

## Viewpoint and Satisfaction of Medical Providers on Introducing E-Appointment System in Primary Health Care

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### Abstract

Scheduling e-appointment systems in primary health care (PHC) are a regular practice in other western countries; however, there is no indication of implementing such a system in R.N. Macedonia and other countries in development. The focus is to investigate the satisfaction of medical providers (MP) in PHC in regards to the current set-up first come–first served (FC-FS) principle, and their viewpoints on implementing e-appointment system at primary care physicians (EASPCP) as a combination of services. Additionally, MP shared their views on the significance of using EASPCP in critical times like the global pandemic with Covid-19. Three hundred and sixty-three (363) MP were surveyed to meet the study's goals. Cross-tabulation between variables to look for any significant correlation was done. To test the correlation and to measure the effect size, Chi-Square and Phi and Cramer's V were used, respectively. The majority of participants were dissatisfied with the FC-FS principle in PHC, and were inclined to implement EASPCP. The participants reacted positively to the system's advantages, such as time-saving, reduce crowding and waiting time, assuring free time slots, and eases patient follow-ups. The main worries were the increased number of no-shows and patient lateness. Furthermore, the participants acknowledge the benefits of an e-appointment system in the battle against the spreading of Covid-19. The participants supported the proposal of introducing EASPCP as a combination of services to the currently established FC-FS principle, however further research is required for real-time usage of such a system in PHC.

**Keywords:** Patient Appointments; eHealth; Primary Healthcare; COVID (Coronavirus Disease)-19 Pandemic; Information Systems; Satisfaction

### Introduction

Making use of scheduled appointments is a regular application for primary care physicians (PCP) in their medical facilities (MF) in UK, and other Western countries [1]. For R.N. Macedonia, the satisfaction level of medical health care (MHC) was rated at 45% in 2019, mainly because of the implementation of e-health system “MojTermin” (My Appointment) used for appointing schedules in secondary health care (SCH) [2]. However, this system does not have an e-appointment module in

its integration for the primary health care (PHC) that could influence the population's level of satisfaction [3].

Very few studies were done on the daily impact, satisfaction, and requirements for PCP in this country. A study by Akintomide et al. [4] shows that waiting rooms in MF are becoming crowded with patients in health centers for ultrasound, which contributes to the decreasing satisfaction both patients and physicians. They suggest dividing appointments in 30-minute intervals, which would reduce crowding, and wait-time, hence improving quality of service (QoS) from the physicians at the MF. Although this recommendation is for radiology, it shows how much an electronic appointment system for patients (EASP) is contributing to the overall satisfaction of health care. As a comparison, in a report by Arak and Wójcik [5] for this country, by using the e-health system “MožTermin” for SHC in the radiology department the waiting time for patients is reduced from 15 months to no more than seven days.

The PCP in their path to offer better services to their patients are prone to integrating an e-appointment system into their practices [6]. The patients' need to know that their medical physician can follow their schedules and have good communication [7]. This is very important for the national PHC with the present payment module in this country as a pay-for-performance strategy. PCP salary is raised up to 30% yearly for a more significant number of patients appointed to them [2].

EASPCP comes with many reported advantages like: time-saving, assured time slots, reduce crowding, decreasing rates for patients lateness and no-shows due to implementing reminder systems like e-mail, messages, etc. [6]. Furthermore, in today's Covid-19 crisis, and the MF closed to the open public, except for emergencies, an EASPCP would enable online schedules for video patient-physician consultations. In addition, by filling out an online form for the cause of appointment at the PCP, the patient would provide some information on his emergencies, and as such, the PCP could determine an initial diagnosis or detect symptoms for the disease like the Corona virus [8, 9].

There is little, if any, published research studies on the satisfaction in using the current FC-FS principle from the PCP, and their viewpoints on implementing EASPCP in R.N. Macedonia. The focus of this research is to investigate this area.

