

# OPD Capacity in the 21st Century: A Review of the Factors that Increase Patient Waiting Time

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## Abstract

The OPD is the first point of call for patients in the hospital and requires operating at optimum capacity to ensure the smooth running of the hospital to maintain a good image to the public. Patients as individuals who are already discomforted either physically, mentally or socially require spending the shortest possible time in the hospital. The healthcare delivery system in the 21<sup>st</sup> century has undergone several changes due to the adoption of technology geared towards improving services. The OPD is no exception where technology has been adopted to reduce long queues. Despite the technology, several other contributions make up the OPD such as hospital staff working at the OPD, the patients and tailor-made protocols peculiar to hospitals. An increase in the waiting time subsequently reduces patients' satisfaction and therefore probing the factors that cause it is vital to providing quick and quality healthcare services. Therefore, the goal of this study is to investigate and elaborate on the factors that contribute to the increase in patient waiting time at the OPD. Current studies fail to focus on the several factors that contribute to the increase in waiting times but instead provide solutions that address one or a few factors. Our review, therefore, provided several solutions after identifying that staffing, demand, OPD Billing, the type of hospital, OPD layout and communication were among the several factors that increase patient waiting time in the OPD in the 21<sup>st</sup> century.

**Keywords:** OPD capacity; patient waiting time; OPD queue; patient flow; outpatient management.

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## **1.Introduction**

Maintaining a balance in the supply and demand of the healthcare system is paramount to providing robust services to patients [1]. Queues in the hospital usually arise when demand exceeds supply [2]. The Outpatient Department (OPD) which serves as an initial service point projecting the image of a hospital is likely to develop queues and hence required to run at optimum capacity bearing in mind that patients are in discomfort and require to be attended to quickly [3,4]. Wait time summarizes how long a patient waits to consult with medical personnel or avail of medical services [5,6,7,8,9]. It is therefore beneficial to reduce patient waiting time in the OPD to ensure the welfare of patients [10]. Also, ensuring that patient wait time to the barest minimum is a major concern for hospital administrators [7]. This is so because having long queues in the hospital may reflect operational deficiencies [10]. Therefore waiting time is a great indicator of the strength of a hospital's management and coordination [4,10]. Operational brilliance and service quality in large hospitals can be indicated by how efficient patient flow in the OPD is [11]. Also, patients judge the competence of healthcare professionals based on the waiting time [12]. When there is a smooth flow of patients in the hospital, there is the absence of overcrowding and mishaps which when present could result in delays in receiving services [2]. Similarly, the World Health Organization (WHO) described waiting time as a key indicator for measuring how responsive a hospital system is [13]. The majority of the profit generated throughout the hospital is obtained from the OPD because of huge investments in technology and therefore maintaining patient satisfaction is critical [2,14]. In several hospitals, it is impossible to increase the number of service counters at the OPD as a result of limited space and therefore technology has been adopted to eliminate certain procedures in the quest to reduce waiting time [15]. On the contrary, irrespective of the technology adopted in the OPD, a significant number of patients still stay in long queues to receive medical services [16].

About up to 10% of patients leave the OPD without receiving any service either from the physician or diagnostic units due to lengthy wait times [17]. Patients leaving may be attributed to them perceiving long queues as a hindrance to receiving services [12]. Patient dissatisfaction is very likely to set in when the wait time increases, and this may affect the profits generated by the hospital [13,18]. In light of this, unnecessary activities can be eliminated in the OPD to enable the cut down of costs to retain profits [15].

### *Significance of This Paper*

A hospital is a place where patients seek remedies for their ailments and therefore, are required to operate at a capacity and a speed such that patients are attended to quickly [1,6,16]. The OPD is therefore a significant portion of the hospital which plays a crucial role in patient throughput [13,17]. The number of patients it can accommodate and its layout contribute significantly to the flow of work around the entire hospital and subsequently the patient waiting time [2,7,19,20, 21]. As much as there is a desire to drastically reduce nosocomial infection, especially in this era of COVID-19, it is an extremely difficult task to perform and therefore patients are required to spend the shortest possible time in the hospital [22,23,24]. Also, because the OPD contributes greatly to projecting a good image of the hospital as it is the first point of call for patients, reducing the time spent at the OPD is paramount to increasing patient satisfaction [10,12]. Healthcare providers, therefore, need to constantly progress their services to fit in the competitive health market [9]. Therefore, the purpose of this paper is to investigate the factors that

contribute to patients spending a long time in the OPD by exploring relevant literature to recommend solutions that may significantly reduce the patient wait time.

