



DOES PROXIMITY TO TREATMENT CENTRE AFFECT ADHERENCE AMONG CANCER PATIENTS?: CASE OF CHILDREN ACCESSING CANCER CARE AT PRINCESS MARINA HOSPITAL

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Abstract: Background: Botswana, which is size of Kenya, Texas or France, has only one pediatric hematology-oncology (PHO) programme currently running out of Princess Marina Hospital (PMH) in the capital of Gaborone. Some patients may have to travel 1000 km or more for medical appointments. The standard mode of transport to the treatment centre is by road. Children with solid tumor malignancy or lymphoma may require monthly visits over six to eight months. Children with leukaemia may require more frequent visits in the first year and monthly for two to three years. While several factors may affect treatment adherence, this investigation focused on the association between the patients' primary residence distances to PMH.

Methods: Scheduled PHO clinic visits at PMH for two months (March to April 2020) were assessed. A list of appointments and the patient sign-in sheets were used to determine patients who attended or missed clinic appointments. The analysis focused on adherence to with scheduled clinic appointments by patients staying closer (<80km, primarily considered the commutable distance) and further away (>80km) from PMH. Only patients who came before or on the day of the appointment were counted as having good adherence. Late arrivals on the other hand would be patients who reported for their visits after the scheduled appointment. A chi-square test was performed to examine the association between proximity to the facility and on-time attendance to appointments.

Results: The analysis focused on compliance with scheduled clinic appointments by patients staying closer (<80km, primarily considered the commutable distance) and further away (>80km) from PMH. Only patients who came before or on the day of the appointment were counted as having good adherence. A chi-square test was performed to examine the association between proximity to the facility and on-time attendance to appointments. Results indicated significant differences across Accuracy groups for Appointments with $F(2, 1239) = 11.446, p < .001$. Findings revealed significant mean differences between each group and the other two groups. That is, there is no association between distance and treatment adherence.

Conclusion: Whilst adherence to PHO clinic visits at PMH has many factors affecting compliance, further distance from PMH barely appears to be associated with an increased risk of presenting after the scheduled date. However, with nearly a quarter of patients presenting later than their scheduled date, further research is necessary to understand all factors contributing to non-compliance with scheduled PHO clinic reviews. Information gathered would inform the program in the future to identify informed and sustainable strategies

to improve patient's adherence to clinic appointments and timely receipt of treatment and monitoring, which are essential for positive cancer outcomes.

Index Terms – Proximity, Pediatric Cancer

I. INTRODUCTION

This paper seeks to investigate whether the distance between the patient's residence and the treatment centre affects treatment adherence among pediatric oncology patients receiving care and treatment at Princess Marina Hospital in Gaborone, Botswana. Medication adherence is the extent to which patients take their prescribed medications as recommended by their health care provider (1). Adherence has also been defined as the ability and willingness to abide by a prescribed therapeutic regimen (2). The World Health Organization (3) defines treatment adherence as "the extent to which a person's behaviour—taking medication, following a diet and executing lifestyle changes, corresponds with an agreed recommendation from a health care provider". Optimal adherence is a patient taking their medication exactly as prescribed, at the exact time, dosage, and for the recommended length of time (4). This study defines treatment adherence by honoring clinic appointments by pediatric oncology patients receiving cancer care and treatment at Princess Marina Hospital. Currently, Pediatric oncology and hematology services are only provided at Princess Marina Hospital, located in the capital city of Botswana. Good adherence was achieved if patients reported before and on their scheduled appointment date, while poor adherence was noted among patients who reported after their scheduled clinic appointment. Poor treatment adherence may lead to disease relapse (5), rendering treatment non-responsive and ineffective (6, 7).

