of the network, the parameters of the local distribution functions are estimated. Each variable has its conditional probability table calculated on the basis of all the configurations of the values of the parents of the variable. Bayesian networks provide a powerful tool to visualise probabilities of given scenarios and review relationships between variables found in the data. For the above reasons, I used a similar model to assess the influence of experience on the willingness to pay.

## 3.3. Subjects

The survey was conducted on a group of 121 respondents who received physiotherapy treatment at least once. They were selected from amongst the employees and students of the Radom University and the Education in Sport University, both from their undergraduate and graduate programs and the 'Third Age University' (where academic classes are offered to older people). The research was carried out in February and March 2020, and the responses collected upon the respondents' oral consent for the participation in the study. All the information obtained was processed and stored anonymously, meeting the data confidentiality requirements as foreseen by Polish law.

The dominating demographic characteristics of the questioned individuals were:
- sex – female (64%);
- age – 18-25 year-olds (43%);
- place of residence – urban (90%);
- population of the place of residence – more than 500 thousand (33%);
- type of job – white collar (71%);
- years spent in education – 12 (68%);
- salary – over PLN 4,000 (55%);
- years of professional experience – 0–10 (62%).

There was a small percentage of 'protest answers' – only 10% for both the willingness to pay for treatment series and the willingness to pay for physiotherapy subscription. The figures provided by the respondents as the valuation of treatment

series ranged between PLN 50-250 with a maximum of PLN 600 and the median at PLN 80. Valuations for a yearly subscription were spread wider through the scale, with a maximum of PLN 930 and a median at PLN 400 (Figure 2 and Table 1).

**Figure 2.** Respondents' WTP for treatment series and their WTP for subscription
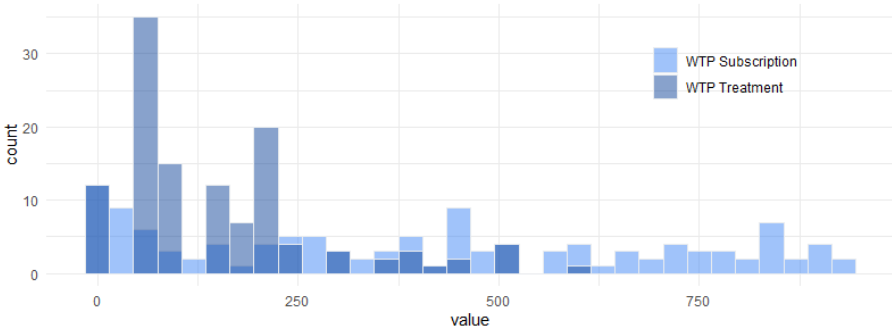


Source: author's calculations based on data collected in Feb-March 2020.

**Table 1.** Minimum, median, mean and maximum values of the WTP for a treatment series and the WTP for subscription

|  | Min | Median | Mean | Max |
|---|---|---|---|---|
| WTP Treatment ..................................................... | 0 | 80 | 149.8 | 600 |
| WTP Subscription ................................................ | 0 | 400 | 397.2 | 930 |

Source: author's calculations based on data collected in Feb-March 2020.

## 4. Results

Experiences related to physiotherapy were proven impactful on the willingness to pay for a treatment series or subscription. More specifically, such effect was observed for variables representing difficulties encountered in arranging treatment and the frequency of the past use of either public or private healthcare services. Opinions about the range of treatments offered in local facilities also impacted the maximum distance an individual was ready to travel to receive treatment. The income effect was observed as well.

### 4.1. Correlations

As expected, experiences such as having already paid for treatments or having encountered problems with receiving physiotherapy were correlated with the treatment valuation. What came as a surprise, though, was that the salary factor was correlated only with the valuation of the treatment series, not the valuation of the

physiotherapy subscription. Significant correlation of the dominating type of the last physiotherapy treatment with the WTP for physiotherapy subscription was observed, but the same did not hold for the WTP for treatment series. However, the above was expected, and could be explained by the fact that different kinds of physiotherapy are differently priced. Besides the respondent's salary, the WTP for treatment series was correlated with his or her age and place of residence. The WTP for a yearly subscription, on the other hand, was correlated only with having a family member who used physiotherapy, and with the population of the respondent's place of residence.