## **2.Methodology**

This review of relevant literature was conducted on [pubmed.ncbi.nlm.nih.gov](http://pubmed.ncbi.nlm.nih.gov) and [scholar.google.com](http://scholar.google.com). Since the focus of this paper was on the 21<sup>st</sup> century, literature published between the years 2000-2022 was first filtered. The following keywords were used: OPD capacity, patient waiting time, OPD queue, patient flow and outpatient management. Papers that focused on OPD capacity and patient wait time were selected based on the following inclusion and inclusion criteria.

### **Inclusion criteria**

- Free full-text papers published in the English language.
- Papers with the objective to reduce long queues or patient queues or wait time.
- Papers that focused on optimizing OPD capacity.

### **Exclusion criteria**

- Papers on patient waiting time and OPD capacity that were published before the year 2000.
- Papers that failed to address reducing queues and long wait times.
- Duplicate publications by authors on the same topic: the most updated publication was selected.

### **Search Results**

A total of 52 papers were found relevant to this study.

## **3.Factors That Increase Patient Waiting Time**

The Institute of Medicine (IOM) suggested that only 10% of patients attending their doctors' appointments should spend over 30 minutes in the OPD [5]. However, findings by several studies suggest that patients collectively spend more than 30 minutes waiting to see medical personnel worldwide [5,19,25,26]. The increase in waiting time cannot be attributed to one factor but several which include the activities surrounding the various stakeholders [10]. Having insufficient medical personnel attending to many patients increases the wait time [25,27]. This highlights staffing deficiency leading to patients spending more time at the OPD subsequently leading to spending less time with the physician who may be in a hurry to satisfy a large number of patients [25]. Long waiting times, especially in developing countries can be attributed to a low physician-patient ratio [5]. This can be attributed to decades of increasing population coupled with a shortage of medical personnel [5]. Some hospitals lack professional medical personnel and workers, therefore, affecting their competency to attend to the patient quickly [28]. Aside from having a shortage of staff, some medical personnel and hospital staff arrive late to work contributing to long waiting times [25,27,29].

Patient demand determines the length of the waiting period [2,28,30,31]. Long waiting times arise when available resources in the hospital don't match the demands of patients [13,14]

. This can be attributed to when the logistics department of a hospital fails to match the increasing demand of patients by supplying the necessary resources [24]. The absence of capacity planning especially in public hospitals results in less OPD capacity as opposed to demand [32]. There is an argument that capacity not meeting demand may be temporary as a result of seasonal changes in the number of patients availing of services, especially from hospitals that do not require appointments [14]. Similarly, hospitals without a stringent appointment policy based on their available capacity will eventually end up having long waiting times [33]. Due to medical personnel having different specialities, the workload is likely to be skewed and therefore large hospitals without a well-planned appointment system will end up having long queues [34]. 24-hour OPD for emergency departments that lack the capacity to meet the demands of patients compromises the quality of care rendered to patients [35].

Several facilities have inefficient systems of booking patients for an appointment such as the use of notebooks and diaries [13]. The absence of a systematic time scheduling technique in this method results in overbooking patients which tend to exceed the OPD capacity [36]. Overbooking not only increases patient waiting time but also results in overtime for medical personnel and OPD staff [37]. Although several facilities use overbooking to counter no-shows, there is a suggestion that overbooking shouldn't be encouraged because it augments operation deficiencies and destabilizes daily work schedules [38]. Hospitals which still use the conventional way of billing where physical cash is taken and receipts are issued tend to have long waiting times and even longer waiting times when the cash collection points are very few [3]. Also, several medical facilities lacked modern and sophisticated information technology equipment resulting in a long registration process for patients [28].