Several factors influence medication adherence problem (8, 9). Such factors may range from patient behaviour, disease, type of treatment, the health system, and social and economic circumstances (8,9,10). Due to its multi-factorial nature, optimising treatment adherence for chronic illnesses such as cancer requires complex, multi-component intervention strategies (12). Treatment adherence is an essential component in ensuring the best outcomes in the management of pediatric cancers (12). Most researchers have associated adherence with a wide range of factors such as knowledge of medication, timely prescription filling, exact dosage, accurate doses, the appropriate drug sequence, correct length of therapy and on-time attendance for follow-up appointments. The objective of our review was to examine whether the distance between one's residence influences treatment adherence among pediatric oncology patients receiving care at PMH. The ultimate aim of any prescribed treatment plan is to achieve specific desired outcomes for the patients concerned. These desired outcomes are part and parcel of the objectives in managing diseases or conditions. However, despite all the best intentions and efforts on the part of the healthcare professionals, those outcomes might not be achievable if the patients are non-compliant. If the patients do not follow or adhere to the treatment plans faithfully, the intended beneficial effects of even the most carefully and scientifically based treatment plan will not be realised. Treatment adherence is required to realise optimal outcomes such as cures or improvement in quality.

Abbreviations and Acronyms

PMH – Princess Marina Hospital

HCW - Health Care Workers

PHO – Pediatric Hematology and Oncology

Global HOPE – Global Hematology Oncology Pediatric Excellence

BPOD – Botswana Pediatric Oncology Database

IRB – Institutional Review Board

MSN – Master Service Note

MRI – Magnetic Resonate Imaging

USS – Ultra Sound Scan

CT – Computerized Tomography

PPC – Pediatric Palliative Care

II. SETTING

This study was conducted at the Princess Marina Hospital (PMH), a government hospital in Gaborone, Botswana. PMH is the largest referral hospital in Botswana, with over 500 inpatient beds. Since 2007, services for children with cancer have been provided at Princess Marina Hospital (PMH) through a partnership between the Botswana Ministry of Health and Wellness (MOHW), Baylor College of Medicine, Texas Children's Hospital, Baylor International Pediatric AIDS Initiative, Botswana-Baylor Children's Clinical Centre of Excellence and the Global Hematology-Oncology Pediatric Excellence (HOPE) initiative. PMH is the only site for children with cancer services provided by Botswana Baylor Children's Centre of Excellence through the Global HOPE Botswana program.

III. METHODS

This is a prospective cohort study of 1 year scheduled hospital visits by pediatric hematology and oncology patients. We assessed scheduled patients' PHO clinic visits at PMH for March 2020 to April 2021. A list of appointments was extracted from the google calendar. All clinic appointments are recorded in the google calendar by clinicians as they discharge patients from time to time.

Population and sample

All pediatric cancer patients, starting in 2007, that present to the pediatric hematology-oncology (PHO) program at PMH are enrolled in the Botswana Pediatric Oncology Database (BPOD). The BPOD contains patient demographics, diagnostic, chemotherapy (including cumulative doxorubicin dose) and outcome information. Four Institutional Review Boards provided approval to establish and sustain this database, namely, the Botswana Ministry of Health-Health Research and Development Division HPDME (13/18/1 IX (189), Princess Marina Hospital [PMH 5/79 (170)], University of Botswana (URB/IRB/1527) and Baylor College of Medicine (H-33816). The BPOD's IRB approvals go only up to age 20 years.

Data and Sources of Data

All clinic appointments falling within the study period (March 2020 to April 2021) were included in the list. The list of clinic appointments and visits were obtained from the Master Service Note (MSN). The MSN is a record of care and treatment notes and plans for all patients seen by the PHO clinicians. The MSN allows for an easy access and flow of patient information between clinicians as they rotate for services. Type of appointment and place of residence were obtained from the BPOD database.

IV. RESULTS AND DISCUSSION

Results

The Statistical Package for Social Sciences (SPSS) was used to determine the frequency and standard deviation of the quantitative analysis. The collected data were evaluated, organised, and processed to address the objectives. Descriptive statistics were used on demographics and study variables. Graphical representation was used on demographics and study variables. Independent samples t-test was used to check the gender differences on appointment and how distance affects treatment adherence. One way Anova was applied was to check the difference in Accuracy.