Figure 3(A) shows that respondents valued physiotherapy more when they did not have much experience with treatments financed by the NFZ, they encountered some problems while trying to receive it through the public healthcare system, or their health improved after the last physiotherapy treatment. As regards the WTP for the subscription for physiotherapy, the correlation is not visible at first sight (Figure 3B). Slightly higher valuations were received from respondents who both experienced problems while arranging/using physiotherapy within the public healthcare system, and whose health improved after the last treatment. The number of treatments financed by the NFZ turned out to be of no significance.

**Figure 3.** WTP for treatment series (A) and WTP for subscription (B) with and without problems encountered in the past
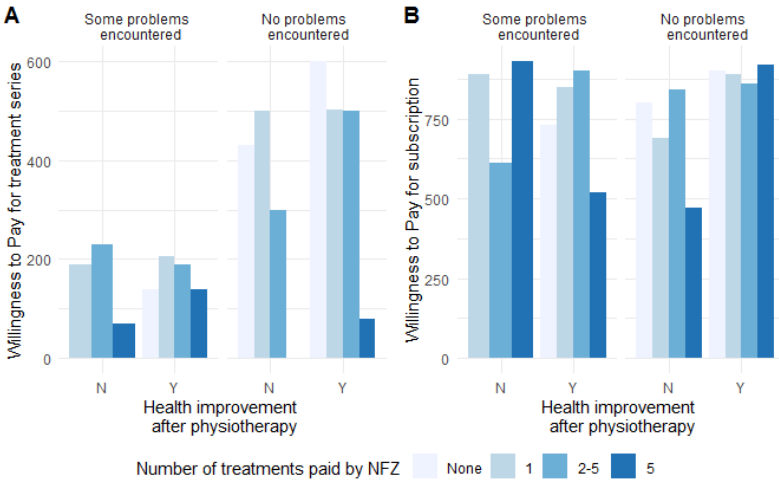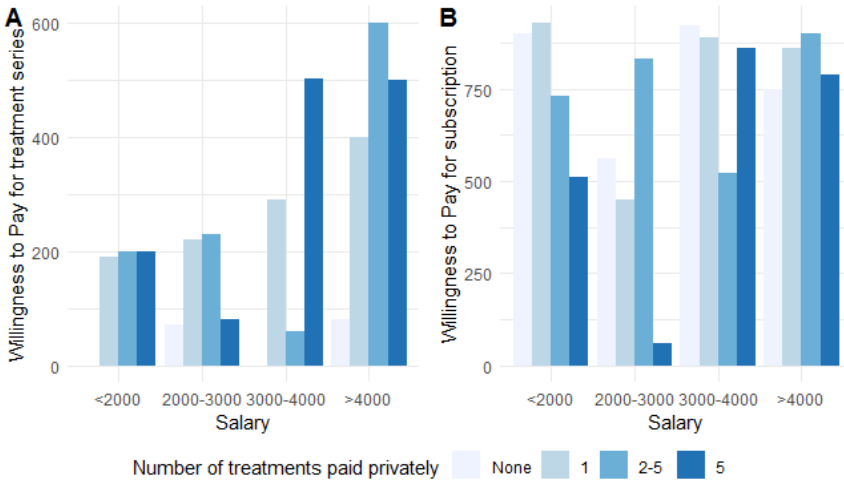


Source: author's calculations based on data collected in Feb-March 2020.

What could be observed and was expected was the fact that the WTP increased along with growing salaries. Figure 4(A) moreover demonstrates that another

treatment series was valued higher by respondents who already paid for physio-therapy in the past. However, when it comes to the WTP for physiotherapy subscription, salary level and previous experiences with private physiotherapy made only a slight difference, as demonstrated in Figure 4(B).

**Figure 4.** WTP for treatment series (A) and WTP for subscription (B) as dependent on salary and experience in paying for physiotherapy



Source: author's calculations based on data collected in Feb-March 2020.