Patients spend the majority of the entire length of time they spend in the OPD at the cash collection point before making it to the consulting room or other departments [39]. Also, the cashiers and record keepers were least qualified and therefore worked with suboptimal speed [26]. Also, patients who accessed medical care using insurance experienced an even much longer waiting time as compared to those paying with cash [40,41]. To further explain, the reason why patients with health insurance spend a long time is because of the rigorous documentation checks they have to go through [41].

Hospitals that serve as teaching hospitals tend to have long waiting times because medical personnel use cases of patients as demonstrations for the students [42]. A study conducted in selected teaching hospitals in Tehran showed long waiting times, especially in emergency departments where critical decisions had to be taken concerning investigative tests, admittance to the wards and paperwork [29]. Also, findings of a study conducted in 14 teaching hospitals in Kuwait showed that a majority of patients permitted the presence of students during their physician consultations as well as consented to them reading their files. This increases the time spent with a single patient where doctors have to explain conditions to students, subsequently delaying those in the OPD [43]. In addition, waiting time increases because several doctors in teaching hospitals that up additional roles such as lecturing students in classrooms and serving as research supervisors [27].

The flow of activities and patients is controlled by the hospital layout and this is a contributing factor to waiting

time[44]. Findings of a study conducted in 2021, found a significant association between service layout and waiting time where it was concluded that an effective layout could reduce waiting time to 30 minutes and below [45]. Also, patient waiting time increases because patients normally have to travel through complex OPDs to avail of all services contributing to their treatment and this, therefore, calls for periodic evaluation of hospital layout designs when planning for capacity [30]. Since the OPD plays a crucial role in the entire treatment process, well-laid-down measures should be put in place to tackle its complexity, especially concerning organizational layout and administrative setup [28].

Poor communication between patients and medical personnel is an important factor that contributes to long waiting times that are often overlooked [46]. Poor communication arises as a result of a language barrier between the patient and medical personnel where the medical personnel spend a significant amount of time explaining procedures [46]. In addition, poor communication between staff and patients on treatment options and estimated waiting time tend to cause angry patients who have waited for a long time to leave without being attended to [47]. Therefore, there is an ideal waiting time required that should be sufficient enough to permit medical personnel and hospital staff to communicate with patients [33].

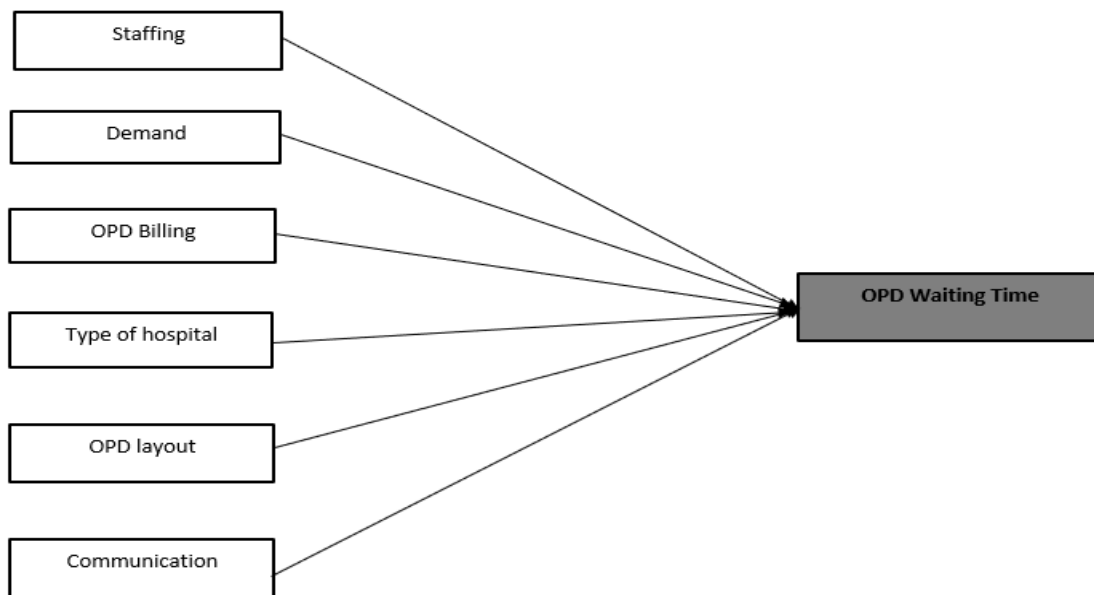
**Table 1:** Highlights on factors that increase patient waiting time