	Distance	N	Mean	Std. Deviation	Std. Error Mean
PMH	less than 80km	924	1.92	1.489	.049
	greater than 80km	320	1.48	.853	.048

Table 1: Distribution of patients by distance from treatment centre

The table above shows that 924/1244 (74.3%) clinic visits were recorded from patients 80km and less from Gaborone while patients residing more than 80 kms from Gaborone accounted for 320/1244 (25.7%) by patients residing more than 80km from Gaborone. Independent samples T-test was done to examine visits performed by patients residing 80km and within and those residing more than 80km from PMH. The Independent Samples t-Test analyses the means of two independent groups (Distance) to evaluate whether there is statistical evidence that the associated population means are significantly different. The above table shows a 80km mean score of 1.92 with a Standard deviation of 1.489 for appointments performed by patients residing less than 80km from PMH and mean score of 1.48 with a Standard deviation of .853 mean differences .437 for patients residing more than 80km from PMH, with $df = (1238)$, $t = (4.976)$ and significant value .000 which is less than 0.05. It confirms that more clinic appointments were observed among patients residing 80km and less from PMH. Patients less than 80 km are more likely to visit the PMH than those more significant than 80 km. While data indicates that more appointments were performed by patients residing closer to PMH, this does not necessarily translate into good adherence as defined in this research. For the purpose of this research is defined by timely (before or on appointment date) reporting for scheduled clinic appointments. A detailed analysis was performed within groups to determine timely clinic appointment honoring.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	780	62.9	62.9	62.9
	Female	460	37.1	37.1	100.0
	Total	1244	100.0	100.0	

Table 2: Gender distribution of participants

A total of 197 (F87; M197) pediatric patients accounted for 1244 clinic appointments at PMH between March 2020 to April 2021. Of the total of 1244 clinic appointments, male patients accounted for 780, while 460 clinic appointments were by female patients. The distribution of 1244 appointments indicates that male patients accounted for 780 (62.9%) while females performed 460 (37.1%) visits.

The table below shows appointment distribution across the service offered to PHO patients who visited PMH between the period March 2020 and April 2021.

	Frequency	Percent	Valid Percent	Cumulative Percent
Review	677	54.6	54.6	54.6
Chemo	411	33.1	33.1	87.7
MRI	49	4.0	4.0	91.7
USS	19	1.5	1.5	93.2
CT scan	23	1.9	1.9	95.1
FBC	29	2.3	2.3	97.4
Radiation/X-rays	24	1.9	1.9	99.4
PPC	8	.6	.6	100.0
Total	1244	100.0	100.0	

Table 3: Distribution and type of appointments

Out of a total of 1244, 677 (54.6%) were review appointments, 411(33.1%) were for chemotherapy administration, 49 (4.0%) for Magnetic Resonate Imaging (MRI) appointments, 19 (1.5%) for Ultrasound Scan (USS) appointments, 23 (1.9%) for computerized tomography (CT) scan appointments, 29 (2.3%) for Full Blood Count (FBC) appointments, 24 (1.9%) for Radiation/X-rays appointments and 8 (.6) for Pediatric Palliative Care (PPC) appointments.