## Material and Method

### *Environment and Study Population*

This research investigates the satisfaction and viewpoints of MP in PHC, carried out in R.N. Macedonia. The sample of the study includes MP as PCP, and other mid-level medical staff at the MF. To meet the aims of the study, and to be relevant for this country, the following estimated samples need to be considered:

At least 341 number of participants to answer a structured questionnaire as PCP from a population of 2951 registered [10]. The margin of error was set to 5% and the confidence level at 95% [11].

### *Structured Questionnaire*

The online questionnaire that was used in this study was divided into three modules:

1. First module contained the demographic characteristics of the PCP;
2. Second module contained the PCP satisfaction and views on the currently established FC-FS principle;
3. Third module contained the PCP point of view on the idea of introducing an EASPCP, opinion for which patient category would be most preferable, and on the anticipated advantages and disadvantages of the system. Furthermore, this module includes PCP views on how this system would benefit in the struggle against the Corona virus spreading in today's crisis.

The survey for PCP in the country was carried out from 9 August 2020 to 30 August 2020 in period of three weeks. Bearing in mind the global Corona virus epidemic, the PCPs were difficult to contact due to increased workload, closed MF except for emergency cases, and many in home isolation infected from Covid-19.

*Statistical Analysis*

For the statistical analysis of the data, a statistical software IBM SPSS Statistics, version 23.0 for Windows operating system was used. The categorical variables were introduced as frequencies and percentages. To search for any significant correlation on the satisfaction of FC-FS principle and the viewpoints of the PCP on implementing EASPCP, a cross-tabulation between the variables was done. To test the correlation and measure the effect size between these variables, Chi-Square and Phi and Cramer’s V was used, respectively. A P-value<0.05 two-tailed was considered significant. For the null hypothesis it was assumed that the two variables are independent of each other.

**Results**

Two thousand two hundred (2200) e-mail invites for the questionnaire were sent to PCPs, of which 363 responses were gathered in the given period, hence the response rate was estimated at 16%. The number of responses meets and satisfies the estimated sample size above from the presented population, which makes it relevant for this research study. With the number of responses received, the margin of error was estimated at 4.82%.

*Baseline Characteristics of Participants*

Demographic characteristics of the MP sample are presented in Table 1. The majority of the participants of this study were between the age of 51 to 65 years (36.7%). However, the participants that took part in this study were almost equally distributed between age groups. The majority were employed as a general practitioner (GP) (67.5%), 10,5% were dentists, 9.3% were gynecologists, 6.5% registered as pediatrician, and 6.2% falls under other medical professions.

**Table 1.** Demographic characteristics of the MP sample

Characteristics	Sample N	%
Age group (in years)		
19-35	110	30.6
36-50	104	28.9
51-65	132	36.7
Above 66	14	3.9
Gender		
Female	241	67.1
Male	118	32.9
Employment status		
General practitioner (GP)	239	67.5
Dentist	37	10.5
Gynecologist	33	9.3
Pediatrician	23	6.5
Other	22	6.2
Living in		
Urban residence	321	90.2
Rural residence	35	9.8
MF location		
Urban area	309	85.4
Rural area	53	14.6

*MP Satisfaction of the Current FC-FS Principle*

Viewpoint and satisfaction level of the currently established FC-FS principle at the PCP in the MF are presented in Table 2. The majority of the participants of this study reported that the most common reason for visit from their patients is only if needed (40.6%) and 34.7% were with chronic

illness. Only 19.0% of patients were reported to come in for regular examination. 56.1% of the participants agreed that crowding appears in their MF because of the increase number of patients in waiting rooms leading to health risks for other patients in the waiting room.