Highlight	Source
<p><b>1.</b></p> <p><b>staffing</b></p> <ul style="list-style-type: none"> <li>➤ Insufficient medical personnel.</li> <li>➤ Staffing deficiency at the OPD.</li> <li>➤ Low-physician-patient ratio.</li> <li>➤ Lack of professional medical personnel and hospital staff.</li> <li>➤ Some medical personnel and hospital staff arrive late to work.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Belayneh and his colleagues 2017 [26]; Motloba et al., 2018 [27]</li> <li>➤ Anderson and his colleagues 2007 [25]</li> <li>➤ Damu and Oche, 2013 [5]</li> <li>➤ Ajbhoj, 2022 [28]</li> <li>➤ Anderson and his colleagues 2007 [25]; Motloba and his colleagues 2018 [27]; Hemmati and his colleagues, 2018 [29]</li> </ul>

Highlight	Source
<p><b>2.</b> <b>emand</b></p> <ul style="list-style-type: none"> <li>➤ patient demand at any point in time determines the length of the waiting period.</li> <li>➤ available resources do not match demand.</li> <li>➤ the logistics department fails to supply resources to match demand.</li> <li>➤ lack of stringent appointment policies.</li> <li>➤ hospitals running a 24-hour OPD without the capacity.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Onyesolu, 2016 [2]; Sun and his colleagues 2017 [13]; ; Rajbhoj, 2022 [28], Munavalli et al., 2022 [30]; Pathirana &amp; De Silva, 2022 [31]; A. Ikwunne &amp; O. Ho, 2014 [34]</li> <li>➤ Sun and his colleagues 2017 [13]</li> <li>➤ Peiffer-Smadja and his colleagues 2020 [24]</li> <li>➤ Sæther and his colleagues 2020 [33] ; Ho, 2014 [34]</li> <li>➤ Habidin and his colleagues 2015 [35]</li> </ul>
<p><b>3.</b> <b>PD Billing</b></p> <ul style="list-style-type: none"> <li>➤ long queues at cash collection points.</li> <li>➤ least qualified cashiers and record keepers work at sub-optimal speed.</li> <li>➤ patients using health insurance spend more time due to verification.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Mohebbifa and his colleagues 2014 [39]</li> <li>➤ Belayneh and his colleagues 2017 [26]</li> <li>➤ Al-Hanawi and his colleagues 2018 [40]; Dalinjong &amp; Laar, 2012 [41]</li> </ul>
<p><b>4.</b> <b>eaching Hospitals</b></p> <ul style="list-style-type: none"> <li>➤ patients are used as models to teach students hence others have to wait.</li> <li>➤ dual role of doctors – teaching students and treating patients.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Chen and his colleagues 2019 [42]</li> <li>➤ Motloba and his colleagues 2018 [27]</li> </ul>
<p><b>5.</b> <b>ayout</b></p>	

Highlight	Source
<ul style="list-style-type: none"> <li>➤ PD layout determines the flow of patients.</li> <li>➤ deficient OPD layout increases patient waiting time.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Ishijima and his colleagues., 2015 [44]</li> </ul>
<p><b>6. Communication</b></p> <ul style="list-style-type: none"> <li>➤ Poor communication between patients and hospital staff.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Sæther and his colleagues 2020 [33]; Levin, 2006 [46]</li> </ul>

**Source:** *Developed from the reviewed literature*



**Figure 1:** Factors that affect OPD waiting time

From Figure 1 and Table 1 above, it can be inferred that the average time a patient will spend at the OPD is determined by the quantity and competency of staff, the patient demand at any point in time, the OPD billing process, the type of hospital, the layout of the OPD and the quality of communication between staff and patients.

#### 4. Discussion And Recommendations

Long waiting times for patients especially in the OPD when uncontrolled may lead to a marred relationship between healthcare providers and patients and even aggravate the condition of patients. The several factors which

collectively contribute to the long waiting time spent by patients require probing to generate tangible recommendations necessary to curb the long waiting time in the OPD.