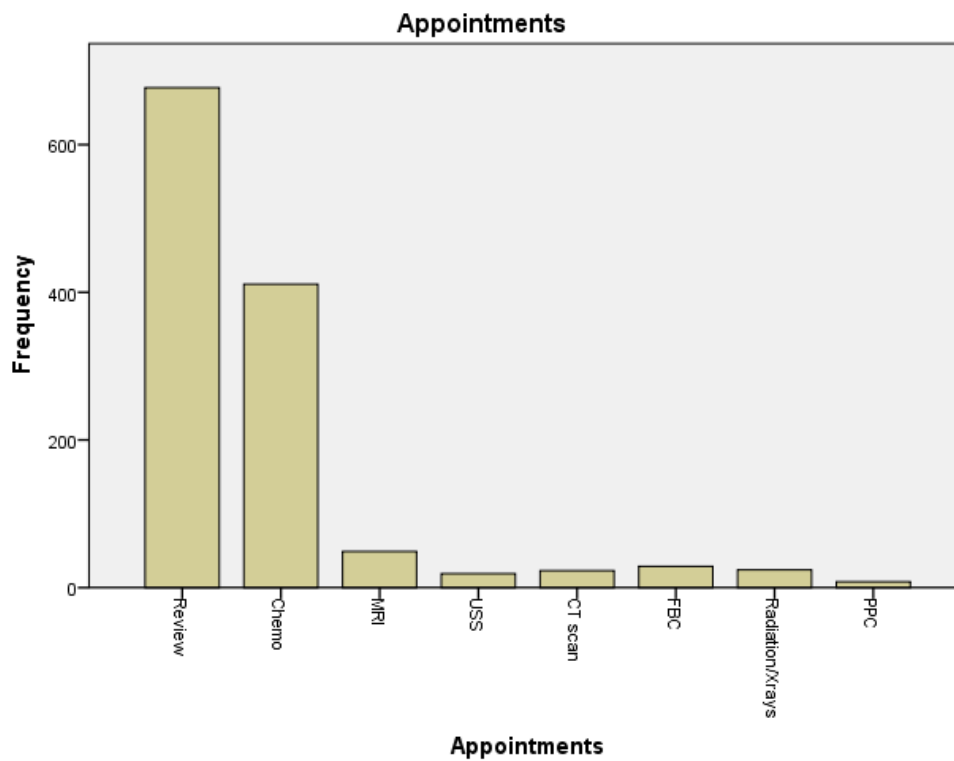


Figure 1 – Graph showing distribution of clinic appointments in relation to type of appointment

The above figure bar graph can be defined as a graphical representation of Appointment data in the form of frequencies.

Distance and honoring clinic appointments

A chi-square analysis was performed to examine appointments within patients residing 80km and less from PMH and determine the same between the patients residing 80km and beyond.

		Distance		Total
		Less than 80 km	Greater than 80km	
Accuracy	On appointment Date	440	240	680
	Before	24	15	39
	After	460	65	525
Total		924	320	1244

Table 4: Accuracy Distance Cross tabulation

This table shows timeliness of honoring clinic appointments between patients residing 80km or less and those residing more than 80 kms from Gaborone. 1244 clinic visits were performed over twelve months, between March 2020 and April 202. 680/1244 (54.7%) patients came on the appointment date. 39/1244 (3.1%) patients before the appointment date and 525/1244 (42.2%) patients after the appointment. It means that 719/1244 (57.8%) patients reported on or before the clinic appointment date, while 525/1244 (42.2%) were late for their clinic appointment dates.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
On appointment Date	997	1.90	1.461	.046	1.81	1.99	1	8
Before	141	1.42	.785	.066	1.29	1.55	1	5
After	102	1.46	.779	.077	1.31	1.61	1	7
Total	1244	1.81	1.367	.039	1.73	1.89	1	8

Table 5: Timeliness on clinic appointment – Mean, Std deviation, Std Error & Confidence Interval

The data above shows 997 patients come on appointment date. 141 patients before appointment date and 102 patients came after appointment date. The data also shows the mean, standard deviation, and F values for Appointments.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42.077	2	21.039	11.446	.000
Within Groups	2273.625	1237	1.838		
Total	2315.702	1239			

Table 6: Timeliness on clinic appointment between groups and within groups

Results indicated significant differences across Accuracy groups for Appointments with $F(2, 1239) = 11.446, p < .001$. Findings revealed that significant mean differences between each group and the other two groups.

Discussions

Botswana – Geography

Botswana is a landlocked country in southern Africa surrounded by Namibia in the west and northwest, Zambia and Zimbabwe in the north and northeast, and the Republic of South Africa on its remaining borders. A map of the country is shown in Figure 3. The country has a relatively large area of 582,000 km²; however, the Kgalagadi desert constitutes 75 percent of the land mass and is largely uninhabitable. Botswana is the physical size of Texas or France. Botswana is one of the most sparsely populated countries in the world (<https://worldpopulationreview.com/countries/botswana-population>). The Kalahari Desert covers seventy percent of the country. South Africa borders it to the south and southeast, Namibia to the

west and north, and Zimbabwe to the northeast. Botswana is divided into ten administrative districts plus two cities and five towns. Sixteen local authorities administer these (district councils, city councils or town councils). Most people live in settlements along a north-south axis in the country's east, adjacent to the desert (13). The recently completed population census puts Botswana's population at 2,346,179 people, with a highly concentrated in the eastern part of the country (14). About 11.6% of the population lives in Gaborone's capital and largest city. Formerly one of the world's poorest countries—with a GDP per capita of about US\$70 per year in the late 1960s—it has since transformed itself into an upper-middle-income country with one of the world's fastest-growing economies.