**Table 2.** MP viewpoints and satisfaction of the current FC-FS principle

MP viewpoints and satisfaction	Sample N	%
Most common reason for patients visits		
Regular examination	69	19.2
Chronic disease	125	34.7
If needed	146	40.6
All of the above	15	4.2
Other	5	1.4
Time of day patients most often visit (24h)		
08-12	255	70.4
13-16	45	12.4
17-20	30	8.3
Full time <sup>1</sup>	13	3.6
Other	19	5.2
Crowding of patients in MF		
Strongly disagree	21	5.8
Disagree	36	9.9
Neither agree nor disagree	102	28.2
Agree	76	21.0
Strongly agree	127	35.1
Health risk at MF in waiting rooms		
Strongly disagree	41	11.3
Disagree	53	14.6
Neither agree nor disagree	91	25.1
Agree	47	13.0
Strongly agree	130	35.9
Exam time (in minutes)		
0-10	67	18.7
10-20	211	58.8
20-30	56	15.6
30-40	20	5.6
Above 40	5	1.4
Satisfaction of the FC-FS principle		
No opinion	40	11.2
Very Dissatisfied	74	20.7
Dissatisfied	67	18.8
Neutral	85	23.8
Satisfied	48	13.4
Very satisfied	43	12.0
Opinion if FC-FS should improve or change		
No opinion	35	9.7
Strongly disagree	25	6.9
Disagree	33	9.1
Neither agree nor disagree	60	16.6
Agree	52	14.4
Strongly agree	157	43.4

<sup>1</sup> Full time = two working shifts for two physicians from 08-14 and 14-20 or two working times for one physician between 08-14 and 14-20

There were fewer GPs who are very dissatisfied and who had no opinion on the subject, more dissatisfied, satisfied, neutral, and very satisfied than expected with the currently established FC-FS principle. Similarly, with other participants with different employment professions in the PHC, there are differences between the actual count and the expected count. The difference between the participant's profession in PHC and the satisfaction level on FC-FS principle is statistically significant ( $X^2=72.04$ ,  $P<0.0001$ ). In this case,  $p<0.05$ , so we'd reject the null hypothesis that asserts the two variables are independent of each other. The data suggests that the variables employment status and the satisfaction level of FC-FS principle are associated with each other, with the effect almost moderate (0.227), i.e. participants profession in PHC is playing some role at how people respond to the question. Same as with MF location ( $X^2=12.71$ ,  $P=0.026$ ), reasons for visits ( $X^2=34.68$ ,  $P=0.022$ ), time of day for visits ( $X^2=32.55$ ,  $P=0.038$ ), crowding at the MF ( $X^2=39.38$ ,  $P=0.006$ ), examination time of the patients ( $X^2=46.59$ ,  $P=0.001$ ), and patients health risk while waiting in the MF for examination ( $X^2=40.97$ ,  $P=0.004$ ) are all statistically significant, however, the effects were weak to moderate (0.189, 0.156, 0.151, 0.166, 0.181, and 0.169 respectively), i.e. all of them are not playing a big role at how people respond to the question. Other variables including age group, gender, current living residence of the participants, etc. did not reveal any significance or effect on the MP satisfaction.

The majority of the participants of this study thought and agreed that the current FC-FS principle should be improved or changed (57.7%). We can see that the participants were prone to improvements and show interests in making changes in the PHC, mainly for their patient's benefits, as well as their own.

There were more participants who strongly agreed that there is often crowding in their MF from patients while waiting to be examined than to be expected, that strongly agree and strongly disagree on changing or improving the current FC-FS principle, fewer that agree, neither agree nor disagree, disagree, and who had no opinion on the subject than to be expected. Similarly, with the other opinions of participants on crowding in their MF, there are differences between the actual count and the expected count. The difference between the opinion that the FC-FS principle needs to be improved or changed and crowding at the MF is statistically significant ( $X^2=69.66$ ,  $P<0.0001$ ). In this case,  $p<0.05$ , so we'd reject the null hypothesis that asserts the two variables are independent of each other. The data suggests that the variables crowding at MF and the opinion that the FC-FS principle needs to be improved or changed are associated with each other. Furthermore, the effect is almost moderate (0.219), i.e. crowding at MF is playing some role at how people respond to the question. Same as with employment status ( $X^2=51.98$ ,  $P<0.0001$ ), time of day visit from patients ( $X^2=37.80$ ,  $P=0.009$ ), and health risk between patients while waiting in the MF, they are statistically significant, however, the effects are weak to moderate (0.192, 0.162, and 0.196 respectively), i.e. all of them are not playing a big role at how people respond to the question. Other variables including age group, gender, MF location, etc. did not reveal any significance or effect on the MP views.