Human resources are critical in delivering quality healthcare and therefore having a shortage of them is detrimental to the health delivery system. The findings of a study conducted in two hospitals in Ethiopia showed that an average of 12 physicians consulted with 420 patients in a day in one hospital while the other hospital had 280 patients attended to by 8 doctors [26]. Also, findings of a study conducted in a tertiary hospital in Northern Nigeria showed that 148 patients were attended to by only 9 hospital staff including doctors, nurses and clerks [5]. 25% of respondents in a study conducted in the United States of America (USA) waited for more than 30 minutes to consult a doctor for 11% of the respondents spent less than 5 minutes with a doctor [25]. The findings from the various studies discussed above are consistent with the findings of this study which indicates that the long waiting time of patients in the OPD could be attributed to insufficient medical personnel attending to patients leading to a low-physician-patient ratio. This staffing deficiency calls for the recruitment, maintenance and retention of doctors and other hospital workers should be prioritized especially in hospitals with high patient throughput [2,26].

The findings of this study indicated that the demand of patients at every point in time coupled with the availability of resources could influence the length of time spent at the OPD. According to findings of a study conducted in the North West of Ethiopia, patients confide in hospitals to supply them with timely care by meeting their demands [26]. The resource requirements that come along with demand require an optimal capacity geared towards curbing waiting time [13]. The rise in demand calls for restructuring departments to reduce waiting time by inculcating stringent resource distribution policies [30]. Also to decrease patient demand, Haukeland University Hospital, Norway in their study decreased the number of patients from 2796 to 1789 by increasing the capacity by simulation [33]. They, therefore, recommended that to shorten waiting time, demand should be brought below capacity. The findings of this study also indicated that the logistics department fails to supply enough resources to match the demand available which in turn increases the patient waiting time. Similarly, the findings of a study conducted in Indonesia stated that capacity controls the entire operations that go on in the hospital and therefore recommended capacity planning and control of operations to tackle the level of demand [32].

Another finding of this study indicated that the lack of stringent appointment policies in hospitals especially with hospitals running a 24-hour OPD without the capacity increases the patient waiting time in the OPD. Similarly, Several patients have to wait for numerous days and weeks to receive an appointment slot with a doctor [14]. Therefore a study conducted in Singapore on “Improving waiting time and operational clinic flow in a tertiary diabetes center” recommended that to match demand with supply, appointments should be synchronized with demand where empty patient slots are given to patients who seek urgent care. This makes patients the happiest when hospitals have a robust appointment scheduling system [12]. It is therefore imperative to ensure that each day in the hospital has appointments that are evenly booked throughout the day [36]. Manually booking patients in the OPD with notebooks over the years has been problematic and hence technology over the years has introduced an easy and understandable process that enables the booking of patients without overlapping appointment slots [13]. According to the findings of a study titled, “Improving Wait Times and Patient Satisfaction in Primary Care”, having a more accessible appointment system is key to preventing patient turnover. The



recommendation of a study conducted in “Colombo North Teaching Hospital (CNTH)” therefore suggested that patients should be allowed to pre-book appointment slots before they visit the OPD to offset some waiting time [49]. A study conducted in two hospitals in the North West of Ethiopia suggested the training of medical personnel and other hospital staff on mechanisms for assigning appointment slots to patients using information technology to prioritize those who need urgent care [5].