Figure2- Botswana Administrative Districts

Treatment adherence among pediatric oncology patients

Caregivers have the primary responsibility and authority to make healthcare decisions for children under their care (15). Therefore, it may mean that children largely depend on their caregivers to take them to their clinic visits. It is also true that even older children who may be able to go solo still need caregivers to provide the needed resources such as travel money to visit the medical centres. It brings much complexity to treatment adherence for this population! Treatment adherence among cancer patients is estimated at 21%, which is significantly high (16). Non-adherence in the paediatric oncology population is even higher (12). A review of studies has identified that treatment adherence rates range from 11 – 93% among children and 40 – 60% among pediatric and adolescent patients with cancer (17). For example, rates of non-adherence in paediatric acute lymphoblastic leukaemia patients have been reported to range between 2% and 60% (12). Non-compliance to treatment in the pediatric oncological population has been associated with reduced treatment efficacy and increased risk of relapse (12).

Treatment adherence among pediatric cancer can be affected by several factors, including age, demographic, type and stage of disease, mode and complexity of drug administration and treatment regime. It is in line with the assertion by WHO (3), which also sees adherence as a multi-dimensional phenomenon influenced by patient-related factors, therapy-related factors, condition-related factors, health system factors and social-economic factors. Because of this, this paper seeks to investigate whether the distance between the treatment centre and place of residence affects treatment adherence among pediatric oncology patients receiving care and treatment at PMH.

Patients with cancer experience a wide range of psychological, social, economic, and family barriers in pursuing required medical care and treatment (18). The burden of travel from a patient's residence to their health care provider can be a possible addition to these barriers influencing access to diagnosis and treatment services for cancer needs. Cancer patients have to visit care and treatment centres repeatedly for cancer diagnosis and treatment on an outpatient or an inpatient basis (16). This complexity makes distance an essential issue that the patient with cancer must manage during the disease journey (19).

The Pediatric Hematology and Oncology program at Princess Marina Hospital, the only centre offering cancer care for children, serves patients from all corners of the country. Patients travel from all parts of the country, some weekly, bi-weekly and monthly, to receive care and treatment. Such services include diagnostics, chemo administration, imaging, and treatment monitoring. A review of patient treatment plans for pediatric oncology patients receiving cancer care treatment at PMH was performed. The review provides information on the various treatment regimes, frequency and duration and the total number of chemotherapy administration cycles. The table below contains the information;

Diagnosis	Monthly treatment structure (i.e. days in the month that require chemo, including pre-or post-hydration)	Total # of months (cycles)
Retinoblastoma	Days 1-4	6
Non-Hodgkins lymphoma	Days 1-3	6-8
Hodgkins lymphoma	Days 1-3 Day 8	6-8
Medulloblastoma	Days 1-3 Day 8 Days 21-23	12
Wilms tumour	Once a week for ten weeks Then every three weeks x 5	Total treatment lasts 25 weeks (longer if it needs radiation)
Acute lymphoblastic leukaemia	Variable, but usually hospitalised for the first three months, then hospitalised most of the next four months with small breaks at home (4-7 days). Once in the maintenance phase, the patient only comes once a month for outpatient reviews/chemo.	Treatment lasts about three years
Carcinomas	Days 1-5 every 3 weeks	3
Sarcomas (Ewings)	Alternating cycles: Odd cycles (1,3,etc): Days 1-3, day 8, day 15 Even cycles (2,4,etc) : Days 1-4	14
Osteosarcoma	Alternating cycles : Odd cycles: Days 1-4 Even cycles: Days 1-3	12
Neuroblastoma	Every cycle varies, minimum 2-day stay, maximum five days	Usually 8
Rhabdomyosarcoma	Weekly With every 3 rd -week requiring admission x 3 days	40 weeks