Table 2 presents the results of Welch's one-way ANOVA tests. Due to its large size, Table 3 with results of the Games-Howell test was placed in the Appendix. Table 3 features statistically significant results only. The average WTP for treatment series was significantly higher in the case of respondents who had never used physio-therapy within the public healthcare system than in the case of both the regular and occasional users of the NFZ-provided physiotherapy. The average valuation was also higher when the number of physiotherapy treatments paid by the patient was larger than 0. This suggests that broader experience with commercial physiotherapy makes patients more prepared to pay for such services. By the same token, a lack of or relatively modest experience with the NFZ-financed physiotherapy proved related to a higher mean valuation. Average valuations were also higher when individuals encountered problems with receiving physiotherapy through the public system, which probably results from the belief that it is easier to receive physiotherapy treatment within the private healthcare system, and that medical personnel are generally more patient-friendly there.

Only a few age and salary groups differed significantly from each other as regards the WTP for treatment series. This is in line with the common expectation that people earning more will be prepared to pay more for medical treatment. Also patients in older age groups, close to the pension age, are believed more likely to spend larger amounts on their health than individuals from younger age groups.

When it comes to the WTP for a yearly subscription, significantly different averages were observed only between a few groups. Patients using mainly massage during their most recent physiotherapy treatment granted lower valuation to the subscription than those using kinesitherapy. As each physiotherapy type is priced differently and is prescribed for specific needs, it is expected that people's valuation will depend on the type of treatment. What came as a surprise, though, was that the average valuation of a subscription was lower in the group of respondents who used commercially-provided physiotherapy relatively often, i.e. more than five times in the last 10 years, than in the group of people who used it moderately often (two to five times in the last 10 years).

Respondents whose parents or spouses used physiotherapy services granted higher average valuations to a yearly subscription than those whose other family members used it. This difference suggests that people were ready to pay more when someone relatively close to them was using physiotherapy, so they were taking into account a close persons' experience. There was also a significant difference between the averages of groups of respondents coming from areas with the relatively smallest and the relatively largest populations, which indicates that residents of large urban areas are accustomed to higher prices and greater spending.

**Table 2.** Welch's ANOVA test results (only variables with significant differences in groups)

| | | F | p-value |
|---|---|---|---|
| WTP Treatment ...................................... | Freq NFZ | 25.145 | 5.496e-10*** |
| | Freq Private | 27.366 | 1.006e-10*** |
| | Difficult Receive | 43.037 | 2.24e-09*** |
| | Salary | 9.583 | 9.01e-05*** |
| | Age | 5.119 | 0.003** |
| | Residence | 4.999 | 0.028* |
| WTP Subscription ................................. | Treatment Type | 5.030 | 0.009** |
| | Freq Private | 3.573 | 0.022* |
| | Difficult Receive | 4.616 | 0.034* |
| | Phys Family | 11.362 | 5.064e-06** |
| | Population | 8.689 | 7.575e-05** |

Note. * $p<0.05$; ** $p<0.01$; *** $p<0.001$.
Source: author's calculations based on data collected in Feb-March 2020.

## 4.2. Causation

The Bayesian network was used to assess the influence of respondents' demographic characteristics and past experiences with physiotherapy on the WTP for a treatment series. In the diagram, the nodes representing the two WTP variables were marked in red (Figure 5).

**Figure 5.** The Bayesian network and relationships between variables used
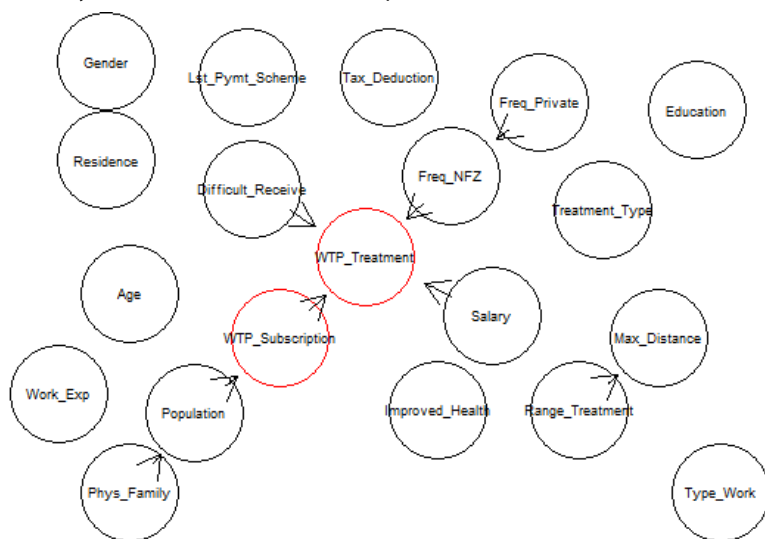


Source: author's work based on data collected in Feb-March 2020.