Comparing these two main variables (opinion and satisfaction), there are more participants, who are very dissatisfied and strongly agree on changing or improving the current FC-FS principle, more who strongly disagree, fewer agree, neither agree nor disagree, disagree or had no opinion on the subject than to be expected. Similarly, with the other participant opinions on changing or improving the current system, there are differences between the actual count and the expected count. The difference between the satisfaction and the opinion on changing or improving the current FC-FS principle is statistically significant ( $X^2=120.10$ ,  $P<0.0001$ ). In this case,  $p<0.05$ , so we'd reject the null hypothesis that asserts the two variables are independent of each other. The data suggests that the variables opinion on changing or improving the current system and the satisfaction of the FC-FS principle are associated with each other, and the effect is almost moderate (0.259), i.e. the data indicates that the satisfaction level is playing some role in the need to change or improve the current work principle.

#### *MP Viewpoints on EASPCP*

The opinion of introducing an EASPCP as a combination to the already established FC-FS principle is presented in Table 3. Furthermore, thoughts of the participants on certain possible advantages and disadvantages that might come with the system is presented in Table 4. Additionally, the participants gave their opinion about their concerns on the Corona virus (Covid-19 case) and if this system would provide help in the current battle against the pandemic. Table 3 and 4 show the obtained and categorized responses. The majority of the participants of this study agreed on the idea of introducing EASPCP as an addition to the current FC-FS principle (65.6%).

**Table 3.** MP viewpoints on introducing EASPCP to the current FC-FS principle

MP viewpoints and satisfaction	Sample N	%
Implementation of EASPCP as addition to FC-FS principle		
No opinion	22	6.1
Strongly disagree	32	8.9
Disagree	27	7.5
Neither agree nor disagree	43	11.9
Agree	182	15.0
Strongly agree	360	50.6
Preferred appointment time (24h)		
08-12	194	55.7
12-16	63	18.1
16-20	29	8.3
Full time <sup>1</sup>	38	10.9
Other	24	6.9
Improve results from Table 4 by introducing mix services		
Strongly disagree	48	13.6
Disagree	30	8.5
Neither agree nor disagree	88	24.9
Agree	74	21.0
Strongly agree	113	32.0
Reminder system to improve results for lateness/no-show patients		
Strongly disagree	28	7.9
Disagree	30	8.5
Neither agree nor disagree	66	18.7
Agree	82	23.2
Strongly agree	147	41.6

<sup>1</sup>Full time = two working shifts for two physicians from 08-14 and 14-20 or two working times for one physician between 08-14 and 14-20

*Covid-19 Case*

Majority of the participants of this study agreed that the implementation of EASPCP and using such system is very promising in the pandemic time, as in the moment with Covid-19 pandemic, and would provide additional benefits to the overall health care (81.0%). As addition to the system, most of the participants were inclined towards the idea that the EASPCP system should also provide online scheduling of video consultations with their patients (46.7%). This would enable fast physician-patient communication and give a glimpse of the patients' needs and health problems to which the PCP would react and guide the patient. Hence, providing increased protection against Covid-19 and other easily spreading diseases and thus further decreasing the possibilities of spreading the disease. Furthermore, by receiving initially described problems and the patients cause for making an appointment when filling in the form through EASPCP, the participants agreed that it would further help to determine the urgency for the examination and be prepared for the patient's arrival (61.2%). This would give the physician head start in diagnosing the health problems and especially would help detecting signs of an illness upfront, which is crucial in today's Covid-19 pandemic. In addition to the previous stated problem, the majority of the participants of this study agreed that by using EASPCP it would help them to respond faster and be more efficient, especially in the case of signs

of corona virus (71.5%). Using e-appointment systems shows to be essential in pandemic crisis especially in health care.