Table 7: Treatment Regimens / Frequency for Various Pediatric Oncology Diagnoses at Princess Marina Hospital

Source: Anecdotal notes from Global HOPE Paediatrician

Association between distance to the treatment centre and treatment adherence

The Government of Botswana has a well-defined health referrals system in line with its primary health structure (20). The National health care system is organised hierarchically into Mobile stops at the bottom, Health posts, Clinics, Primary Hospitals, District Hospitals, and Referral hospitals at the apex. While the Referral hospitals are located in the two cities of Gaborone (the capital) and Francistown, the district hospitals are located in the headquarters of the 11 districts and town councils (21, 20). Upon being seen at the health post or clinic, and where there is the need for referral, patients are channeled through these levels.

Despite the need for continued care, there are several barriers to clinic attendance, and distance is a case in point (22). Distance in the context of time spent on reaching the next point as a factor of transportation infrastructure and means of transport has not been studied in Botswana. (23) have anticipated that distance from health facilities may pose some challenges for early diagnosis and desired patient management leading to poor treatment outcomes. Treatment abandonment has been identified as a significant cause of treatment failure in low and middle-income countries (24).

Some of the barriers associated with long-distance travel by patients include timing of appointments and duration of the trip, securing companionship, difficulties with navigation, mode and cost of travel, childcare, physical discomfort of lengthy travel, and care coordination challenges (25). Several studies have documented that the travel burden (measured as the travel distance or travel time) can result in delays in diagnosis and can influence the choice of treatment for a variety of common cancers (15).

While data for this study showed that patients residing closer to the treatment centre were more likely to show up for their clinic appointments, the same could not be established when it comes to timeliness (adherence) of honoring clinic appointments! 74.3% of the clinic appointments occurred among patients who reside 80km or less from Gaborone while 25.7% visits were accounted for by patients residing 80km or more from Gaborone. Among patients residing 80km and less from Gaborone 48% of clinic visits were honored on or before the appointment date, while 49.8% came late for their clinic appointments. The difference (1%) between timely honoring of clinic appointments and the quiet among patients who reside closer to the treatment centre is insignificant. It may therefore mean no association between distance and treatment adherence. Among those residing 80km and beyond 255/320 (79.7%) occurred on or before the appointment date, while 65/320 (20.3%) reported being late for their clinic appointment dates. This data further shows that 48% of the patients residing 80km or less were honored on or before the clinic appointment date, while 79.7% of clinic visits occurred among patients residing 80km and beyond Gaborone. From this data, still, there seems to be no correlation between the distance from the treatment centre and the timely honoring of appointments.

The cost of Transport

One of the barriers to healthcare in low and middle-income countries is access to transport to a healthcare facility. Due to the distance between the place of residence to the health facilities, transport has been cited as one of such barriers. Researchers have documented financial distress associated with travel for cancer care. Cancer patients have reported that travel for cancer treatment is inconvenient and adverse. (26) This travel can lead to additional emotional and economic burdens for patients and their families. Some scholars have confirmed this by alluding that the distance between the place of residence and the treatment centre is directly linked to transport challenges (27). Lightfoot N. (2005) Distance from the patient's residence to the care and treatment centre may be viewed as a proxy for costs associated with travelling for cancer treatments (26). It is so because the more extensive the distance, the higher the transport cost. It has also been noted that patients who live further away from the treatment centre spend more time travelling, may incur higher travel expenses, and face more inconveniences that lower their likelihood of receiving chemotherapy (28).

Furthermore, some studies were conducted in the US and UK Revealed that long-distance to health care providers was associated with a later diagnosis stage for breast cancer and a lower likelihood of breast cancer screening and breast-conserving therapy (28). Some researchers have also found that public transport becomes scarce and roads also worsen in other places. Transport is a critical area in health care access, which links home and health facilities (22). Both availability and affordability of transport can be issues delaying access to health care (29). Several studies highlighted that a lack of affordable transportation could negatively impact treatment adherence. This factor featured prominently in patients from developing countries' rural areas, especially those from the lower socioeconomic classes (30). According to (12), a review of some studies identified financial difficulties as critical in contributing to treatment non-adherence among the pediatric oncology population. A study which compared distance and mode of transport found that the cost of transport negatively affected cancer care and the management of other chronic conditions (27). Another study by the University of Texas revealed that patients who cited transportation problems were 1.45 times more likely to delay seeking medical while some abandoned treatment because of transport-related problems (27).