As expected, the salary level, previous experience of difficulties in arranging or using physiotherapy, and experiences with physiotherapy within the public healthcare system influenced the WTP for a treatment series. Experience related to paying for treatment also influenced this indicator, but indirectly, i.e. it impacted the number of the NFZ-financed treatments that respondents used, which, in turn, affected the WTP. An interesting relationship was also observed between the two analysed variables (the WTP for a yearly subscription and the WTP for treatment series), where the former affected the latter. The WTP for a yearly subscription was directly affected by the size of the population of the respondent's place of residence, and indirectly by the prior experience with physiotherapy treatment of the respondent's close family member. Another relationship was found between the respondent's opinion about the range of treatments offered in local medical facilities and the maximum distance he or she was willing to travel to receive treatment.

Tables 4 and 5 present conditional probabilities for nodes representing the WTP for a physiotherapy subscription and the WTP for treatment series, respectively. Due to the tables' large sizes, the author placed both of them in the Appendix.

Conditional probabilities suggest that people living in highly-populated areas (with more than 500,000 inhabitants) are likely to value the yearly access (subscription) to physiotherapy treatment higher (are willing to spend PLN 660–930 on such a subscription) than people from places with smaller populations. The latter, i.e. people coming from places with populations up to 10,000 inhabitants and between 10,000 and 50,000 inhabitants, are willing to pay considerably smaller amounts, i.e. the maximum of PLN 120 and PLN 120–400, respectively.

In the case of some respondents, the quoted value of the WTP for physiotherapy subscription increased the probability of indicating concrete values for the WTP for physiotherapy series. For example, the WTP for a physiotherapy subscription in the range of (660,930] was related to a high probability (~0.42) of the WTP for treatment series valuation between PLN 60–80. Low values of the WTP for a physiotherapy subscription [0,120], on the other hand, were associated with a high probability (~0.32) of a relatively high valuation of treatment series (80,200].

The income effect was visible in the valuation of the physiotherapy treatment series. There was a noticeable probability (~0.34) that people with high earnings (between PLN 3,000 and PLN 4,000 per month) will quote the highest prices (between PLN 200 and PLN 600). Patients with lower salaries (less than PLN 2,000) were more likely (~0.51) to value the a physiotherapy treatment series at the maximum of PLN 60.

The effect of previous experience was also noticeable. Patients who encountered problems with getting physiotherapy treatment in the past (as mentioned before, e.g. certain types of treatment unavailable, long waiting times, long journeys involved) were more likely to value the access to treatment series higher. Approximately 33% of them were prepared for a price within the range of PLN 80–200, and about 32% for a price within the range of PLN 200–600.

Patients who often used physiotherapy financed by the NFZ were on the other hand more likely (~0.3) to declare lower values of the WTP for a treatment series (a maximum of PLN 60). Those who never used physiotherapy provided within the public healthcare system would probably (~0.31) declare higher values (PLN 80–200). Similarly, there was a high probability (~0.29) that patients who often paid for physiotherapy in the past would be willing to pay between PLN 80 and PLN 200 for the next treatment series. Those who did not have any experience with paid treatment would probably (~0.3%) state a minimal price of PLN 60.

Those respondents who have never had any problems with receiving physiotherapy, who often used treatment paid by the NFZ, or whose salaries are relatively low, would probably declare the WTP for treatment series between 0 and PLN 60. Those who had difficulties in getting access to physiotherapy in the past, who have never used treatment financed by NFZ, or whose salary is in the highest income range, would probably value physiotherapy treatment within the price range of PLN 200–600.

A few variables correlated with the WTP were not affecting the valuation. The WTP for treatment series was correlated with the respondents' age and place of residence, but those variables were not found impactful. Also, the dominant treatment type of the most recent physiotherapy, the frequency of receiving private treatments, and difficulties with arranging or using physiotherapy were correlated with the WTP for subscription, but did not impact its valuation.