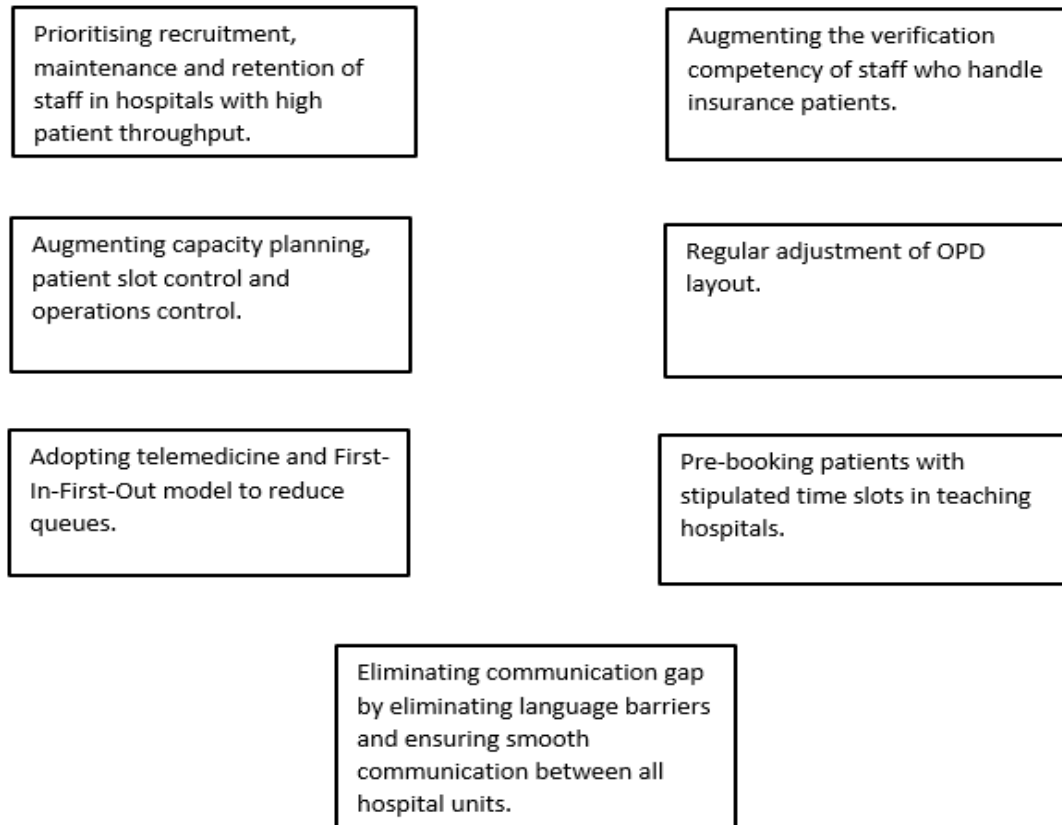
One finding this study pointed out is that the long queues at cash collection points increase the waiting time of patients in the OPD. Consistent with the findings of this study, a study conducted in the OPD of a pharmacy in Nigeria, found out that cash collection after billing the patients contributes significantly to long patient waiting times [3]. Similarly, according to the findings of a study conducted in a tertiary diabetes center, also, there was usually a long waiting line in the mornings and afternoons at the cash collection point. Consistently, a study conducted in an orthopaedic clinic in Iran revealed that patients spent an average of 65 minutes at the collection point [39]. The findings of another study conducted in Iran which was also consistent with the findings of this study showed that patients could spend as much as 23.53 minutes at the cash collection point which is too long a time to spend at the OPD [48]. Also consistent with the findings of this study, a study conducted at Lagos University Teaching showed that patients could spend as much as 19.2 minutes at the cash collection point which is also considered too long a time to spend just on payment of hospital bills [8]. To address long waiting times at the cash collection points, a study conducted in the North West of Iran recommended that models such as telemedicine which would normally take monetary transactions online and First-In-First-Out models should be applied to strategically reduce queues at the cash collection point [39]. A study conducted on the OPD of two hospitals in Ethiopia also recommended that job specifications for cashiers should be raised high to employ highly skilled individuals who would work faster and with competence [26]. Similarly, a study conducted in two districts of Ghana recommended employing highly skilled staff to handle patients using insurance both within the hospital and the offices of the insurance companies to ensure swift verification and documentation to curb long waiting times at cash collection points [41].

The findings of this study indicated that patients are being used as models to teach and the dual role of doctors serving also as teachers in teaching hospitals contributes to a pool of patients waiting at the OPD. Consistently, a study conducted in a dental hospital in Pune, India stated that teaching hospitals across the globe are challenged with providing timely and quality care to their patients at the same time providing quality education to students [28]. Coincidentally, a study conducted in Sri Lanka and Iran recommended that OPDs in teaching hospitals should introduce a system where patients pre-book slots before arriving at the hospital to offset some waiting time [39,49]. A study conducted in a dental hospital in South Africa again recommended teaching hospital managers to adopt a process whereby operations in every ramification in the hospital are efficient while simultaneously ensuring that patients are occupied with activities such as health talks and short documentaries on health while they wait at the OPD to offset patient satisfaction [27]. A study conducted on selected teaching hospitals in Tehran also recommended that teaching hospitals are capable of attending to patients within the shortest possible time by augmenting service availability and distributing medical personnel across various wards based on their demands at every point in time [29].