**Table 1.** MP viewpoints on possible advantages/disadvantages and help against Covid-19 spread by using EASPCP expressed as number (%)

MP viewpoints	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Advantages					
Time saving	20 (5.7)	32 (9.2)	85 (24.4)	62 (17.8)	149 (42.8)
Reduce crowding	8 (2.3)	30 (8.5)	72 (20.5)	54 (15.3)	188 (53.4)
Improves patient care	14 (4.0)	30 (8.6)	72 (20.6)	56 (16.0)	177 (50.7)
Improves access and organization	14 (4.1)	23 (6.7)	65 (18.9)	58 (16.9)	184 (53.5)
Reduce wait time	9 (2.6)	36 (10.4)	63 (18.1)	53 (15.2)	187 (53.7)
Assured time slot	16 (4.6)	33 (9.5)	73 (21.0)	55 (15.8)	171 (49.1)
Easy for follow-up patients	14 (4.1)	30 (8.7)	58 (16.8)	61 (17.7)	182 (52.8)
Improve PCP services	20 (5.8)	29 (8.4)	59 (17.0)	56 (16.1)	183 (52.7)
Offer easy consultations	11 (3.2)	24 (6.9)	66 (19.0)	57 (16.4)	189 (54.5)
Essential for health care	15 (4.3)	28 (8.1)	56 (16.2)	60 (17.4)	186 (53.9)
Disadvantages					
Flexibility of PCP	55 (15.9)	71 (20.6)	98 (28.4)	55 (15.9)	66 (19.1)
No-shows/Patient lateness	24 (7.0)	44 (12.8)	103 (29.9)	64 (18.6)	110 (31.9)
Covid-19 case					
Help against spreading	15 (4.3)	11 (3.1)	41 (11.6)	62 (17.6)	223 (63.4)
Online video consultations	77 (21.7)	45 (12.7)	67 (18.9)	54 (15.2)	112 (31.5)
Pre-filled form to determine emergency for exam	31 (8.7)	33 (9.3)	74 (20.8)	90 (25.4)	127 (35.8)
Better response rate	23 (6.6)	16 (4.6)	61 (17.4)	64 (18.2)	187 (53.3)

There are more participants than to be expected who strongly agreed on changing or improving the current FC-FS principle that are supporting the idea on introducing EASPC as a mix of services, additionally there were fewer that agree, neither agree nor disagree, disagree, strongly disagree, and had no opinion on the subject than to be expected. Similarly, with the other participants' views on changing or improving FC-FS principle, there are differences between the actual count and the expected count. The difference in supporting the idea of introducing EASPC to the current FC-FS principle between MP viewpoint on improving FC-FS is statistically significant ( $X^2=90.58$ ,  $P<0.0001$ ). In this case,  $p<0.05$ , so we'd reject the null hypothesis that asserts the two variables are independent of each other. The data suggests that the variables MP viewpoint on improving FC-FS principle and opinion of introducing EASPC as a mix of systems are associated with each other. Furthermore, the effect is almost moderate (0.224), i.e. MP viewpoint on FC-FS is playing some role in how they respond to the question. Same as with crowding at MF ( $X^2=37.27$ ,  $P=0.011$ ), and health risk ( $X^2=57.75$ ,  $P<0.0001$ ), both are statistically significant. However, the effects are weak to moderate (0.161, and 0.200 respectively), i.e. both do not play a big role in how people respond to the question. Other variables, including age group, gender, employment status, etc. did not reveal any significance or effect on the MP views.

## Discussion

The results of the survey show that the majority of the participants are not satisfied with the current FC-FS principle leading to search for improvements and changes in patient management in PHC system (Table 2). Furthermore, the data from the analysis indicates that the main reasons for wanting to change or improve the currently established FC-FS principle are crowding from patients at the MF, and the health risks from exposing patients in close contacts between themselves while waiting for examination by the PCP as presented in Table 2. These results correspond to other research studies [5, 7, 12].

The information acquired from the survey indicates that the participants strongly approve on the idea of introducing EASPC as a mix of services as shown in Table 3. By doing this, the physicians would be satisfied the needs of patients who are prone to using online services and those who want to use the FC-FS principle.