## 5. Conclusions

While planning changes in the prices of treatments, it would be useful for owners and managers of medical facilities to accurately predict patients' behaviour and decisions. Due to the fact that healthcare services are not typical services, it is not easy to understand how clients value particular medical treatments. A 'willingness to pay' indicator proves helpful here, as it allows a better understanding of customers' needs and expectations. Depending on the chosen method, the values of this indicator might be calculated directly (by asking respondents about the maximum price they would be prepared to pay for a good they do not have) or indirectly (by inferring these values from respondents' decisions between a set of scenarios). In this research, only two determinants were chosen for the analysis of the willingness to pay, namely the income effect, related to respondents' salaries, and the effect of experience, shaped by respondents' memories of past treatments and the emotions connected with them which might affect the willingness to pay for similar goods in the future.

This research has shown that sociodemographic characteristics of patients and their previous experiences impact the willingness to pay for physiotherapy. As expected, the willingness to pay for a treatment series depended on the salary level, the experiences with using physiotherapy (especially within the public healthcare system, but not only), and the potential problems encountered while receiving physiotherapy. What turned out against expectations, though, was the dependence of the willingness to pay on the size of the population of respondents' place of residence and, indirectly, on whether respondents' close family members also used physiotherapy. It was expected that the salary level and treatment type would impact

the value a person was prepared to pay for the subscription to physiotherapy, often more expensive than a single treatment series, but overall likely to prove cheaper (when costly treatments are necessary). On the other hand, the lack of dependence between the type of treatment received in the most recent physiotherapy series and the willingness to pay for another treatment series might result from patients' uncertainty about the potential future health issues and treatments needed. Another unexpected outcome of this study was the lack of correlation between the observed improvement in the patient's health state after the most recent physiotherapy treatment and his or her willingness to pay. However, this inconsistency could be explained by patients' uncertainty regarding the effects and the quality of potential future treatments (the already-mentioned unpredicatability related to health problems and recovery).

The study also brought to light an interesting relationship between the valuations of the two analysed goods. The willingness to pay for a treatment series turned out to be dependent on the willingness to pay for a yearly subscription. Although this relationship was not completely linear at some levels of the rest of the parent nodes, it nevertheless strengthened the effect.

The healthcare system in Poland and the patients' attitudes towards paying for medical services are specific, as demonstrated by other researchers as well. Pajewska-Kwaśny (2016) showed that even though the public healthcare system is not working optimally, and the range of services offered is relatively narrow and not of the best quality, patients in Poland are reluctant to buy additional healthcare insurance. Aspects influencing the exact valuation of healthcare services were studied in a similar way as in this work.

Bielawska and Lyskawa (2021) demonstrated that age, years in education and the size of the population of the place of residence all influence the willingness to pay for medical services (in my research, only the size of the population of the place of residence proved significant). Dror et al. (2007) showed the correlation between the willingness to pay for health insurance and the respondents' salaries and the education level. Salary was also found the key determinant of the willingness to pay for internal preferences concerning multiple health statuses presented (Javan-Noughabi et al., 2017). Nielsen et al. (2003) demonstrated that socio-demographic characteristics like respondents' sex, education, place of residence and age significantly influence their willingness to pay for health services, so in other words, their willingness to pay for the reduction of the future health risk. Research conducted on the basis of data from the Social Diagnosis' databases moreover showed that income and previous medical expenses might influence patients' willingness to pay for healthcare services (Jewczak, 2014). Żółtaszek (2012) presented similar observations to the results of my study, namely that the willingness to pay

grows along with increasing income and experience with private medical services or insurance. Similarly Dudziński (2019) – proved that the effectiveness of the public healthcare system might influence the willingness to pay for healthcare services.