Another finding of this study indicated that the layout of the OPD contributes to the time patients spend in the

OPD and hence a deficient OPD layout increases patient waiting time. Consistent with the findings of this study, a study conducted in the OPD of dr. Iskak General Hospital Tulungagung recommended that arranging the layout of the OPD efficiently contributes greatly to reducing waiting time [45]. A study conducted in Northern Tanzania therefore recommended that constantly adjusting the layout by throwing out outdated files and properly labelling shelves can significantly improve patient waiting time in the OPD [44]. Similarly, a study titled “Dynamic Layout Design Optimization to Improve Patient Flow in Outpatient Clinics Using Genetic Algorithms” also stated that constantly redesigning the layout due to fluctuations in patient demand with the help of a mathematical model and algorithm will help curb waiting time [30]. A study conducted in a rural district hospital in KwaZulu-Natal also recommended arranging the layout such that patients can move freely from one service point to another within the shortest possible time in a sequential manner [50]. Similarly, a study conducted in the OPD of Fortis Escorts Hospital Jaipur (FEHJ) in Jaipur, India recommended that arranging hospital operations such that items needed at a particular service point are within reach with an adequate amount of workers who are supervised by managers to ensure a smooth flow of patients [10].

Last but not least, per the findings of this study, poor communication between patients and hospital staff may lead to an increase in patient waiting time, especially in the OPD. Consistently, a study conducted on the OPD of Kopanong Hospital pointed out that communication in the hospital is influenced by the behaviours of hospital workers and patients [51]. A study conducted in a South African pediatric teaching hospital recommended bridging the communication barrier by using translators otherwise medical personnel should take up lessons in other commonly used languages to enable them to communicate with patients who do not speak their native languages [46]. A study conducted on capacity planning in a hospital in Iran recommended that since communication plays an important role in the capacity planning of a hospital, communication flow should be continuous between all units to address issues immediately they arise [52]. Also, a study conducted in a tertiary diabetes center in Singapore believed that communication is essential in ensuring the smooth flow of patients between consultation rooms and other service centres [34]. Therefore, the study recommended the use of communication sheets that will enable patients to access several services in a day and navigate easily without miscommunication [34].



**Figure 2:** Recommended measures to reduce patient waiting time in the OPD

Several measures to reduce patient waiting time were generated from the recommendations provided by the authors whose works were reviewed in this literature review. Figure 2 above highlights these seven measures which include solutions to staffing deficiencies and competencies, demand and operations loopholes, coordination problems between units, patient scheduling deficiencies, deficient OPD layout and communication barriers.

This study has several limitations. One of the limitations is the selection bias whereby the exclusion of studies relevant to this study may have been ignored based on the interpretation of the researchers. Secondly, the search was restricted to papers published after the year 2000 and those published in English only therefore some relevant studies may have been conducted before the year 2000 and in other languages that were ignored. Finally, the papers included in this study were selected from only two sources which are [pubmed.ncbi.nlm.nih.gov](http://pubmed.ncbi.nlm.nih.gov) and [scholar.google.com](http://scholar.google.com) and therefore relevant papers from other databases which could have influenced the conclusion of this study were ignored.

## 5. Conclusion

This paper highlights the various factors that contribute to the increase in patient waiting time concerning OPD capacity. The factors include insufficient medical personnel and hospital staff, patient demand, ineffective appointment system, inefficient cash collection system, imbalance between educating students and providing

quality healthcare to patients in teaching hospitals, complex and unplanned OPD layout and communication barriers. Hospitals or medical centres may experience all these major factors or some of them. Either way, it is imperative to address these factors to curb patient waiting time to ensure timely healthcare delivery.

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There are no competing conflicts of interest either financially or personally that could have influenced the outcome of this paper.

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