The participants of this study agreed on many advantages (Table 4) that establishing the EASPCP system as a combination of services to the FC-FS principle would provide, like saving time, reduce waiting time, crowding, and health risk for patients, improve patient care, access and organization, improve PCP services to offer easy consultation schedules, etc. [9, 13, 14]. Additionally, they recognize some disadvantages (Table 4) of the system like no-shows and patient lateness, however, they neither agree nor disagree on reducing their work flexibility as confirmed in [14]. For example, according to Zhao et al. [14], as of 2014 in Scotland, 67% of the GPs that have their own websites only 10% are using online scheduling system. The slow adapting is due to several issues like: abandoning their old way of administrating the patients, the strict rules of appointments hindering their flexibility, recognizing real emergency cases, and fear of no-shows and patient lateness.

Because of the currently established first come – first served (FC-FS) work practice at the PCP, an adjustment needs to be provided in order to include EASPCP as an addition to the services. A popular approach to this is to overbook patients in the case of FC-FS patients in specific periods; however, this approach only supplements if the rate of no-shows in the day is higher [15]. A second approach includes splitting time for FC-FS and for appointments. As reported in [15], no-shows appear more in the mornings compared to the FC-FS in the afternoon, hence, proposing for the PCP to divide their work practice into preferred schedules for the patients and FC-FS practice. This kind of work practice should be defined individually by the PCP and the patients' preferences [16].

In regards of the current Covid-19 crisis, the majority of participants were in favor of implementing e-appointment scheduling system for PHC, as it would help fight against the virus spreading, reducing patient contacts to a minimum or making it non-existent while in the MF (Table 4). As MF are open for emergency cases only, detecting the need for examination from the patients beforehand would be crucial and it would improve the physicians response rates [8, 9].

Introducing EASPCP in other countries proved to bring advantages for MP [1]. The appointment principle and its effectiveness have shown to have an effect on the MP satisfaction level [17]. In addition, the time spent on waiting and check-ups are good measures that influence QoS for the PHC [18]. Hence, by implementing the option of schedules and appointments for PCP to the population, it will contribute in raising the overall satisfaction of the entire health care system [13]. EASPC would enable advantages to the administration and organization of work processes. As presented in [19], from 11 health centers in Florianópolis, state of Santa Catarina, by introducing a scheduling model the system had beneficial results and enhances the QoS of PHC according to the users.

However, we acknowledge that the data in this research may not be relevant for the whole population since PHC belongs under the Ministry of Health. A flexible way in implementing and integrating EASPCP to PHC should be provided, and it must have adequate finance and support either by the Government and the health care authorities, or the private sector. Lastly, further research is needed to test the functionality of EASPC and study the satisfaction of patients after the system's implementation to the MF, and how it will influence the overall healthcare quality.

## Conclusions

By introducing an EASPCP and other patient-oriented functionalities could reduce waiting time, crowding, health risks, and increase satisfaction for patients. This would contribute to a more organized work schedule and safe working environment for both MP and the patients. There are certain advantages and disadvantages to the system. In addition, from the provided analytical data, we can see that web-based scheduling system improves timely accessed slots to PHC compared to the currently established FC-FS principle. Furthermore, EASPCP would lower the health risk of patients and reduce spreading of diseases, especially in the current pandemic crisis with the Corona virus. These discovered results need to be put under serious consideration, because they can contribute to further improvements to the overall healthcare in R.N. Macedonia and other similar



developing countries. This study concludes that MP are prone on the implementation of scheduling e-appointment system in PHC in R.N. Macedonia.

**Supplementary Materials:** The used survey is available online.

#### **List of abbreviations**

PHC – Primary Health Care  
MP – Medical Providers  
FC-FS – First Come – First Served  
EASPCP – Electronic Appointment System for Primary Care  
PCP – Primary Care Physician  
MF – Medical Facility  
MHC – Medical Health Care  
SHC – Secondary Health Care  
QoS – Quality of Service  
EASP – Electronic Appointment Systems for Patients  
GP – General Practitioner

#### **Conflict of Interest**

The authors declare that they have no conflict of interest.

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