Like my research, other studies as well show that emotions – either by themselves or in interaction with other variables – cause changes in the willingness to pay, not only for health services but also for other goods (Silva et al., 2019). Bigné et al. (2008) showed that satisfaction both impacts customers' loyalty and increases their willingness to pay for a service. Most of my respondents were willing to pay at least a small amount for an improved access to physiotherapy, even though the valuation questions were open-ended. Some other analyses showed that patients in Poland declare unwillingness to pay for healthcare services if the question regards solely their general inclination (Magda & Szczygielski, 2012). The willingness to pay grows significantly when a specific price per visit is mentioned. Unlike this study, Markiewicz (2021) showed that sociodemographic characteristics are not always influencing patients' willingness to pay for healthcare-related treatments. It might turn out in the course of further research that only health improvements plausible 'here and now' influence the valuation.

The aim of this research has been fulfilled. However, some limitations occurred that might be addressed in the future. What is worth consideration in this context is the use of a more precise tool to define respondent's previous, current, and possible future health states, for example the EuroQol-5D (EQ-5D) scale (Brooks et al., 2003) or the Quality-Adjusted Life Years (QALY) (Haninger & Hammitt, 2006). The emotion-related aspects of patients' choices might also be studied in more detail by enabling respondents to comprehensively describe their experiences and feelings related to the analysed good. Another possible development of this study could involve the comparison of two groups of respondents: those who used physiotherapy treatment in the past and those who did not.

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## Appendix

**Table 3.** Games-Howell post hoc test results

| Variable | Group 1 | Group 2 | Estimate | Conf.low | Conf.high | p. adj. |
|---|---|---|---|---|---|---|
| | | | WTP Treatment | | | |
| Freq NFZ | 1 | >5 | −144. | −213.0 | −74.3 | 1.2e-05*** |
| | 2–5 | >5 | −98.7 | −144.0 | −53.1 | 2.29e-06*** |
| | 2–5 | None | 110.0 | 1.73 | 218.0 | 0.046* |
| | >5 | None | 209.0 | 104.0 | 313.0 | 11.3e-05*** |
| | 1 | >5 | 102 | 6.78 | 197.0 | 0.032* |
| Freq Private | 1 | None | −111.0 | −155.0 | −66.5 | 1.95e-07*** |
| | 2–5 | None | −147.0 | −217.0 | −76.9 | 8.07e-06*** |
| | >5 | None | −213.0 | −306.0 | −119.0 | 7.27e-06*** |
| Diff. Receive | N | Y | 127.0 | 88.6 | 165. | 2.24e-9*** |
| Salary | <2000 | >4000 | 117.0 | 54.4 | 180.0 | 3.73e-5*** |
| | <2000 | 3000–4000 | 160.0 | 13.4 | 306.0 | 0.031* |
| | >4000 | 2000–3000 | −73.0 | −133.0 | −12.7 | 0.011* |
| Age | 26–35 | 36–45 | 61.9 | −40.8 | 165.0 | 0.415* |
| Residence | City | Village | −49.7 | −94.0 | −5.44 | 0.028* |
| | | | WTP Subscription | | | |
| Treatment Type | Kinesitherapy | Massage | −237.0 | −418.0 | −57.0 | 0.007** |
| Freq Private | 2–5 | >5 | −215.0 | −403.0 | −27.6 | 0.019* |
| Diff. Receive | N | Y | 122. | 9.28 | 234. | 0.034* |
| | None | Other | −321.0 | −551.0 | −91.0 | 0.003** |
| Phys Family | Other | Parent | 428.0 | 206.0 | 650.0 | 7.81e-5*** |
| | Other | Spouse | 344.0 | 157.0 | 530.0 | 2.05e-4*** |
| Population | 10 | 10–50 | 74.0 | −123.0 | 271.0 | 0.820** |
| | 10 | 101–500 | 262.0 | 50.2 | 474.0 | 0.009*** |
| | 10–50 | >500 | 283.0 | 82.5 | 484.0 | 0.002** |

Note. * p<0.05; ** p<0.01; *** p<0.001.

Source: author's work based on data collected in Feb-March 2020.

**Table 4.** Conditional probability table for the willingness to pay for a yearly subscription node

| WTP Subscription | Population (in thousands) | | | | |
|---|---|---|---|---|---|
| | 10 | 10–50 | 51–100 | 101–500 | 500 |
| [0,120] ............................................ | 0.52 | 0.35 | 0.33 | 0.13 | 0.10 |
| (120,400] ........................................ | 0.27 | 0.38 | 0.11 | 0.35 | 0.20 |
| (400,660] ........................................ | 0.22 | 0.15 | 0.33 | 0.26 | 0.25 |
| (660,930] ........................................ | 0.00 | 0.12 | 0.22 | 0.26 | 0.45 |

Source: author's work based on data collected in Feb-March 2020.