In Botswana, some patients travel long distances from their places to seek medical care at PMH. Some patients, for instance, from the Kgalagadi, Gantsi Ngamiland and Chobe districts, travel well over a thousand kilometres to reach Gaborone, where the services are sought. The government has developed a transport system where ambulances transport referred patients between health facilities. Each health facility determines ambulance movement schedules. The hospital system prioritises maternity patients, especially those experiencing obstetric complications (29). Due to the amount and frequency of travel required by pediatric oncology patients, their needs are often not accommodated.

Many children diagnosed with cancer or blood disorders in Botswana live far away from Gaborone. Their treatment plan may require monthly or weekly travel to Princess Marina Hospital for medications, reviews, and blood tests. Most pediatric oncology patients and their families resort to using public transport and private vehicles to travel to attend clinic appointments. Significant financial strain is therefore placed on families who may already be facing the loss of work, food insecurity, and other challenges. The need to frequent the hospital and the distance escalates the costs, making it difficult for families to travel. It has profound implications for treatment adherence as some patients default or fails to take up treatment per the treatment plan. The Government of Botswana has a network of social workers posted at government clinics and hospitals. Part of the mandate of social workers is to facilitate social welfare support to deserving families by offering transport support. This process requires social workers to perform assessments to determine whether families qualify for assistance. These assessments by social workers may take months to complete; therefore, families may rely on loans from family members and friends to pay for transport to Gaborone.

Travel Time

Travel burden is measured as the travel distance or time that can result in delays in diagnosis (31, 32). While it is essential to acknowledge and factor it in planning cancer care and treatment, The role played by the travel burden in cancer patient management might not be adequately considered (33). Some of the many delayed presentations of disease seen in medical practice in the low-income setting are due to the cost of transportation and the time taken to reach the health facility. This scenario has been noted in one study conducted in Malawi, where people living in rural Malawi are faced with severe challenges due to long distances between their places of residence and the nearest health facility (34). Unfavourable terrains and poor roads in rural areas have not spared the situation! Even where the roads are in a usable condition, the distance from the health facilities, which results in long travel times, has also been shown to influence health-seeking behaviour (35). However, another study in Malawi conducted by (34) noted that people from rural areas spend more time travelling to health facilities and thus limiting patients travelling from outlying areas to access or reach health facilities. Due to the frequency of travel associated with cancer care, patients or caregivers in formal employment may not be able to take time off work for treatment. It may significantly affect the patient's need to travel to access treatment, threatening adherence. Therefore, shorter travel time between residence and healthcare facilities could enhance patient compliance, requiring less travel time (36).

V. CONCLUSION

Whilst adherence to PHO clinic visits at PMH may be affected by many factors, further distance from PMH barely appears to be associated with an increased risk of presenting after the scheduled date. However, with nearly a quarter of patients presenting later than their scheduled date, further research is necessary to understand all factors contributing to non-compliance with scheduled PHO clinic reviews. Information gathered would inform the program in the future to identify informed and sustainable strategies to improve patient's adherence to clinic appointments and timely receipt of treatment and monitoring, which are essential for positive cancer outcomes.

Literature has shown that long-distance travel by pediatric cancer patients is likely to strain patients and families financially and emotionally. Financial difficulties are the most frequently cited factors associated with non-adherence to treatment (12). Because of this, routine supportive care counselling is recommended to reduce the emotional difficulty experienced while travelling for care (26). Travel time may not be ignored as

a direct cost of cancer treatment that the patients and their families usually absorb. As such, the time costs associated with travel are an essential component of the whole economic burden of cancer. Travel can be significant for socioeconomically disadvantaged persons because the time costs associated with care can strain limited resources. Also, lower provider accessibility or transportation barriers can result in longer travel times for socioeconomically disadvantaged families (19.)

VI. ACKNOWLEDGEMENT

Not applicable

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