**Table 5.** Conditional probability table for the willingness to pay for a treatment series node

| | Salary (in PLN) | WTP Treatment | WTP Subscription | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | [0,120] | (120,400] | (400,660] | (660,930] |
| Difficult Receive = N Freq NFZ = <=1 | <2000 | [0,60] | 1.00 | | 1.00 | |
| | | (60,80] | 0.00 | | 0.00 | |
| | | (80,200] | 0.00 | | 0.00 | |
| | | (200,600] | 0.00 | | 0.00 | |
| | 2000–3000 | [0,60] | 0.00 | | 0.00 | |
| | | (60,80] | 0.50 | | 1.00 | |
| | | (80,200] | 0.50 | | 0.00 | |
| | | (200,600] | 0.00 | | 0.00 | |
| | >4000 | [0,60] | 0.00 | 1.00 | 0.00 | 0.00 |
| | | (60,80] | 0.00 | 0.00 | 0.00 | 0.00 |
| | | (80,200] | 0.50 | 0.00 | 1.00 | 1.00 |
| | | (200,600] | 0.50 | 0.00 | 0.00 | 0.00 |
| Difficult Receive = N Freq NFZ = 2-5 | <2000 | [0,60] | 1.00 | 1.00 | | 1.00 |
| | | (60,80] | 0.00 | 0.00 | | 0.00 |
| | | (80,200] | 0.00 | 0.00 | | 0.00 |
| | | (200,600] | 0.00 | 0.00 | | 0.00 |
| | 2000–3000 | [0,60] | | 1.00 | 1.00 | |
| | | (60,80] | | 0.00 | 0.00 | |
| | | (80,200] | | 0.00 | 0.00 | |
| | | (200,600] | | 0.00 | 0.00 | |
| | >4000 | [0,60] | 0.00 | 0.80 | 0.00 | |
| | | (60,80] | 0.50 | 0.00 | 0.50 | |
| | | (80,200] | 0.50 | 0.20 | 0.00 | |
| | | (200,600] | 0.00 | 0.00 | 0.50 | |
| Difficult Receive = N Freq NFZ = >=5 | <2000 | [0,60] | 1.00 | | 1.00 | 1.00 |
| | | (60,80] | 0.00 | | 0.00 | 0.00 |
| | | (80,200] | 0.00 | | 0.00 | 0.00 |
| | | (200,600] | 0.00 | | 0.00 | 0.00 |
| | 2000–3000 | [0,60] | 1.00 | 1.00 | | |
| | | (60,80] | 0.00 | 0.00 | | |
| | | (80,200] | 0.00 | 0.00 | | |
| | | (200,600] | 0.00 | 0.00 | | |
| | 3000–4000 | [0,60] | | | 1.00 | |
| | | (60,80] | | | 0.00 | |
| | | (80,200] | | | 0.00 | |
| | | (200,600] | | | 0.00 | |
| | >4000 | [0,60] | 1.00 | 0.50 | 0.00 | |
| | | (60,80] | 0.00 | 0.00 | 1.00 | |
| | | (80,200] | 0.00 | 0.50 | 0.00 | |
| | | (200,600] | 0.00 | 0.00 | 0.00 | |

**Table 5.** Conditional probability table for the willingness to pay for a treatment series node (cont.)

| | Salary (in PLN) | WTP Treatment | WTP Subscription | | | |
|---|---|---|---|---|---|---|
| | | | [0,120] | (120,400] | (400,660] | (660,930] |
| Difficult Receive = Y Freq NFZ = <=1 | <2000 | [0,60] | | | 0.00 | |
| | | (60,80] | | | 0.00 | |
| | | (80,200] | | | 1.00 | |
| | | (200,600] | | | 0.00 | |
| | 2000–3000 | [0,60] | | | 0.00 | |
| | | (60,80] | | | 0.00 | |
| | | (80,200] | | | 1.00 | |
| | | (200,600] | | | 0.00 | |
| | 3000–4000 | [0,60] | 0.00 | 0.25 | 0.00 | |
| | | (60,80] | 0.00 | 0.00 | 0.00 | |
| | | (80,200] | 1.00 | 0.00 | 1.00 | |
| | | (200,600] | 0.00 | 0.75 | 0.00 | |
| | >4000 | [0,60] | 0.00 | 0.00 | 0.00 | 0.00 |
| | | (60,80] | 0.00 | 0.00 | 0.50 | 0.43 |
| | | (80,200] | 0.00 | 1.00 | 0.00 | 0.14 |
| | | (200,600] | 1.00 | 0.00 | 0.50 | 0.43 |
| Difficult Receive = Y Freq NFZ = 2–5 | <2000 | [0,60] | 0.00 | 0.50 | 0.00 | 0.00 |
| | | (60,80] | 0.00 | 0.00 | 0.00 | 1.00 |
| | | (80,200] | 1.00 | 0.50 | 1.00 | 0.00 |
| | | (200,600] | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2000–3000 | [0,60] | 0.00 | 0.67 | 0.00 | 0.00 |
| | | (60,80] | 0.00 | 0.00 | 0.00 | 0.00 |
| | | (80,200] | 1.00 | 0.33 | 0.00 | 0.00 |
| | | (200,600] | 0.00 | 0.00 | 1.00 | 1.00 |
| | 3000–4000 | [0,60] | 0.00 | | | 0.00 |
| | | (60,80] | 0.00 | | | 0.00 |
| | | (80,200] | 1.00 | | | 0.00 |
| | | (200,600] | 0.00 | | | 1.00 |
| | >4000 | [0,60] | 0.00 | 0.33 | 0.00 | 0.00 |
| | | (60,80] | 0.17 | 0.00 | 0.00 | 0.80 |
| | | (80,200] | 0.33 | 0.33 | 0.00 | 0.20 |
| | | (200,600] | 0.50 | 0.33 | 1.00 | 0.00 |
| Difficult Receive = Y Freq NFZ = >=5 | 2000–3000 | [0,60] | 0.00 | | 1.00 | |
| | | (60,80] | 1.00 | | 0.00 | |
| | | (80,200] | 0.00 | | 0.00 | |
| | | (200,600] | 0.00 | | 0.00 | |
| | 3000–4000 | [0,60] | | | | 1.00 |
| | | (60,80] | | | | 0.00 |
| | | (80,200] | | | | 0.00 |
| | | (200,600] | | | | 0.00 |
| | >4000 | [0,60] | | 1.00 | 0.00 | |
| | | (60,80] | | 0.00 | 1.00 | |
| | | (80,200] | | 0.00 | 0.00 | |
| | | (200,600] | | 0.00 | 0.00 | |

**Table 5.** Conditional probability table for the willingness to pay for a treatment series node
(cont.)

|  | Salary (in PLN) | WTP Treatment | WTP Subscription | | | |
|---|---|---|---|---|---|---|
|  |  |  | [0,120] | (120,400] | (400,660] | (660,930] |
| Difficult Receive = Y Freq NFZ = None | 2000–3000 | [0,60] |  | 0.00 |  |  |
|  |  | (60,80] |  | 0.00 |  |  |
|  |  | (80,200] |  | 1.00 |  |  |
|  |  | (200,600] |  | 0.00 |  |  |
|  | 3000–4000 | [0,60] | 0.00 |  |  | 0.00 |
|  |  | (60,80] | 0.00 |  |  | 0.00 |
|  |  | (80,200] | 0.00 |  |  | 0.00 |
|  |  | (200,600] | 1.00 |  |  | 1.00 |
|  | >4000 | [0,60] | 0.00 | 0.00 | 0.00 | 0.00 |
|  |  | (60,80] | 0.50 | 0.00 | 0.33 | 0.00 |
|  |  | (80,200] | 0.00 | 0.00 | 0.67 | 0.50 |
|  |  | (200,600] | 0.50 | 1.00 | 0.00 | 0.50 |

Source: author's work based on data collected in Feb-March 2020.